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Resources and Energy Quarterly

September Quarter 2013

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Foreword

The *Resources and Energy Quarterly* is an important publication from the Bureau of Resources and Energy Economics (BREE). It provides statistical data on the performance of Australia's mineral and energy commodities sectors as well as BREE's analysis of key commodity markets. Previously BREE has provided a five year outlook in the *Resources and Energy Quarterly* released in March of each year with short term updates for the June, September and December quarters. To improve the timeliness of the analysis provided, BREE will now provide a five year outlook in both the March and September quarter editions of the *Resources and Energy Quarterly* while continuing to provide short term updates in the June and December editions.

This release of the *Resources and Energy Quarterly* provides an overview of world macroeconomic issues, analysis of world commodity markets, projections of Australia's commodity exports and statistical data tables on Australia's output and exports of mineral and energy commodities. In addition, there are two review articles on Australia's off-grid electricity market and consumption of refined metals in China.

Australia's mineral and energy export earnings totalled $177 billion in 2012–13, an 8 per cent decrease from 2011–12. While the volume exported increased for most commodities, moderating prices as a result of increasing world supply resulted in lower export revenues for Australian producers. Over the period 2013–14 to 2017–18, BREE projects that Australian export revenues will grow at an annual average rate of 11 per cent to total $294 billion in 2017–18. Growth in export revenue will be driven by two main factors: substantial growth in bulk commodity export volumes, particularly for LNG and iron ore; and a lower Australian dollar exchange rate.

Uncertainty in the world macroeconomy over sovereign debt management, rising domestic production costs and industry productivity are key factors that could affect the growth in Australia's exports over the medium term. While many macroeconomic risks are beyond the control of any one country, policy decisions in Australia will have an increasingly important role in supporting growth in its resources and energy sectors.

Bruce Wilson
Executive Director
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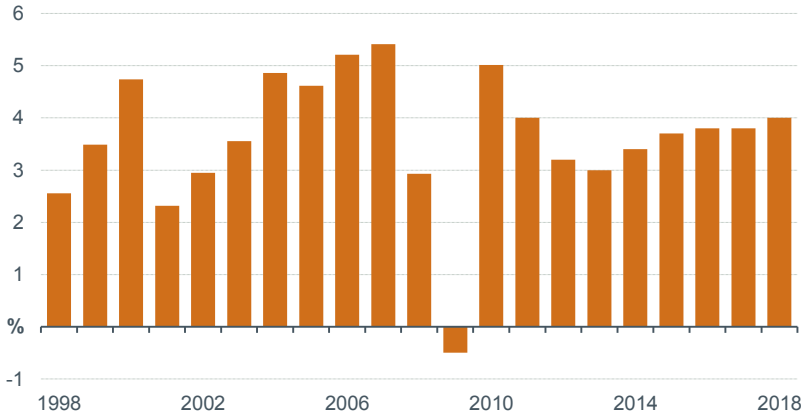
Macroeconomic outlook

The global economy

For the past few years global economic growth, although declining, has been supported by robust activity in emerging 'BRIC' economies (Brazil, Russia, India and China) as well as other nations in South-east Asia, South America and the Middle East. This growth in emerging economies offset low and, in some cases, negative growth rates in advanced OECD economies. However, in 2013 this pattern has begun to shift with recovering growth rates in OECD economies and declining growth rates among emerging economies. There are signs that the euro zone is moving out of recession and that economic activity in the US and Japan has increased in response to expansionary monetary policies and stimulus measures. By comparison, growth rates have moderated in key emerging economies over the past two quarters along with significant fluctuations in their exchange rates, bond yields and equity markets.

The world economy is forecast to grow by 3 per cent in 2013, the lowest level since the global financial crisis in 2009 and 0.2 percentage points lower than 2012 (see Table 1). Growth in advanced economies in 2013 is forecast to be slightly higher than in 2012 at 1.5 per cent as a result of improving economic conditions in the euro zone which is showing signs of recovery after a prolonged recession. Growth in emerging economies is forecast to moderate to 4.8 per cent in 2013, mainly due to expected lower growth in China, ASEAN economies and Russia.

Figure 1: World economic growth



Sources: IMF; BREE.

Table 1: Key macroeconomic assumptions for the world

	unit	2011	2012	2013 a	2014 a	2015 a	2016 a	2017 a	2018 a
Economic growth bc									
OECD	%	1.6	1.2	1.5	2.1	2.4	2.4	2.6	2.6
United States	%	1.8	2.2	2.1	2.4	3.0	3.0	3.0	3.0
Japan	%	– 0.6	2.0	2.0	1.8	1.9	2.0	2.0	2.0
EU 27	%	1.4	– 0.6	0.2	0.9	1.5	1.6	1.7	1.7
Germany	%	3.1	0.9	1.1	1.5	1.8	2.0	2.0	2.0
France	%	1.7	0.0	0.4	0.9	1.2	1.5	1.8	1.8
United Kingdom	%	0.9	0.2	0.9	1.7	1.8	1.9	2.1	2.1
Korea, Rep. of	%	3.6	2.0	2.8	3.5	3.5	3.5	3.5	3.5
New Zealand	%	1.4	2.5	2.3	2.8	2.4	2.5	2.5	2.5
Developing countries	%	6.4	5.1	4.8	5.0	5.0	5.3	5.3	5.4
Non-OECD Asia	%	8.1	6.6	6.3	6.7	6.8	6.8	7.0	7.2
South East Asia d	%	4.5	6.1	5.8	5.3	5.5	5.6	5.7	5.8
China e	%	9.3	7.8	7.3	7.6	7.2	7.2	7.2	7.5
Chinese Taipei	%	4.2	1.3	2.3	3.0	3.5	3.5	3.5	3.5
Singapore	%	5.2	1.3	2.5	3.5	4.3	4.2	4.1	4.0
India	%	7.7	4.0	4.5	4.2	4.5	5.0	5.0	5.0
Latin America	%	4.6	3.0	2.7	3.1	3.5	3.5	3.5	3.5
Middle East	%	3.9	4.7	3.1	3.7	4.5	4.6	4.7	4.6
World c	%	4.0	3.2	3.0	3.4	3.7	3.8	3.8	4.0
Industrial production b									
OECD	%	– 0.5	1.0	1.2	1.2	1.1	1.1	1.1	1.1
Japan	%	– 0.9	7.1	5.9	5.3	4.5	4.0	4.0	4.0
China	%	9.9	8.8	9.4	9.4	9.3	9.2	9.1	9.1
Inflation rate b									
United States	%	4.3	3.1	2.3	2.3	2.3	2.3	2.3	2.3
Interest rate									
US prime rate g	% pa	3.3	3.3	3.3	3.4	3.5	3.5	3.5	3.5

a **BREE assumption.** b **Change from previous period.** c **Weighted using 2012 purchasing power parity (PPP) valuation of country gross domestic product by IMF.** d **Indonesia, Malaysia, the Philippines, Thailand and Vietnam.** e **Excludes Hong Kong.** g **Commercial bank lending rates to prime borrowers in the United States.**
Sources: **BREE; Australian Bureau of Statistics; International Monetary Fund; Organisation for Economic Cooperation and Development; Reserve Bank of Australia.**

In 2014, growth rates in advanced and emerging economies are assumed to increase to 2.1 per cent and 5 per cent, respectively. This improvement in growth rates will be supported by improving economic stability in the euro zone, continued recovery in the US and a moderate rebound in non-OECD economies in Asia. The tapering, and potential end, of the US Federal Reserve's bond buying program, or Quantitative Easing 3 (QE3), remains the principal downside risk to these assumed growth rates. Although the September meeting of the US Federal Open Markets Committee (FOMC) agreed to maintain the existing rate of bond purchases under QE3, this is still expected to taper during 2014 when there are more robust signals of improving economic growth in the US.

Over the outlook period for this edition of the Resources and Energy Quarterly, world economic growth is assumed to recover to a medium term average annual rate of 3.8 per cent (see Figure 1). This assumed growth rate is predicated on the expectation that the fiscal consolidation in the euro zone is sustainable such that key economies can grow over the medium term without further increases in debt levels, that the recovery in the US continues after the end of QE3 and that China continues with the required reforms to move away from its investment led growth model at a moderate pace.

Outlook for key economies

The US

GDP in the US is forecast to grow by 2.1 per cent in 2013 and then by a further 2.4 per cent in 2014. For the remainder of the outlook period, US GDP growth is assumed to recover to an average annual rate of 3.0 per cent.

Economic data for the first half of 2013 indicates that economic recovery in the US is starting to gain sustainable momentum. US GDP grew at an annualised rate of 2.5 per cent over the June quarter 2013, more than double the rate recorded for the March quarter. The effect of US$85 billion worth of cuts in Government spending (due to the start of the budget sequester from 1 March 2013) has been more than offset by a substantial rise in export values and business investment, as well as growth in the residential construction activity, in the first half of 2013. Two key risks to the US' economic recovery continuing into 2014, and over the medium term, will be further fiscal consolidation to reduce the budget deficit and government debt and the timing of the tapering of QE3.

The US congress is expected to vote on a proposal to extend the debt ceiling that limits the amount of national debt the US Treasury can accumulate by October 2013. As at September 2013, US government debt totalled US$16.7 trillion; without an increase in the debt ceiling, the US Government will be unable to pay its operating expenses and would default on its existing debt obligations. Despite the political tension over the debt and budget deficit, it is expected that the debt ceiling will be raised to avoid damaging market volatility and its de-stabilising effects on the US economic recovery.

In its report, The Budget and Economic Outlook: Fiscal Years 2013 to 2023, the US Congressional Budget Office estimated that the budget sequester would result in GDP growing by around 1.5 percentage points less in the first year alone. The effect on GDP growth so far appears manageable based on positive data for the June quarter 2013, but mounting criticism of falling standards of government services has led President Obama to propose budget measures to reverse many of the spending cuts. There has already been a rapid decline in the budget deficit, which is expected to narrow to less than $1 trillion dollars for the first time in five years, but political divisions remain as to whether spending cuts should now be reversed or if further cuts should be made.

The US Federal Reserve's monthly purchase of US$85 billion of bonds has supported a substantial volume of low interest mortgages and commercial loans that have stimulated a recovery in residential construction activity and business investment the US. The recent releases of positive US economic indicators and announcements from the chairman of the US Federal Reserve after FOMC meetings in July 2013 fuelled market speculation of a tapering of QE3. However, at its September meeting the FOMC announced it would continue the bond purchasing program at the same rate to support 'progress toward maximum employment and price stability'. Although unemployment rates in the US have declined in line with the improvements in economic growth, the FOMC appears committed to achieving a lower rate before it adjusts the bond purchasing rate of QE3.

Based on forecast US economic growth rates, tapering of QE3 is still assumed to occur in 2014. The impact of this is uncertain; business and consumer confidence may have already recovered to the point where 'normal' interest rates are again sustainable resulting in minimal impact on the US economy. However, expected higher interest rates after the end of the period of cheap money present the risk of de-stabilising the current recovery in residential construction and business investment in the US. As investment in residential construction accounted for around one fifth of GDP growth in the June quarter of 2013, any reductions in activity, as well as flow on effects, are a risk to sustaining the economy's recovery.

Speculation over the tapering of QE3 has already had observable effects in international financial markets. Over the past four months the US dollar has appreciated against most currencies and particularly those of emerging economies as well as the Australian dollar. Bond markets have also begun pricing in a return to higher interest rates with 10-year US Treasury bond yields doubling in the past four months. For emerging economies this has resulted in a substantial decrease in purchases of their bonds and somewhat large capital outflows. The FOMC announcement to continue QE3 purchases at the same rate may result in some short term relief in international financial markets, but more destabilising speculation is likely if more positive economic data from the US supports the tapering of QE3 in 2014.

China

In 2013 China's GDP growth rate is forecast to moderate to 7.3 per cent, 0.4 percentage points lower than in 2012 (7.8 per cent). There is less potential for GDP growth in China to experience a 'hard landing' in 2013 following Premier Li Keqiang's announcement that growth below 7 per cent was unacceptable and renewed commitment to capital expenditure as a means of supporting declining GDP growth rates. While this will support GDP in the short term, it may signal possible delays to some of the reform measures considered necessary for the Chinese economy.

China's GDP growth is assumed to recover slightly to 7.6 per cent in 2014, again supported primarily by capital expenditure. Residential construction activity is expected to pick up in the second half of 2013 as an upswing in housing sales in early 2013, prior to tighter credit controls being implemented, has yet to materialise into growth in housing starts. This indicates construction activity will rise during the second half of 2013 and continue into 2014. As inflation remains within Government targets there is potential for interest rate reductions as a means of stimulating additional residential construction activity if GDP growth slows again.

In addition to residential construction, infrastructure investment is expected to pick up following a raft of expenditure announcements on rail and energy plans that together could be construed as a subtle fiscal stimulus package. While not directly labelled as a stimulus package, the Airborne Pollution and Prevention and Control Action Plan announced in September came with around US$270 billion of funding to be spent over the next five years.

The impact of these 'mini stimulus' packages are not expected to support additional GDP growth over the medium term. Although the timing is highly uncertain, higher debt levels, while still manageable, and policies targeting financial sector reforms are expected to eventually restrict growth in private sector investment. Capital expenditure over the period is not projected to decline as there is still considerable investment required to bring China's capital stock per person up to levels comparable with OECD economies. However, it is expected that capital expenditure growth rates will moderate over the medium term as financial market reforms take effect thereby reducing government support for unprofitable enterprises. Over the outlook period, China's GDP growth rate is assumed to decline to 7.2 per cent after 2014 and return to higher growth rates from 2018 as a recovery in exports to advanced OECD economies and an eventual upswing in domestic consumption start to take effect.

The EU

For the European Union (EU), GDP is forecast to grow at 0.2 per cent in 2013, 0.8 percentage points higher than 2012. Economic indicators for countries in the EU have shown signs of an economic recovery in the second quarter of 2013. According to Eurostat, GDP in the EU grew 0.4 per cent in the June quarter of 2013, a recovery from –0.1 per cent in the March quarter. This growth in GDP was supported by 0.2 per cent growth in final consumption expenditure, a 0.4 per cent increase in capital expenditure and exports rising 1.7 per cent during the period.

These positive results have pushed the region, as a whole, out of recession for the first time in six quarters. Nevertheless, several key economies still remain trapped in a quagmire of high sovereign debt levels and austerity measures that limit the potential for a sustained rebound across the region. Slow implementation of economic reforms is expected to limit the prospect of sustainable recovery in these economies which will continue to weigh down the economic performance of the region as a whole. In 2014, EU GDP is assumed to grow by 0.9 per cent, supported by improving growth in Germany and the UK as well as more modest growth in France. The effects of austerity measures and unemployment are expected to limit growth in other key economies, such as Italy and Spain, which are still at risk of further economic contractions.

Over the outlook period, EU GDP growth is assumed to recover to 1.7 per cent in 2018, based on the expectation that fiscal reforms continue across the region. Exports from the EU are expected to pick up in line with an improvement in the world economy; however uncertainty over the management of internal challenges, particularly debt and fiscal policy, is assumed to moderate the prospects for higher economic growth over the next five years.

Japan and South Korea

Japan's GDP is forecast to grow 2 per cent in 2013, underpinned by expansionary monetary policy that is targeting a doubling of the Japan's monetary base over the next two years through purchases of Government bonds. These actions have devalued the yen by 20 per cent since November 2012 which, in turn, has supported growth in exports as evidenced by the highest growth rate in export values for three years being recorded in July 2013. Despite the large increase in exports, Japan also recorded its largest monthly trade deficit due, in part, to growing energy import prices.

The low exchange rate and continuing economic growth in China and the US are expected to support further increases in Japan's exports, particularly of automobiles and consumer electronics, in 2014. Growth in GDP is assumed to moderate with the expected rise in the country's consumption tax likely to curb growth in domestic consumption expenditure. Over the outlook period, Japan's economy is assumed to grow at around 2 per cent a year. High debt levels remain a risk to the length of time that the Government can sustain some of its stimulus programs, particularly if continued speculation over the tapering of QE3 results in international markets expecting higher bond yields.

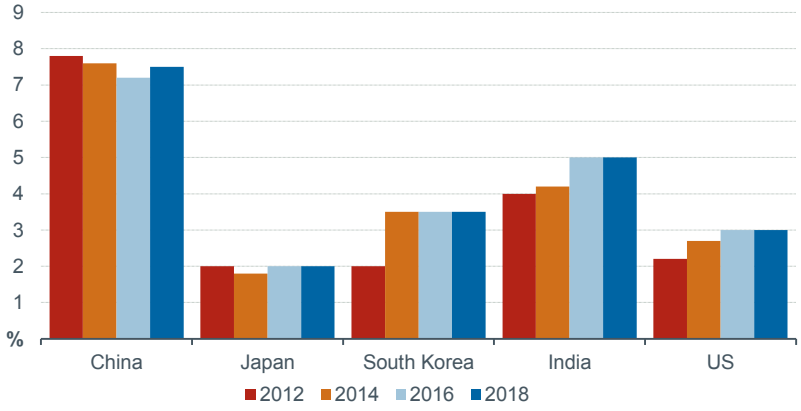
South Korea's economic growth is forecast to rebound to 2.8 per cent in 2013, supported by increasing exports to advanced economies and China. The growth rate is assumed to increase further in 2014 due to growing business investment as well as continued growth in exports. Over the outlook period South Korea will have increasing competition for export markets from China and Japan, the latter mainly due to the lower value of the yen. South Korea's GDP growth is assumed to average 3.5 per cent over the outlook period.

India

India's GDP is forecast to grow 4.5 per cent in 2013. However, high inflation, a rapid depreciation in the Indian rupee and a growing current account deficit present substantial downside risks to this forecast. Speculation over the tapering of the QE3 bond program has hit India particularly hard. The Indian rupee has depreciated by around 14 per cent against the US dollar from June to September 2013 and was accompanied by benchmark 10-year bond yields rising to around 9 per cent. The government initiative to allow 13 state companies to offer bonds with untaxed interest income has acted to limit the rise in bond yields, but the risk of further capital outflows remains if India's economic situation deteriorates.

Data from India's Central Statistics Office for the June quarter 2013 indicates GDP grew at an annualised rate of 4.4 per cent. Lower GDP from mining activities has been one of the principal contributors to the decline with export bans imposed by the Shah commission to prevent illegal mining leading to sizable reductions in export revenues, particularly from iron ore. It is likely that there is a moderate return to minerals exports from affected regions, but this is not expected to support a recovery in GDP growth rates. In 2014, India's GDP growth is assumed to decline to 4.2 per cent but there is the potential for Government stimulus efforts in the lead up to the national election before May 2014. Over the medium term, GDP growth is assumed to rebound to around 5 per cent by 2018 but still remain below pre-GFC levels.

Figure 2: Economic growth in Australia's major resources and energy export markets



Sources: IMF; BREE.

Economic outlook for Australia

Based on Australian Bureau of Statistics data, Australia's GDP grew 0.6 per cent in the June quarter 2013 and 2.6 per cent over the financial year 2012–13. This growth in GDP was below the long term average and 0.3 percentage points lower than in 2011–12. It is assumed that economic growth will rebound slightly in 2013–14 to 2.8 per cent, primarily as a result of low interest rates stimulating housing construction and consumption expenditure. Although the minutes from the Reserve Bank of Australia's (RBA) September board meeting indicate that there is potential for further interest rate cuts, the risk that this may generate unsustainable asset prices in the Australian real estate sector may limit the effectiveness and use of low interest rates to stimulate economic growth over the medium term.

Lower interest rates have yet to translate into increased capital expenditure in Australia which was 2.3 per cent lower, year-on-year, in the June quarter 2013 reflecting the trend of declining non-mining capital expenditure. As noted in BREE's Resources and Energy Major Projects Report – April 2013, capital expenditure in the mining sector is also now likely to have peaked due to a substantial draw back in the rate of high value projects over the past twelve months. While there still remain several very large projects under construction, as these are completed over the next three to four years, there are few projects of equal value scheduled to offset the decline in mining capital expenditure. Over the medium term BREE assumes Australia's GDP growth will moderate to 2.5 per cent from 2014–15. Proposed government spending on infrastructure, increased housing construction and a rise in mineral exports are expected to partially offset the decline in mining capital expenditure.

Table 2: Key macroeconomic assumptions for Australia

		2010	2011	2012	2013	2014	2015	2016	2017
	unit	–11	–12	–13	–14 a	–15 a	–16 a	–17 a	–18 a
Economic growth b	%	**2.3**	**3.6**	**2.6**	**2.8**	**2.5**	**2.5**	**2.5**	**2.5**
Inflation rate b	%	**3.1**	**2.3**	**2.4**	**2.4**	**2.4**	**2.2**	**2.2**	**2.2**
Interest rate d	%	**4.7**	**4.3**	**3.1**	**2.5**	**2.3**	**2.5**	**2.5**	**3.0**
Nominal exchange rates e									
– US$/A$	US$	**0.99**	**1.03**	**1.03**	**0.91**	**0.86**	**0.86**	**0.86**	**0.86**

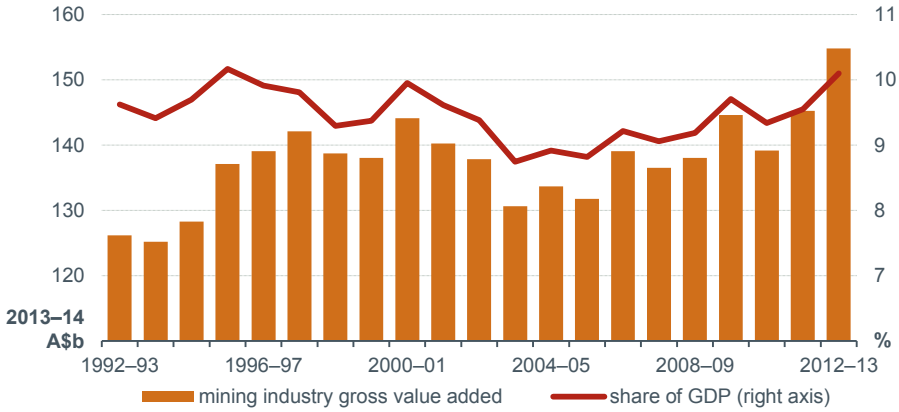
a **BREE assumption.** b **Change from previous period.** c **Seasonally adjusted chain volume measures.** d **RBA cash rate.** e **Average of daily rates.** g **Base: May 1970 = 100.**
Sources: **BREE; Australian Bureau of Statistics; Reserve Bank of Australia (RBA).**

The Australian dollar has depreciated against the US dollar over the past four months due to speculation over the US QE3 program, the RBA's decision to cut the official cash rate 25 basis points and concerns over growth in China. The exchange rate has dropped from as high as US 105c in January to around US 91c in September 2013. For this outlook the Australian dollar is assumed to average US 91c in 2013–14, 11 per cent lower than 2012–13. Over the outlook period, the tapering of QE3, declining terms of trade and lower relative interest rates are expected to lead to the value of the Australian dollar declining further. An average exchange rate of US 86c is assumed from 2014–15 for this report. However, a more rapid recovery in the US economy, a longer period of low interest rates in Australia and more rapid decline in the terms of trade could result in a lower exchange rate.

The Australian mining industry

In 2012–13, the gross value added by the Australian mining industry, in chain volume measures, increased 8.8 per cent, relative to 2011–12, to total $151.2 billion. Mining activities accounted for $140.4 billion of this total with exploration and mining support services contributing $10.8 billion. The Australian mining industry accounted for 10.1 per cent of Australia's GDP in 2012–13, up from 9.6 per cent in 2011–12.

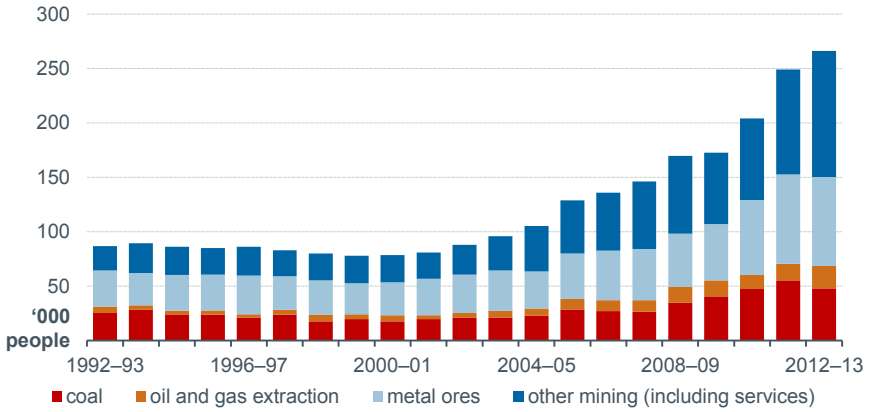
Figure 3: Australian mining industry gross value added, chain volume measures



Source: ABS.

Employment in the Australian mining industry, including services to mining, remained at around 2 per cent of Australia's total workforce in 2012–13. The average number of workers in the mining industry increased 6.7 per cent to around 266 146. Although the 2012–13 average was higher, the number of workers in the mining industry in the June quarter 2013 was around 15 900, or 5.7 per cent, lower year-on-year. This decrease in the mining workforce reflected the cost savings programs many mining companies have been implementing in Australia in response to lower commodity prices.

Figure 4: Employment in the Australian mining industry

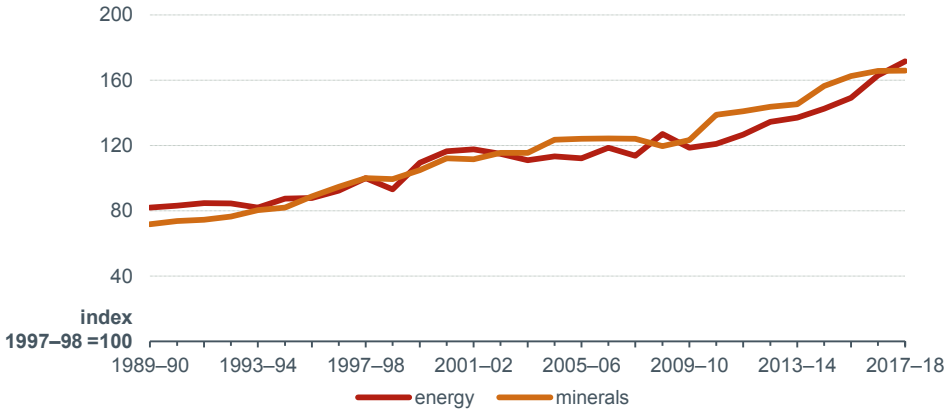


Source: ABS.

Australian resources and energy commodities production and exports

In 2012–13, Australian mine production increased 4.1 per cent, relative to 2011–12, underpinned by 6.2 per cent and 1.9 per cent increases in the output of energy and mineral commodities, respectively. Mine production is forecast to increase a further 1.4 per cent in 2013–14 as a result of substantial growth in iron ore and black coal production. Over the outlook period, further growth in iron ore and coal production, as well as a significant increase in LNG production, are projected to support total mine production increasing at an average annual rate of 5.4 per cent (see Figure 5).

Figure 5: Australian mine production



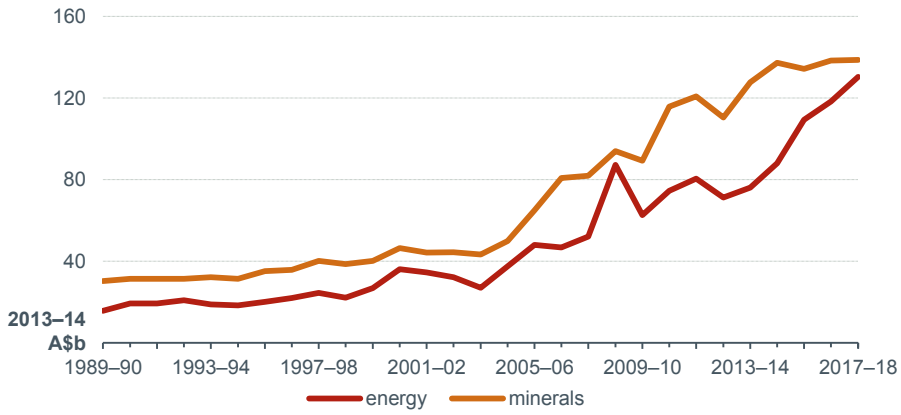
Sources: BREE; ABS.

Australia's energy and mineral commodity export earnings decreased by 8.3 per cent in 2012–13, relative to 2011–12, to total $177.4 billion. Mineral commodities export earnings accounted for 61 per cent, or $107.9 billion, of this total and energy commodities export earnings accounted for 39 per cent, or $69.6 billion.

In 2013–14, total export earnings for mineral and energy commodities are forecast to increase 15 per cent, supported by robust growth in both mineral and energy commodity export volumes and a lower Australian dollar exchange rate. Mineral commodity export earnings are forecast to increase 18 per cent to total $127.7 billion, mainly due to substantial growth in iron ore exports. Export earnings from energy commodities are forecast to increase 9 per cent to total $76.1 billion, underpinned by higher earnings for LNG as well as thermal and metallurgical coal.

The outlook for Australia's mineral and energy exports remains positive. Although prices for most commodities are expected to moderate over the outlook period, the projected substantial growth in export volumes of Australia's key commodities will support growth in export earnings. However, in real terms, export earnings from mineral commodities are projected to peak in 2014–15 and energy commodity exports will be the principal driver of export earnings. LNG exports are projected to increase around 360 per cent over the outlook period as the large investments in new facilities over the past three years start production. Total export earnings are projected to increase at an average annual rate of 11 per cent to total $294 billion in 2017–18. Mineral and energy export earnings are projected to total $151 billion and $142 billion in 2017–18, respectively (see Figure 6).

Figure 6: Australia's minerals and energy export earnings



Sources: BREE; ABS.

Table 3: Australia's resources and energy commodity exports, by selected commodities

	Volume				Value			
	unit	2012–13	2017–18 z	Annual growth %	unit	2012–13	2017–18 z	Annual growth %
Commodity								
Alumina	**kt**	**18 909**	**19 750**	**3.1**	**$m**	**5 339**	**8 228**	**8.3**
Aluminium	**kt**	**1 569**	**1 412**	**– 2.9**	**$m**	**3 277**	**3 677**	**– 0.2**
Copper	**kt**	**930**	**1 157**	**4.6**	**$m**	**8 077**	**12 830**	**7.3**
Gold	**t**	**280**	**301**	**– 0.1**	**$m**	**15 043**	**15 352**	**0.1**
Iron ore	**Mt**	**527**	**836**	**10.2**	**$m**	**57 201**	**86 967**	**6.4**
Nickel	**kt**	**253**	**219**	**– 1.4**	**$m**	**3 589**	**3 776**	**– 0.6**
Zinc	**kt**	**1 599**	**1 624**	**0.8**	**$m**	**2 208**	**3 367**	**7.2**
LNG	**Mt**	**24**	**83**	**29.8**	**$m**	**14 314**	**66 268**	**35.1**
Metallurgical coa	**Mt**	**154**	**194**	**5.3**	**$m**	**22 439**	**34 578**	**3.2**
Thermal coal	**Mt**	**182**	**261**	**8.8**	**$m**	**16 162**	**24 244**	**6.3**
Oil	**ML**	**18 750**	**17 025**	**– 1.8**	**$m**	**12 505**	**11 530**	**– 2.0**
Uranium	**t**	**8 675**	**9 590**	**6.6**	**$m**	**739**	**1 094**	**10.8**

z **BREE projection.**
Sources: **BREE; Australian Bureau of Statistics.**

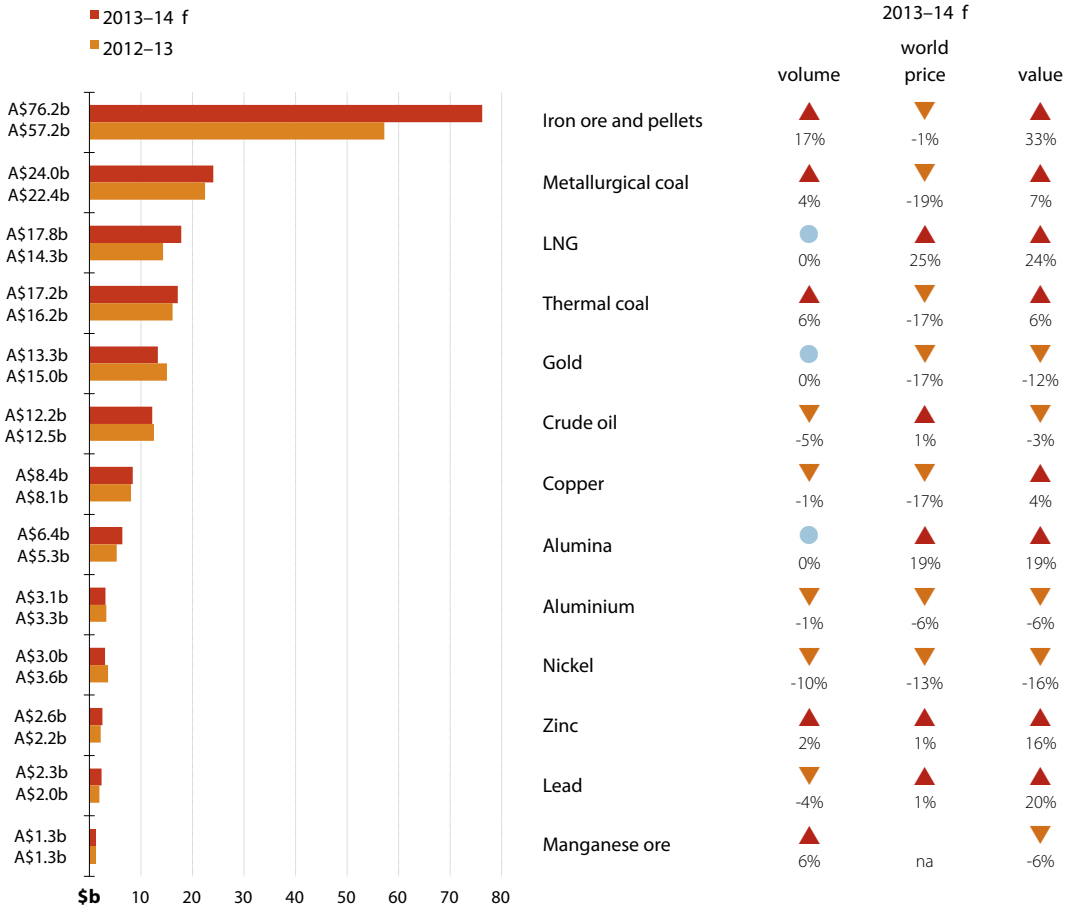
Table 4: Medium term outlook for Australia's resources and energy commodity

	unit	2010 –11	2011 –12	2012 –13	2013 –14 f	2014 –15 z	2015 –16 z	2016 –17 z	2017 –18 z
Commodity exports									
Exchange rate	**US$/A$**	**0.99**	**1.03**	**1.03**	**0.91**	**0.86**	**0.86**	**0.86**	**0.86**
Value of exports									
Resources and energy	**A$m**	**179 237**	**192 523**	**177 440**	**203 758**	**230 592**	**254 846**	**274 381**	**293 979**
– real a	**A$m**	**190 231**	**201 246**	**181 699**	**203 758**	**225 187**	**243 516**	**256 538**	**268 946**
Energy	**A$m**	**70 143**	**77 029**	**69 550**	**76 077**	**90 101**	**114 332**	**126 443**	**142 432**
– real a	**A$m**	**74 445**	**80 519**	**71 219**	**76 077**	**87 989**	**109 249**	**118 221**	**130 303**
Metals and other minerals	**A$m**	**109 094**	**115 493**	**107 891**	**127 681**	**140 490**	**140 514**	**147 938**	**151 547**
– real a	**A$m**	**115 785**	**120 726**	**110 480**	**127 681**	**137 198**	**134 267**	**138 318**	**138 642**
Resources and energy sector									
Volume of mine production b	**index**	**93.2**	**96.0**	**100.0**	**101.4**	**107.6**	**116.8**	**127.8**	**130.7**
– energy	**index**	**89.8**	**94.1**	**100.0**	**101.9**	**105.9**	**110.9**	**121.1**	**127.5**
– metals and other minerals	**index**	**96.7**	**98.2**	**100.0**	**101.1**	**108.9**	**113.2**	**115.4**	**115.5**
Gross value of mine production	**A$m**	**172 067**	**184 822**	**170 343**	**195 608**	**221 368**	**244 652**	**263 406**	**282 220**
– real a	**A$m**	**182 621**	**193 196**	**174 431**	**195 608**	**216 180**	**233 775**	**246 277**	**258 188**

a **In 2013–14 Australian dollars.** b **Base: 2012–13 = 100.** f **BREE forecast.** z **BREE projection.**
Sources: **BREE; Australian Bureau of Statistics.**

Major Australian resources and energy commodity exports

LNG and alumina are export unit returns in $A. All other commodities are world indicator prices in $US. For export value, annual forecasts are the sum of quarterly forecasts. As a result, annual export values do not necessarily reflect variations in export volumes, world prices and exchange rates. Thermal coal is the annual negotiated contract price for the Japanese fiscal year running from April 2012 to March 2013.



f **BREE forecast.**

Energy outlook

Oil

Pam Pham and Alex Feng

Oil prices

World oil prices were volatile during the first eight months of 2013 as a result of uncertainty about global economic conditions and geopolitical concerns in the Middle East. In the first half of 2013, the West Texas Intermediate (WTI) price averaged around US$94 a barrel while the Brent price averaged around US$108 a barrel.

Oil prices edged higher in July and August, supported by stronger economic data from the US, China and the EU. During In this period, the WTI price averaged around US$106 a barrel while the Brent price averaged around US$110 a barrel.

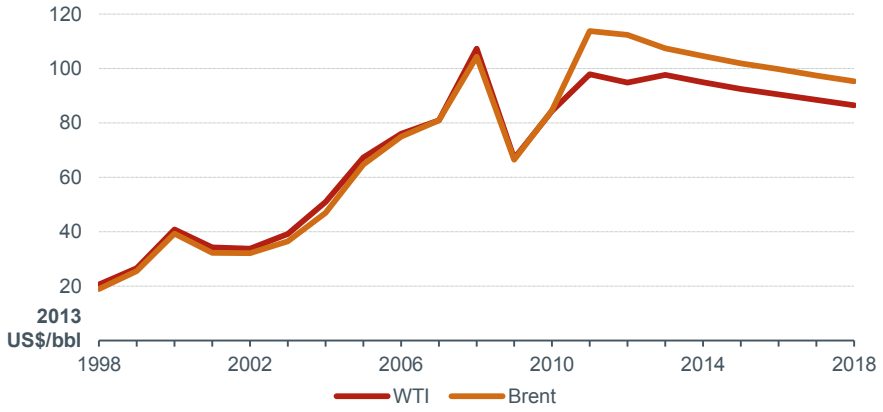
Notwithstanding the recent increase in oil prices, increased production and a possible easing of geopolitical tensions over the remainder of the year are expected to place downward pressure on world oil prices. For 2013 as a whole, the WTI price is forecast to average US$98 a barrel, 5 per cent higher than in 2012. Brent prices are forecast to average US$107 a barrel in 2013.

Over the outlook period, world oil prices are expected to moderate, as a result of projected increases in world oil production, driven largely by increased supply from non-OPEC countries, particularly the US, Canada, Kazakhstan and Brazil. Continued declines in oil consumption in OECD economies and moderate growth in oil consumption in non-OECD economies will also contribute to lower oil prices over the projection period.

Accordingly, world oil prices are projected to decline steadily between 2014 and 2018, with WTI prices expected to fall to US$86 a barrel (in 2013 US dollars) and Brent prices US$95 a barrel (in 2013 US dollars).

Given the sensitivity of the price of oil to changes in economic and political conditions, oil prices are expected to continue to exhibit considerable volatility over the medium term. For example, geopolitical tensions and unexpected supply disruptions may put upward pressure on oil prices. Conversely, weaker-than-assumed world economic growth may place downward pressure on oil prices.

Figure 1: Annual WTI and Brent oil prices



Sources: BREE; IEA.

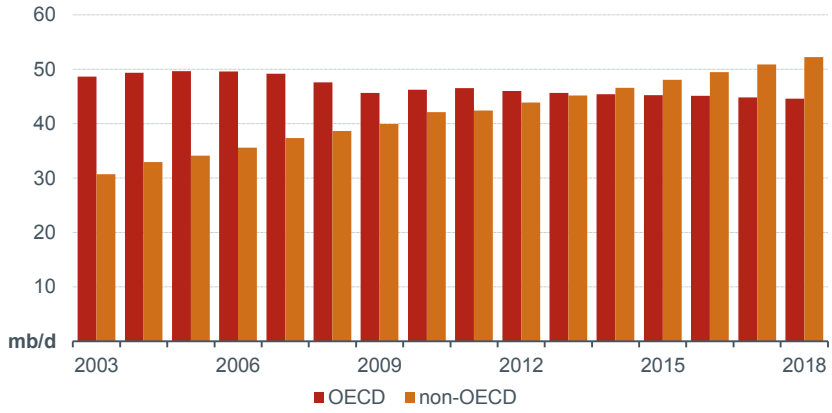
World oil consumption

World oil consumption is forecast to increase by 1.0 per cent in 2013 to 90.8 million barrels a day. Strong consumption growth in non-OECD economies, particularly China, is forecast to offset lower consumption in the OECD stemming from subdued economic conditions.

In 2014, world oil consumption is forecast to increase by 1.2 per cent to 92 million barrels. Rapid growth in oil consumption in Asia and the Middle East is expected to contribute to non-OECD consumption exceeding OECD consumption for the first time. This trend is anticipated to continue over the projection period, with the gap between the two regions widening (Figure 2). Accordingly, non-OECD economies consumption will be the major driver of growth in world oil consumption.

Over the medium term, world oil consumption will be influenced by economic conditions, fuel substitution in some applications and efforts to improve the efficiency of use, particularly in the transport sector. Between 2014 and 2018, world oil consumption is projected to grow at an average annual rate of 1.3 per cent to reach 96.8 million barrels a day in 2018.

Figure 2: Oil consumption in OECD and non-OECD economies



Sources: BREE; IEA.

Oil consumption in non-OECD economies

In 2013, oil consumption in non-OECD economies is forecast to increase by 3.0 per cent to 45.2 million barrels a day, underpinned by strong demand in Asia and the Middle East. From 2014, oil consumption growth in non-OECD economies will be supported by expanding economic activity, relatively high oil intensity and rising household incomes which will underpin an expanding vehicle fleet. Over the period 2014 to 2018, non-OECD oil consumption is projected to grow by 2.9 per cent a year to 52.3 million barrels a day in 2018, driven by strong consumption growth in China, India and the Middle East.

China has become an increasingly important consumer in the world oil market over the past decade. China's oil consumption is forecast to average 10.1 million barrels a day in 2013, reflecting strong demand for motor gasoline and diesel oil. Relative to advanced economies, China has a low vehicle penetration. As household incomes increase, China's vehicle fleet will expand as more households purchase automobiles, providing further stimulus for oil consumption.

Partially offsetting some of this growth will be alterations to energy consumption patterns as the structure of the Chinese economy changes. The energy intensity of the Chinese economy is likely to decline as it moves towards to a consumption-led growth model and high oil prices encourage greater efficiency and fuel substitution. Under the 12th Five-Year Plan on Energy Development, released in January 2013, China has set a target to improve energy efficiency by 38 per cent by 2015. Between 2014 and 2018, China's oil consumption is projected to increase at an average annual rate of 3.7 per cent to 12.1 million barrels a day in 2018.

India's oil consumption is forecast to average 3.8 million barrels a day in 2013, increasing by 2.7 per cent relative to 2012. India's young population and middle class are expected to contribute to growing demand for oil in transportation. Although a reduction in diesel subsidies implemented from early 2013 will have a negative impact on demand, the growth in India's oil consumption are expected to still robust over the projection period, leading by population growth and increasing middle class's income. Over the period 2014 to 2018, India's oil consumption is projected to grow at an average annual rate of 3.1 per cent to 4.4 million barrels a day in 2018.

Oil consumption in the Middle East is forecast to expand by 2.4 per cent to average 7.8 million barrels a day in 2013, supported by the development of new oil-fuelled electricity generation capacity. This growth is expected to be sustained over the projection period, underpinned by increasing urbanisation and subsidies in some countries. From 2014, oil consumption in the Middle East is projected to grow at an average annual rate of 3.3 per cent to 9.2 million barrels a day in 2018. Over the medium term, the use of oil in electricity generation in the Middle East is likely to decline as some countries promote the more efficient use of electricity and alternative power generation sources.

Oil consumption in OECD economies

In the OECD, oil consumption is forecast to decline by 0.7 per cent to 45.7 million barrels a day in 2013. Oil demand across the OECD has been declining in response to improved fuel efficiency in the transport sector, which has more than offset any increases in vehicle numbers, and changes in consumer behaviour. This trend is expected to persist over the medium term. Reflecting this, OECD oil consumption is projected to decrease at an average annual rate of 0.5 per cent to 44.6 million barrels a day in 2018.

Oil consumption in OECD-Europe declined steadily since 2006, driven by weak economic growth, ongoing efficiency gains in the transport sector and reduced use in electricity generation and heating applications. This trend is expected to persist over the projection period, with oil consumption in OECD-Europe projected to decrease at an average annual rate of 0.6 per cent to 13 million barrels a day in 2018.

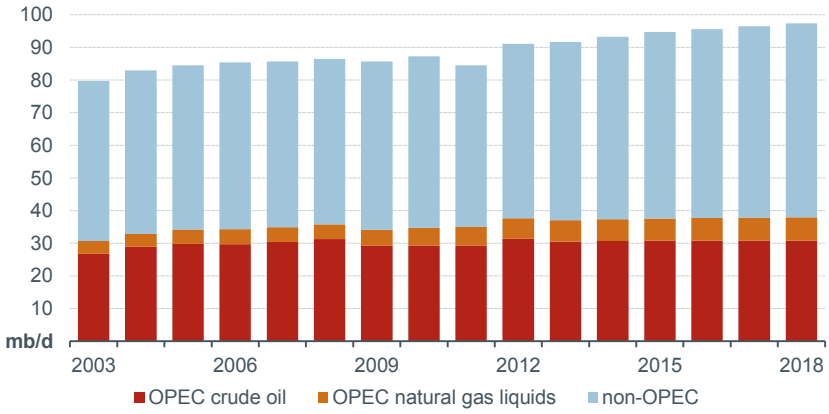
Oil consumption in North America is forecast to average 23.8 million barrels a day in 2013, largely reflecting lower oil consumption in the US which is forecast to average 18.6 million barrels a day. Over the period 2014 to 2018, oil consumption in North America is projected to remain relatively stable at around 23.3 million barrels a day. In the US, oil consumption is projected to decrease marginally to 18.2 million barrels a day in 2018. This will be underpinned by energy efficiency policies and substitution to the use of gas and biofuels in a number of applications, such as space heating and transportation.

After a short period of growth in oil consumption following the Fukushima Daiichi reactor incident, Japan's oil consumption is forecast to decline by 3.4 per cent in 2013 to 4.6 million barrels a day. In 2014, Japan's oil consumption is projected to decrease by a further 1.8 per cent to 4.5 million barrels a day reflecting an assumed gradual recovery in nuclear power generation capacity. The energy mix in Japan is expected to change over the projection period as nuclear generation capacity is progressively restarted. Furthermore, expected improvements in fuel efficiency will also contribute to lower oil consumption over the projection period. Accordingly, Japan's oil consumption is projected to decrease at an average annual rate of 0.7 per cent to 4.4 million barrels a day in 2018.

World oil production

In 2013, world oil production is forecast to increase by 0.7 per cent to 91.7 million barrels a day, largely driven by higher output in non-OPEC countries (Figure 3). Over the medium term, world oil production is projected to increase at an average annual rate of 1.1 per cent to 97.4 million barrels a day in 2018, supported by projected increases in non-OPEC production, particularly unconventional oil production in North America.

Figure 3: World oil production in OPEC and non-OPEC economies



Sources: BREE; IEA.

Oil production in non-OPEC countries

In 2013, oil production in non-OPEC countries is forecast to increase by 2.2 per cent to 54.6 million barrels a day, driven by growth in unconventional supplies—mainly US light tight oil and Canadian oil sands. Between 2014 and 2018, non-OPEC oil production is projected to grow at an average rate of 1.5 per cent per year to 59.4 million barrels a day in 2018. The largest contributor to non-OPEC production over the medium term will be North America, while Latin America, particularly Brazil, is projected to exhibit the fastest growth.

In the US, high oil prices and the adoption of new technologies associated with shale gas extraction have contributed to a rapid increase in US oil production and is expected to contribute to further growth in production over the medium term. In 2013, US oil production is forecast to increase by 10 per cent to 10.1 million barrels a day. Over the period 2014 to 2018, oil production in the US is projected to grow at an average rate of 3.1 per cent a year to 12.2 million barrels a day in 2018. Over the longer term, the IEA projects that the US will surpass Saudi Arabia to become the world's largest oil producer by 2020.

The expansion in Canada's oil production has been driven by the development of oil sands projects, increased domestic and foreign investment in the sector and the successful application of horizontal drilling and multi-stage hydraulic fracturing. In 2013, Canada's oil production is forecast to increase by 6 per cent to 4 million barrels a day. Between 2014 and 2018, Canada's oil production is projected to increase at an average rate of 5 per cent a year to 5 million barrels a day in 2018. Pipeline capacity may limit growth in production in the early part of the projection period unless alternative delivery methods can be organised.

In 2013, Latin American oil production is forecast to increase by 1 per cent to 4.2 million barrels a day. Over the period 2014 to 2018, Latin American oil production is projected to increase at an average annual rate of 3.9 per cent to 5.2 million barrels a day in 2018, driven largely by increased production in Brazil.

Brazil's oil production is forecast to average 2.2 million barrels a day in 2013, because of increased deep-water production in the Campos and Santos basins. Over the medium term, Brazil is projected to be the fastest-growing non-OPEC oil producer outside North America, increasing at an average annual rate of 7 per cent to 3.2 million barrels a day in 2018. Higher output will be underpinned by expanded production at several offshore oil fields including Baleia Azul, Guara North, Cernambi, Lula Central, Lula High and Maromba.

Oil production in Russia is forecast to remain relatively stable at 10.8 million barrels a day over the medium term. Lower production at maturing fields is projected to more than offset increased production at new fields in Eastern Siberia which are often more challenging to develop.

After almost a decade of delays, first production from the Kashagan field in Kazakhstan occurred in mid-September, with the first cargo to be shipped in October 2013. The field is the largest outside of the Middle East and will transform Kazakhstan into a major oil producer over the medium to longer term. Output could reach 370 000 barrels a day during early phases of the project, and could eventually increase to 1.5 million barrels a day (around 1.6 per cent of 2012 production).

Oil production in OPEC economies

OPEC oil production is forecast to decline by 1.5 per cent to 37.1 million barrels a day in 2013 because of lower output in Iran. Over the medium term, OPEC production is only projected to increase marginally between 2014 and 2018 to 38 million barrels a day in 2018. Production growth will be adversely affected maturing fields, declining recovery rates, geopolitical issues and relatively unattractive investment regimes, particularly in African member countries. Nearly half of the production increase is projected to come from natural gas liquids (NGLs), with crude oil and Venezuelan extra-heavy oil accounting for another 30 per cent and 20 per cent, respectively.

The projected growth in OPEC production will primarily come from Iraq. Iraqi production is forecast to remain relatively steady in 2013 with strong production in the first half offset by expected lower output in the second half from infrastructure and weather disruptions. Between 2014 and 2018, oil production in Iraq is projected to grow at an average annual rate of 8 per cent to around 4.6 million barrels a day in 2018. If delays in the contracting of awards for infrastructure required to support project development are not resolved, production may be lower than projected, providing a downside risk to this assessment.

International sanctions imposed on Iran's oil exports have contributed to lower production at a number of its major fields, particularly during June and early July. For 2013 as a whole, Iran's oil production is forecast to average 2.5 million barrels a day. Assuming that international sanctions remain in pace over the projection period, Iran's oil production is projected to decrease by an average of 7 per cent a year to 1.8 million barrels a day in 2018.

Oil production in Saudi Arabia is forecast to remain at 11 million barrels a day in 2013 because of lower output from maturing fields. In 2014, Saudi Arabia's oil production will increase by 7 per cent to 11.8 million barrels a day, mainly driven by the commissioning of the Manifa offshore field. Over the medium term, production growth is assumed to be constrained by resource depletion and further supported by a government decision to maintain capacity at around 12.5 million barrels a day. Production is projected to decline by 0.6 per cent a year to 10.7 million barrels a day in 2018.

Oil production in Libya has recovered rapidly following the 2011 civil war, but is yet to return to pre-war levels. After a recovery in production in early 2013, oil production in Libya declined to 150 000 barrels a day in early September 2013 compared with 1 million barrels a day in July because of labour disputes and political unrest. Because of its weak investment environment, there are few projects being developed in Libya over the medium term.

Australia's production and exports

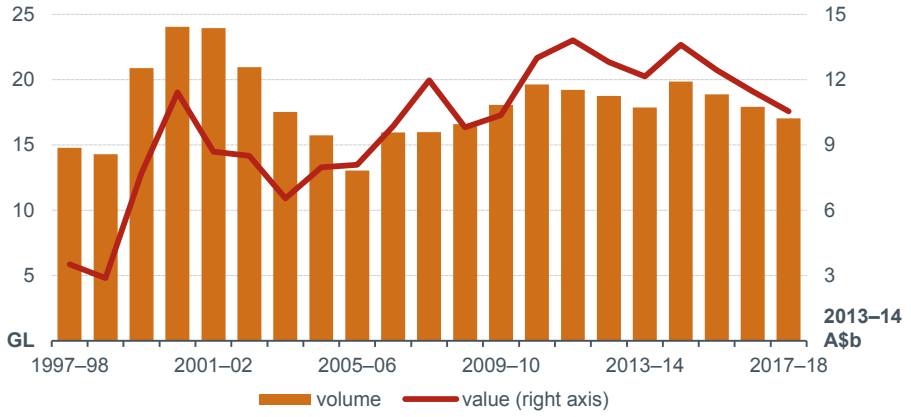
Australia's crude oil and condensate production declined by 8 per cent to 22.3 gigalitres (around 384 000 barrels a day) in 2012–13 owing to lower production at mature fields (Figure 4). In 2013–14, crude oil and condensate production is forecast to increase by 2.8 per cent to 22.9 gigalitres (395 000 barrels a day) following the commencement of the Montara-Skua, Fletcher-Finucane and Coniston projects.

Between 2014–15 and 2017–18, Australian oil production is projected to decline at an average rate of 5 per cent a year to 19.4 gigalitres (334 000 barrels a day) as lower production at mature fields more than offsets increases in new production capacity. While Australia has large shale oil resource potential, these deposits are not expected to be developed over the outlook period.

In 2012–13, Australia's crude oil and condensate export volumes declined by 2.4 per cent to 18.8 gigalitres (324 000 barrels a day). Reflecting this, export values also declined by 5 per cent to $12.5 billion. In 2013–14, crude oil and condensate exports are forecast to decline by 4.7 per cent to 17.9 gigalitres (308 000 barrels a day). Given reduced volumes, earnings from crude oil and condensate exports are forecast to decline by 2.7 per cent to $12.2 billion.

Between 2014–15 and 2017–18, Australia's crude oil and condensate export earnings are projected to decline at an average rate of 8 per cent a year to $10.5 billion (in 2013–14 dollar terms) in 2017–18, as lower export volumes and prices offset the effect of an assumed depreciation in the Australian dollar.

Figure 4: Australia's crude oil and condensate exports



Sources: BREE; ABS.

Table 1: Oil outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Production	**mbd**	**84.5**	**91.1**	**91.7**	**93.2**	**94.7**	**95.6**	**96.5**	**97.4**
Consumption	**mbd**	**88.8**	**89.9**	**90.8**	**92.0**	**93.3**	**94.6**	**95.7**	**96.8**
West Texas Intermediate crude oil price									
– nominal	**US$/bbl**	**95**	**93**	**98**	**96**	**94**	**93**	**92**	**92**
– real c	**US$/bbl**	**98**	**95**	**98**	**95**	**92**	**90**	**88**	**86**
Brent crude oil price									
– nominal	**US$/bbl**	**110**	**110**	**107**	**105**	**104**	**103**	**102**	**101**
– real c	**US$/bbl**	**114**	**112**	**107**	**105**	**102**	**100**	**97**	**95**

		2010 –11	2011 –12	2012 –13	2013 –14 f	2014 –15 z	2015 –16 z	2016 –17 z	2017 –18 z
Australia									
Crude oil and condensate									
Production	**ML**	**25 772**	**24 068** i	**22 257**	**22 884**	**22 658**	**21 525**	**20 449**	**19 426**
Export volume	**ML**	**19 638**	**19 212**	**18 750**	**17 860**	**19 857**	**18 864**	**17 921**	**17 025**
Export value									
– nominal	**A$m**	**12 245**	**13 205**	**12 505**	**12 163**	**13 932**	**13 019**	**12 249**	**11 530**
– real d	**A$m**	**12 997**	**13 803**	**12 806**	**12 163**	**13 606**	**12 441**	**11 452**	**10 548**
Imports	**ML**	**32 225**	**29 495**	**29 970**	**28 176**	**27 584**	**29 517**	**29 193**	**29 302**
LPG									
Production e	**ML**	**3 907**	**3 813**	**3 607**	**3 823**	**3 861**	**3 900**	**3 939**	**3 978**
Export volume	**ML**	**2 471**	**2 115**	**2 384**	**2 119**	**2 090**	**1 987**	**2 445**	**2 445**
Export value									
– nominal	**A$m**	**1 068**	**971**	**1 091**	**1 447**	**1 466**	**1 371**	**1 670**	**1 655**
– real d	**A$m**	**1 133**	**1 015**	**1 117**	**1 447**	**1 432**	**1 310**	**1 562**	**1 514**
Petroleum products									
Refinery production	**ML**	**38 393**	**36 081**	**35 163**	**31 535**	**25 055**	**25 348**	**25 649**	**25 927**
Exports g	**ML**	**760**	**1 151**	**943**	**1 059**	**1 082**	**1 084**	**1 087**	**1 087**
Imports	**ML**	**18 762**	**22 194**	**23 699**	**29 569**	**33 806**	**34 173**	**35 239**	**36 353**
Consumption h	**ML**	**52 095**	**53 809**	**54 866**	**53 187**	**54 200**	**54 664**	**55 824**	**56 917**

c **In 2013 US dollars.** d **In 2013–14 Australian dollars.** e **Primary products sold as LPG.** g **Excludes LPG.** h **Domestic sales of marketable products.** i **Energy Quest.** f **BREE forecast.** z **BREE projection.**

Sources: **BREE; ABARES; Australian Bureau of Statistics; International Energy Agency; Energy Information Administration (US Department of Energy); Energy Quest; Geoscience Australia.**

Gas

Tom Willcock and Ross Lambie

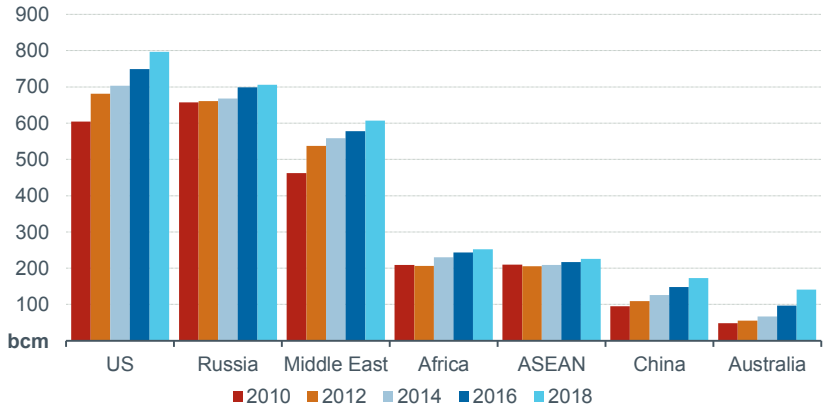
World gas production

Global gas production was around 3.4 trillion cubic metres in 2012, a considerable increase on the 2.5 trillion cubic metres produced in 2000. Increasing output in the US, Middle East, China, Australia and Russia has more than offset decreasing European production over the past decade. These same countries are expected to continue to underpin growing global gas production in the medium term.

The International Energy Agency's (IEA) 2013 Medium-term Gas Market Report projects global gas supply to increase to 4 trillion cubic metres in 2018; considerably higher than previously forecast (the 3.8 trillion cubic metres reported in the March edition of the *Resources and Energy Quarterly*). This increase is linked to expectations for greater US, Australian and African production (69, 49 and 24 billion cubic metres higher, respectively in 2018 than previously reported).

Russia and the US are projected to remain the two largest gas producers in 2018. Growth in Russian supply will come from increasing output at existing basins, while unconventional resources are expected to underpin US growth. Other countries, such as China, Australia, Saudi Arabia and Qatar, are also expected to provide a considerable quantity of incremental increases in supply to 2018 (Figure 1).

Figure 1: World gas production



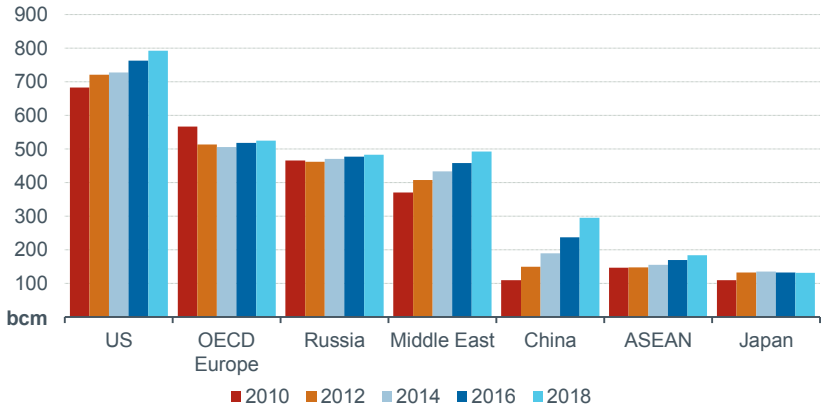
Source: IEA.

World gas consumption

Annual global gas consumption has grown rapidly in recent years, increasing at an average annual rate of 2.5 per cent from 2.5 trillion cubic metres a year in 2000 to 3.4 trillion cubic metres a year in 2012 (equivalent to global production). This growth is projected to continue at an average annual rate of around 1.8 per cent over the medium term; reaching 4.0 trillion cubic metres a year in 2018.

Future growth is expected to come mostly from non-OECD economies where gas demand is projected to grow at 3.5 per cent annually to 2018. China underpins a large proportion of rising demand with 12 per cent annual growth expected to more than double annual consumption from an estimated 149 billion cubic metres in 2012 to 295 billion cubic metres in 2018 (see Figure 2). Gas consumption in India, Africa and ASEAN is also expected to grow substantially to 2018. Demand growth from OECD nations is expected to develop more moderately, at around 1.3 per cent per year over the same time period. Falling European demand, a result of strong competition from renewables and assumed weak economic growth, will be offset by increased American demand, primarily from electricity generation (as lower prices see generators substitute away from coal).

Figure 2: World gas consumption



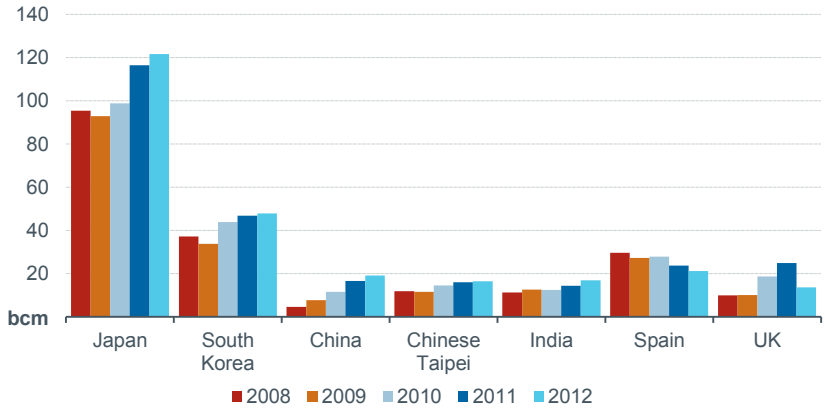
Source: IEA.

Global LNG trade

In 2012, world LNG trade totalled 322 billion cubic metres, a slight decrease from the 328 billion cubic metres traded in 2011. Growth in demand from the Asia-Pacific region, which accounted for about 70 per cent of total LNG imports, was not enough to offset a 25 per cent fall in imports from OECD Europe. This growth has been driven mainly by increasing Chinese consumption and demand for gas for power generation in Japan The fall in OECD Europe gas consumption from 2011 to 2012 was felt strongly in the LNG market where a large quantity of purchases on the LNG spot market were foregone. In contrast, OECD Europe's pipeline imports, almost all of which are under contract, fell by less than 1 per cent.

Figure 3 shows seven of the world's largest LNG importers, which together accounted for 80 per cent of the global LNG market in 2012. Reflecting the main trends in the market, increasing Asia-Pacific imports (from Japan and China in particular) clearly contrast with declines in demand from Spain and the UK.

Figure 3: World LNG imports



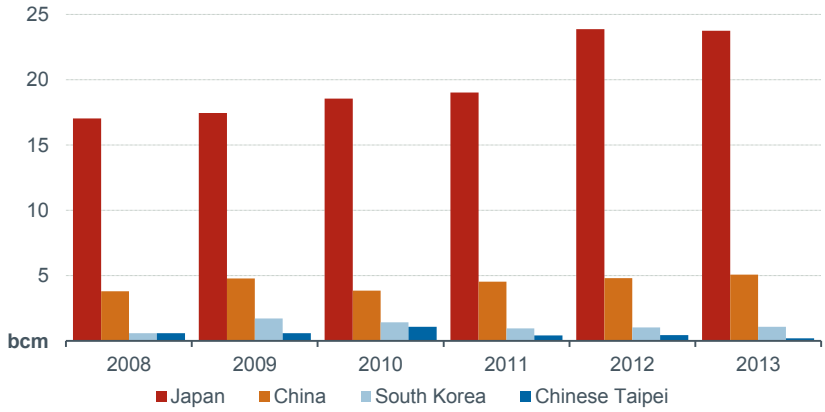
Source: IEA.

These trends are expected to continue over the five years to 2018. In particular, Chinese and ASEAN demand will underpin marginal Asia-Pacific growth, while European LNG demand is expected to remain subdued.

The majority of LNG supply growth to 2018 will come from Australia. Of the 12 LNG projects currently under construction globally, half are in Australia (including Prelude FLNG which is under construction in the Republic of Korea but will be transported to Australia once completed). The global LNG market is expected to tighten considerably over the next couple of years as demand grows but before new liquefaction projects come online. From 2014–15, new projects, mostly in Australia, will considerably increase global LNG capacity and help to alleviate constraints.

Since Australia first began producing LNG in 1989, Japan has been Australia's dominant (and sometimes only) export destination. In recent years, growing Chinese demand and increasing Australian liquefaction capacity have seen exports to China increase considerably. Australia also exports smaller quantities of LNG to South Korea, Chinese Taipei, and irregularly through spot markets to a number of other countries (such as the UK, Kuwait and UAE).

Figure 4: Australia's LNG exports into the Asia-Pacific



Sources: IEA; BREE; Argus LNG.

Japan

Japan is the world's largest LNG importer and Australia's largest LNG export destination, accounting for around 78 per cent of Australia's total exports in 2012 (Figure 4). Japan is almost totally reliant on LNG to meet domestic demand which in 2012 was around 122 billion cubic metres of gas, a 4 per cent increase on 2011.

The ongoing closure of most of Japan's nuclear reactors following the March 2011 earthquakes and tsunami is expected to underlie historically high levels of gas demand from the electricity generation sector. The Institute of Energy Economics, Japan expects some reactors to be restarted in mid-2014. However, the IEA anticipates that public opposition will slow the restart such that by 2018 nuclear energy generation will only have returned to around half of 2010 levels. The Government's decisions on the nuclear fleet will have a considerable impact on gas demand from the electricity generation sector, which is Japan's largest gas consuming sector by some margin.

China

China is currently the world's fourth largest LNG destination, with 19 billion cubic metres imported in 2012. China also accounted for around 16 per cent of Australia's LNG exports in 2012, which makes it Australia's second largest LNG export market after Japan. Chinese domestic demand has grown strongly over the past five years largely due to a concerted push by the Government to develop both the demand and supply sides of the industry domestically.

China is expected to be a key source of future LNG demand as domestic gas demand is projected to outstrip domestic gas production (China imported around 43 billion cubic metres from both pipeline and LNG sources in 2012, this is projected to grow to 122 billion cubic metres in 2018). Chinese LNG demand growth is dependent on a number of factors, key amongst which are domestic demand and production growth and the source of imports. China currently has a number of pipelines connecting it to gas resources in neighbouring countries in both Central and South-East Asia, and a number of possible new pipelines are at various planning stages. There is also around 32 billion cubic metres of regasification capacity currently under construction, which will more than double the nation's current import capacity.

South Korea

In 2012, South Korea (which is the world's second largest LNG importer) imported 48 billion cubic metres of LNG (against 0.4 billion cubic metres of domestic production), a 2.3 per cent increase on 2011. Demand growth over the past decade has been underpinned by considerable increases in gas used for electricity generation (from 6 billion cubic metres in 2000 to 22 billion cubic metres in 2011). LNG is expected to continue to play an important role in South Korea's energy mix, with a fifth regasification terminal currently under construction and a sixth is being planned. Most of the capacity for these new plants is expected to be met from the US as Kogas (the owner and operator) has signed long term contracts with the Sabine Pass LNG export project currently under construction in Louisiana.

Australia's gas production

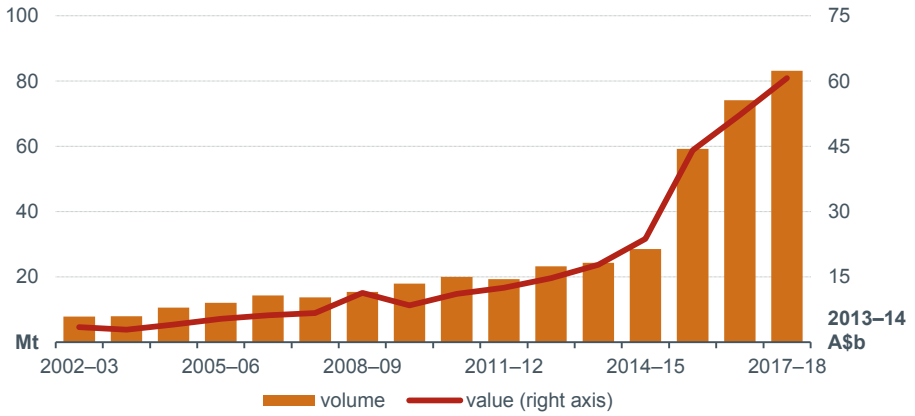
In 2011–12, Australian gas production was 55.8 billion cubic metres and increased by 5.7 per cent to 59 billion cubic metres in 2012–13. Gas produced for LNG production in 2012–13 accounted for around half of Australia's total gas production. BREE's medium term projections for Australian gas production and exports have changed slightly since the March edition of *Resources and Energy Quarterly* due to updated expectations regarding new LNG projects' start up dates and ramp rates and domestic gas consumption. Total gas production is now projected to increase at an average annual rate of 22 per cent to reach just over 159 billion cubic metres by 2017–18 (see Table 1). This growth will be underpinned by the large number of LNG projects currently under construction.

Australia's LNG exports

In 2012–13, Australia exported 24.3 million tonnes of LNG, 26 per cent higher than in 2011–12. Australian LNG exports are forecast to remain at around 24 million tonnes in 2013–14. In 2014–15, LNG export volumes are projected to increase to 31.1 million tonnes as the first of Australia's new LNG plants start production. Following the start up of all plants currently under construction over the outlook period, Australia's LNG export volumes are projected to increase to 83 million tonnes in 2017–18.

Over the medium term outlook, lower LNG prices in the Asia-Pacific are expected due to a combination of lower oil prices and growing competition from US suppliers. Despite falling LNG prices (in nominal terms), the significant depreciation in the Australian dollar relative to the US dollar (as outlined in the macro assumptions section) will underpin a higher value of nominal exports in 2017–18 than projected previously. In 2013–14, the value of Australian LNG exports is forecast to total $14.8 billion and are projected to continue growing strongly to total $60.6 billion (in 2013–14 dollars) in 2017–18.

Figure 5: Australia's LNG exports



Sources: BREE; ABS.

Table 1: Gas outlook

	unit	2010 –11	2011 –12	2012 –13	2013 –14 f	2014 –15 z	2015 –16 z	2016 –17 z	2017 –18 z
Australia									
Production	**Gm^3**	**53.1**	**55.8**	**59.0**	**73.8**	**113.2**	**132.3**	**154.6**	**159.4**
LNG export volume	**Mt**	**20.0**	**19.3**	**24.3**	**24.3**	**31.1**	**57.0**	**69.6**	**83.0**
LNG export value									
– nominal	**A$m**	**10 437**	**11 949**	**14 314**	**17 801**	**24 281**	**46 192**	**55 857**	**66 268**
– real b	**A$m**	**11 077**	**12 491**	**14 657**	**17 801**	**23 712**	**44 138**	**52 224**	**60 625**

b In 2013–14 Australian dollars. f BREE forecast. z BREE projection.
***Sources:* BREE; Australian Bureau of Statistics; EnergyQuest; Argus LNG.**

Thermal coal

Tom Shael

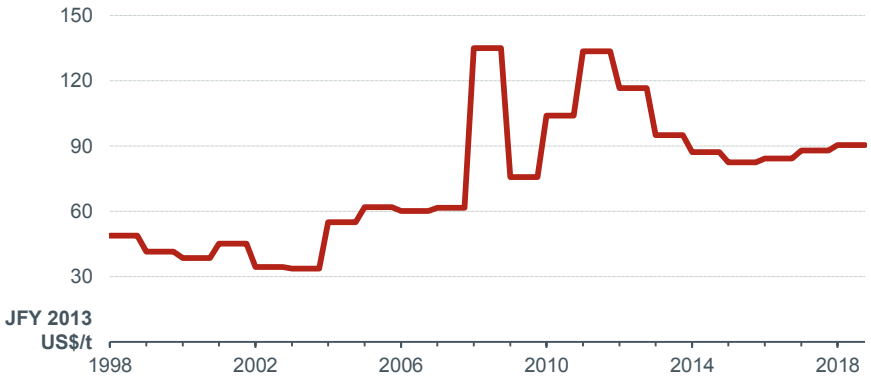
Prices

So far in the September quarter 2013 spot prices for 6000 kcal/kg coal net as received FOB Newcastle have remained around US$77 a tonne, a decrease of more than US$8 from the June quarter average. Although import demand has been growing, an abundance of seaborne supply has pushed prices down. The recent completion of key transport infrastructure in China has lowered the cost of delivering domestic coal to southern regions, putting additional pressure on landed coal prices. Moreover, an increasing preference for lower calorific coals has reduced the premiums paid for higher quality valued coals.

For Australian exporters, the recent price decline has been partially offset by a lower exchange rate. The depreciation has been large enough such that the Australian dollar price has decreased by only around $2, to around $84 a tonne, much less than the drop in US dollars terms of US$8 a tonne. Spot prices for coal FOB at ports in other key coal exporting economies, such as South Africa, Colombia and the Russia, have also decreased to a lesser extent when measured in local currencies, compared with the US dollar price.

The Japanese financial year 2013 (JFY, April 2013 to March 2014) benchmark contract price settled at US$95 a tonne, down from US$115 a tonne in JFY 2012. The decline was a result of an extended period of lower spot prices leading up to negotiations in early 2013, and an expectation for this trend to continue.

Figure 1: JFY thermal coal prices



Source: BREE.

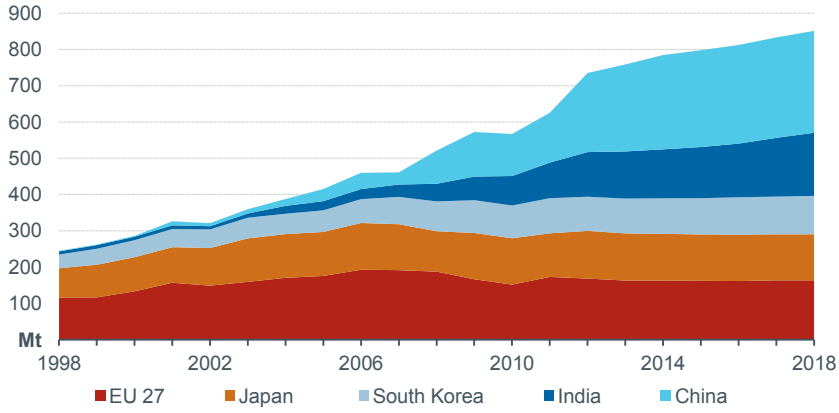
Over the outlook period, thermal coal contract prices (in JFY 2013 dollars) are projected to decrease in the short term to a low of US$82 a tonne in JFY 2015. The decrease is projected as a result of increasing competition, cost-cutting and a supply overhang driving down prices in the short term. Later in the outlook period, increasing import demand is expected to require mines higher on the cost curve to continue operating and to provide support higher prices, which are projected to rise to US$90 a tonne (in JFY 2013 dollars) in JFY 2018.

World thermal coal imports

According to the latest IEA data, world thermal coal trade is estimated to have increased by 14 per cent in 2012 to total 989 million tonnes. Increased demand in non-OECD economies, especially China and India, was the primary driver of increased trade.

Over the medium term, both world thermal coal consumption and trade are projected to increase, supported by growth in energy demand in emerging economies. The low-cost and reliability of coal-fired electricity generation capacity will continue to make it appealing to meet the projected growth in emerging economies' energy demand. In line with higher consumption, world trade of thermal coal is projected to grow at an average rate of 2.1 per cent a year from 2013 to 2018, to total 1.12 billion tonnes in 2018.

Figure 2: Major thermal coal importers



Sources: BREE; IEA.

China

Imports into China increased by 59 per cent in 2012 to 218 million tonnes as a result of continued growth in electricity demand and the relatively low cost of imported coal. An emerging preference for lower calorific value coals that are cheaper and have lower ash content has resulted in a substantial increase in imports of lignite from Indonesia. Thermal coal imports are forecast to increase again in 2013, albeit at a lower rate of 10 per cent, to around 240 million tonnes. The forecast increase is a result of continued relatively cheap and readily available coal in the Asia-Pacific market. Recent infrastructure investments in China have reduced the cost of transporting domestically produced coal to southern markets and made it more competitive with imported supplies.

Over the medium and longer term, China's coal consumption is projected grow but at a declining rate. Climate change policies and energy targets are expected to impact more on coal consumption towards the end of the outlook period, but not reduce China's overall coal consumption from current levels. This is not inconsistent with the recent government announcement that aims to have coal comprise no more than 65 per cent of China's total energy mix by 2017 as no exact level was announced. More rapid growth in the use of gas, nuclear and renewables in the energy mix are expected to lower coal's share of China's energy mix rather than a decrease in coal consumption. Furthermore, to allay environmental concerns, the use of scrubbers that have already been installed at many coal fired power plants could become mandatory and enforced. Currently scrubbers are not widely used as it results in higher electricity costs and lower profit margins for generators.

Also announced recently was a plan to not build any new coal-fired power plants in Beijing, Shanghai and Guangzhou. However, this is not expected to impact significantly on China's overall coal demand, as cities in inland and western regions are projected to be the main source of growth in coal consumption.

China is expected to remain the world's largest producer of coal by a substantial margin over the outlook period. However, China is projected to increase its use of imported coal, taking advantage of large quantities of supply on the seaborne market at relatively low prices. Following an estimated large surge in imports in 2012, growth in China's thermal coal imports is projected to moderate to an average rate of 3.2 per cent a year over the outlook period to total 281 million tonnes in 2018.

India

In 2012, India's thermal coal imports are estimated to have increased by 25 per cent to total 123 million tonnes. Over the medium term, India's thermal coal consumption is projected to increase significantly, with the majority of the increases occurring towards the end of the outlook period. India is expected to increase its coal-fired electricity generating capacity significantly over the medium term. The increase in generating capacity is expected to support increasing electricity demand from India's growing middle-class consumers and the manufacturing sector.

Growth in India's thermal coal production over the medium term is not expected to meet increasing consumption demand. Plans to start production from coal resources in Odisha, Jharkhand, and Chhattisgarh are not expected to be developed before 2018 arising from difficulties with acquiring land and the necessary government approvals for new mines and associated infrastructure. Accordingly, India is expected to become more reliant on imports of thermal coal which are projected to grow at an average rate of 6 per cent a year over the outlook period to total 174 million tonnes in 2018. The risk of further depreciation in the Indian rupee and subsequent rise in relative cost of fuel imports is a downside risk to this forecast.

Japan

Japan's imports of thermal coal in 2012 are estimated to have increased by 9 per cent to total 132 million tonnes. Infrastructure and port capacity constraints for the importation of coal are expected to continue to limit the prospects for substantial growth in Japan's thermal coal imports. In 2013, thermal coal imports are forecast to total around 130 million tonnes. Over the outlook period, thermal coal imports are projected to decline by around 0.6 per cent a year and to total 127 million tonnes in 2018 as a result of Japan increasing its use of gas and renewable energy.

South Korea

South Korea's imports of thermal coal in 2012 are estimated to have totalled 94 million tonnes, a slight decrease from 2011. Over the medium term, imports into South Korea are projected to grow at an average annual rate of 2.0 per cent to total 106 million tonnes in 2018. The lower rate of growth is projected as a result of moderating demand for electricity from the manufacturing sector.

World thermal coal exports

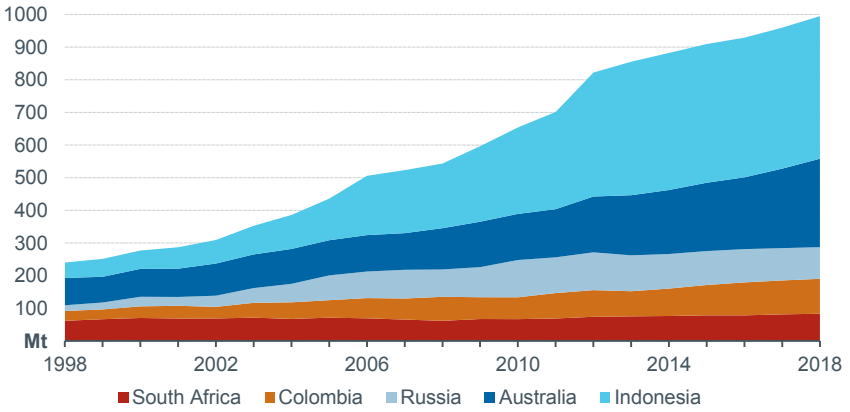
Over the medium term higher world demand for thermal coal is projected to be met by higher exports from established coal exporting economies, including Australia, Indonesia and Colombia (see Figure 3). There are plans to expand production and infrastructure capacities in each of these countries, which will likely see competitive pressures in coal export markets continue.

Australia

In 2012, thermal coal exports from Australia increased 16 per cent to total 171 million tonnes. While Japan remained the primary destination for Australia's thermal coal exports, having imported 75 million tonnes, China accounted for the largest share of the additional tonnage from Australia. In 2012 Australia's exports to China grew by 73 per cent, to total 34 million tonnes. Exports to South Korea were 30 million tonnes, 2 per cent higher than in 2011.

Australia's thermal coal exports in 2013 are forecast to increase by 8 per cent, relative to 2012, to total 184 million tonnes. The increase is forecast to be supported by the start-up of recently completed projects, such as Rio Tinto and Mitsubishi's Hunter Valley Operations Expansion, BHP Billiton's Mount Arthur project and stage two of Whitehaven Coal's Narrabri Coal Project. The majority of additional exports are expected to be sent to China, but Japan is still expected to be the principal export market for Australian thermal coal.

Figure 3: Major thermal coal exporters



Sources: BREE; IEA.

A slowdown in investment in new coal projects in Australia over the last two years is expected to result in the rate of growth of exports slowing over the next three to four years. Although there are many coal mining projects at the planning stage, rising construction and operating costs have reduced the financial viability of many of these projects. The recent depreciation of the Australian dollar is not expected to significantly improve the competitiveness of Australian coal producers in the international market as most competitors have also experienced similar currency depreciations with the net effect being that the relative position of Australian mines on the thermal coal cost curve remains mostly unchanged.

It is expected that Australian coal producers will continue to target efficiency gains and cost cutting in response to lower received prices and that any projects that proceed to construction will be larger mines that offer lower costs of production through efficient logistics networks and economies of scale from higher production volumes. These prospective projects include GVK-Hancock's Alpha mine (annual capacity of 30 million tonnes), Adani's Carmichael mine (60 million tonnes) and Waratah Coal's China First coal project (40 million tonnes). All of these greenfield projects are in the Galilee coal basin in Queensland and have scheduled start-up dates towards the end of the outlook period. Larger mines such as Whitehaven's Maules Creek (10 million tonnes) and Shenhua Energy's Watermark (6 million tonnes) in New South Wales may also start production within the outlook period and support higher export volumes.

Over the medium term, Australia's thermal coal exports are projected to increase at an average rate of 8 per cent a year to 271 million tonnes in 2018. The growth is expected to be supported by increased demand for exports from China in the short term and then from India later in the outlook period. By 2018 both China and India are expected to overtake Japan to be the top two export destinations for Australian thermal coal.

Indonesia

In 2012, Indonesia's exports of thermal coal are estimated to have increased by 28 per cent to total 380 million tonnes with most of this additional tonnage exported to India and China. In 2013, exports are forecast to increase by a further 8 per cent to total 409 million tonnes, supported by continued import demand from India and China. Over the medium term, infrastructure constraints, higher transportation costs associated with transporting coal from new inland mines and a domestic reservation policy to ensure coal supply to electricity generators are expected to result in Indonesia's exports growing at a slower rate than in previous years. In 2018, Indonesia's exports are projected to total 437 million tonnes. There is an increasing trend in demand for lower calorific and cheaper coals, such as those from Indonesia. While this is expected to continue over the medium term, lower projected prices for higher quality coals, such as those from Australia and Colombia, could see this trend halt, or reverse, which may result in lower exports from Indonesia. Chinese government policies to restrict imports of lower quality coal are also a risk to growth in Indonesian exports.

The US

Exports from the US in 2012 are estimated to have increased by 49 per cent to total 51 million tonnes. A substitution away from coal towards the relatively cheaper natural gas for domestic electricity generation has resulted in many US coal producers putting their displaced sales onto the seaborne market. This transition has seen US thermal coal exports increase strongly for the last two years. However, forecast higher domestic gas prices and lower world coal prices are expected to reduce the financial incentives for current coal exporters over the medium term. In addition, the prospects of large volumes to be exported from central regions, such as the Powder River Basin, will be limited by the substantial infrastructure requirements to transport them. Over the outlook period US thermal coal exports are projected to decrease at an average annual rate of 11 per cent to total 25 million tonnes in 2018.

Colombia

In 2012, Colombia's thermal coal exports are estimated to have increased by 4.9 per cent to total 82 million tonnes. Colombia's thermal coal exports are forecast to decline to 77 million tonnes in 2013, as labour disputes disrupted export supply in the March and September quarters of 2013.

In the medium term, Colombia is expected to export increasing quantities of coal to the Asia-Pacific market as weak import demand from the EU and the US continues. Supporting the transition to new markets will be the low operating costs and high quality coal (low sulphur content and high calorific value). Expansions to infrastructure and mines that are scheduled for completion in Colombia over the outlook period will underpin thermal coal exports growing at an average annual rate of 7 per cent over the period 2014 to 2018, to total 107 million tonnes in 2018.

South Africa

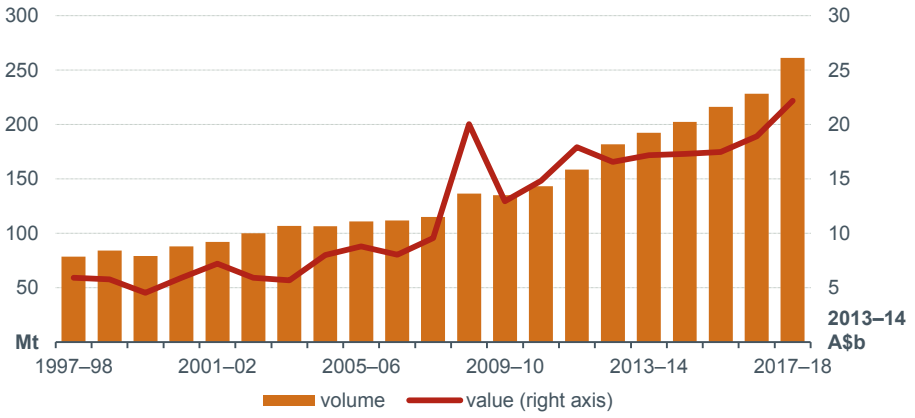
Exports from South Africa in 2012 are estimated to have increased by 8 per cent, relative to 2011, to total 74 million tonnes. Over the outlook period, growth in export volumes is expected to be limited by government policy that will aim to secure coal supply for state-owned electricity generator, Eskom. As a result, exports are projected to increase at around 2 per cent a year between 2013 and 2018, to total 83 million tonnes in 2018.

Australia's export volumes and values

Australia's export volumes of thermal coal increased by 15 per cent in 2012–13, relative to 2011–12, to total 182 million tonnes. The value of these exports was 6 per cent lower at $16.2 billion, with a lower Australian dollar thermal coal price more than offsetting higher export volumes. In 2013–14, export volumes and values are forecast to increase by around 6 per cent to total 192 million tonnes and $17.2 billion.

Over the remainder of the outlook period, Australia's thermal coal exports are projected to grow at an average rate of 6 per cent a year to total 261 million tonnes in 2017–18. Export values (in 2012–13 dollars) are projected to grow at an average annual rate of 7 per cent to total $22.2 billion dollars.

Figure 4: Australia's thermal coal exports



Sources: BREE; ABS.

Table 1: Thermal coal outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Contract prices b									
– nominal	**US$/t**	**130**	**115**	**95**	**88**	**84**	**87**	**92**	**96**
– real c	**US$/t**	**134**	**117**	**95**	**87**	**82**	**84**	**88**	**90**
Coal trade	**Mt**	**867**	**989**	**1 007**	**1 034**	**1 050**	**1 070**	**1 098**	**1 121**
Imports									
Asia	**Mt**	**580**	**691**	**720**	**748**	**765**	**781**	**803**	**822**
China	**Mt**	**137**	**218**	**240**	**260**	**267**	**272**	**277**	**281**
Chinese Taipei	**Mt**	**61**	**56**	**56**	**57**	**59**	**59**	**60**	**59**
India	**Mt**	**98**	**123**	**130**	**135**	**141**	**148**	**162**	**174**
Japan	**Mt**	**120**	**132**	**130**	**129**	**128**	**128**	**127**	**127**
Korea, Rep. of	**Mt**	**97**	**94**	**96**	**98**	**100**	**103**	**104**	**106**
Malaysia	**Mt**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**
other Asia	**Mt**	**45**	**46**	**46**	**47**	**48**	**49**	**51**	**53**
Europe	**Mt**	**211**	**215**	**212**	**214**	**216**	**217**	**221**	**223**
European Union d	**Mt**	**173**	**168**	**163**	**163**	**162**	**161**	**163**	**163**
other Europe	**Mt**	**39**	**47**	**49**	**52**	**54**	**55**	**58**	**60**
Exports									
Australia	**Mt**	**148**	**171**	**184**	**196**	**209**	**220**	**244**	**271**
China	**Mt**	**18**	**9**	**8**	**7**	**6**	**5**	**5**	**5**
Colombia	**Mt**	**78**	**82**	**77**	**84**	**93**	**101**	**104**	**107**
Indonesia	**Mt**	**298**	**380**	**409**	**420**	**425**	**428**	**432**	**437**
Russian Federation	**Mt**	**110**	**116**	**110**	**106**	**104**	**102**	**99**	**97**
South Africa	**Mt**	**68**	**74**	**75**	**76**	**78**	**78**	**81**	**83**
United States	**Mt**	**34**	**51**	**47**	**41**	**35**	**29**	**26**	**25**
		2010	2011	2012	2013	2014	2015	2016	2017
		–11	–12	–13	–14 f	–15 z	–16 z	–17 z	–18 z
Australia									
Production	**Mt**	**202.1**	**215.9**	**238.7**	**248.2**	**257.3**	**271.4**	**283.5**	**316.4**
Exports									
Volume	**Mt**	**143.3**	**158.4**	**181.6**	**192.2**	**202.2**	**216.1**	**228.2**	**261.1**
Value									
– nominal	**A$m**	**13 956**	**17 118**	**16 162**	**17 179**	**17 699**	**18 264**	**20 216**	**24 244**
– real e	**A$m**	**14 812**	**17 894**	**16 550**	**17 179**	**17 284**	**17 452**	**18 901**	**22 179**

b **Japanese Fiscal Year, starting April 1, fob Australia basis, BREE Australia–Japan average contract price assessment. For steaming coal with a calorific value of 6700 kcal/kg (gross air dried.** c **In JFY 2014 US dollars.** d **Regarded as 27 countries for all years.** e **In 2013–14 Australian dollars.** f **BREE forecast.** z **BREE projection.**
Sources: **BREE; ABARES; International Energy Agency; Coal Services Pty Ltd; Queensland Department of Mines and Energy.**

Uranium

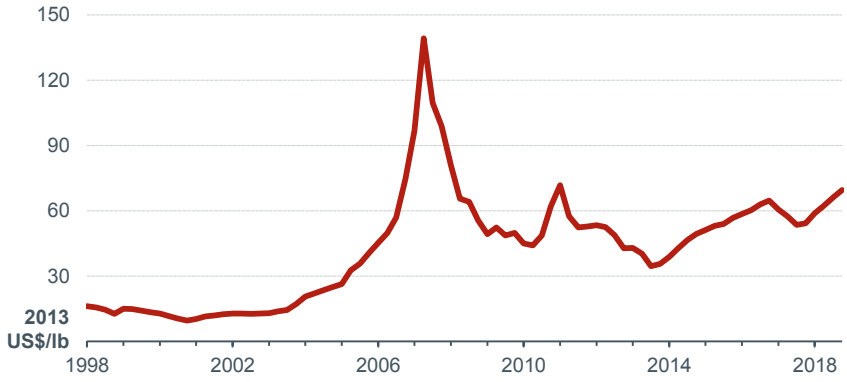
John Barber

Prices

Uranium spot prices have declined throughout 2013 in response to lower consumption demand and further growth in primary uranium production. The resulting market surplus has led to uranium spot prices declining to US$34 a pound in September 2013, a reduction of 20 per cent from the start of the year. This surplus is expected to continue through the rest of 2013 as Japan's idled nuclear power reactors are not expected to restart in 2013 and uranium miners have shown no signs of production curtailments, despite some mines operating at a loss. For 2013 as a whole, the uranium spot price is forecast to average US$38 a pound, 22 per cent lower than in 2012.

The end of the US-Russian Highly Enriched Uranium (HEU) deal in 2013 is expected to have a subdued effect on prices. Although this will remove around 10 000 tonnes of uranium from the market the impact on the demand-supply balance will be moderated by many power companies already committing to long term supply agreements while prices were low. In addition the build-up of inventories in 2013 and production at recently started mines will keep prices at lower levels. The average uranium price is forecast to increase 17 per cent in 2014, relative to 2013, to total US$45 a pound; however there are a number of key downside risks to this forecast. Delays to the restart of Japan's nuclear reactor fleet, a slower start-up of new reactors in China, a faster ramp up in production at emerging mines and sales of Government inventories could limit a rebound in uranium prices in 2014.

Figure 1: Uranium spot prices



Sources: Cameco, UxC Consulting Company.

Over the period 2014 to 2018, the uranium market balance is projected to change substantially. Rapid growth in nuclear power output, particularly among emerging economies, reduced supplies from secondary sources and long mine development lead times are expected to result in a substantially tighter market towards 2018 and support higher prices. The average uranium spot price is projected to increase to US$64 (in 2013 prices) a pound in 2018, a 67 per cent increase from price levels in 2013, in order to support increased output from higher cost mines around the world.

Consumption

World uranium consumption for civilian electricity generation in 2013 is forecast to decline 2 per cent, relative to 2012, to total 73 600 tonnes of uranium oxide (U_3O_8). This forecast decline is the result of the ongoing shut down of most of Japan's nuclear power industry, delays to the start-up of several new reactors being built in Asia and lower nuclear power output in the US, where several reactors have been idled or shut down.

In 2014, world uranium consumption is forecast to recover and to increase 10 per cent to total 81 200 tonnes. This forecast growth will be underpinned by the initial fuelling requirements for new reactors in China and the expected restart of some reactors in Japan. The timing of these events remains a key risk as there have been delays to both over the past two years. Over the medium term, growth in the number of operating nuclear power reactors will lead to substantial increases in demand for uranium. World uranium consumption is projected to grow at an average annual rate of 6 per cent from 2013 to 2018 and to total 97 500 tonnes in 2018. Delays in reactor approvals and construction have moderated this rate of increase but most emerging economies remain committed to increasing their use of nuclear power to provide a low cost and low carbon emitting source of electricity.

The restart of Japan's nuclear power industry is the principal issue defining the uranium market in 2013 and 2014. This closure has reduced Japan's uranium consumption by around 8500 tonnes in 2013 relative to its 2010 pre-Fukushima consumption levels. Nuclear power reactors are still expected to come back online to reduce Japan's reliance on fossil fuel imports but the exact timing of this restart is uncertain. In June 2013 Japan's Nuclear Regulatory Authority released the policy and requirements for restarting nuclear power reactors that have been switched off since the Fukushima Daiichi incident in March 2011. Although 4 power companies in Japan have lodged applications to restart up to 12 nuclear power reactors the likely time to assess the applications, particularly amid continuing public concerns about radiation leaks at the damaged Fukushima Daiichi reactor, suggest no reactors will restart in 2013 with mid-2014 seemingly more likely for some reactors to come back online. As a result, Japan's uranium consumption (excluding any inventory purchases) is forecast to be 400 tonnes in 2013, or around 5 per cent of its pre-Fukushima incident level. Consumption is forecast to increase to around 700 tonnes in 2014. As most of this forecast consumption growth is likely to be met by existing inventories, it is not expected to support higher uranium spot prices in 2014. Over the outlook period more reactors are expected to restart in Japan. However, several older power plants that require significant works and investment to meet the new safety standards are more likely to be decommissioned.

China is currently the third largest consumer of uranium in the world and consumed around 7700 tonnes of U_3O_8 in 2012. In 2013 its uranium consumption is forecast to moderate to around 7100 due to lower initial fuelling requirements in new reactors. The Chinese government review of its energy policy in 2012 delayed the start-up schedules of the 28 nuclear power reactors that are currently under construction. However, these reactors, as well as some of the additional 53 that are currently being planned, are expected to start-up in the outlook period. This is projected to support China's nuclear power generating capacity rising from an estimated 16 GWe in 2013 to around 53 GWe in 2018. To support this growth in nuclear power output, uranium consumption in China is projected to increase by around 65 per cent from 2013 levels to total 14 200 tonnes in 2018. Based on the schedule for new reactors to come online, China is expected to overtake France to be the world's second largest consumer of uranium in 2015 and then overtake the US as the largest consumer around 2020. As China currently produces around 1700 tonnes of U_3O_8 per year and has identified resources of around 166 100 tonnes* (tonnes of uranium at US$59/lb), most of its increasing uranium requirements are expected to be sourced from imports.

Uranium consumption in the world's largest producer of nuclear power, the US, is forecast to decrease 4 per cent to total 22 400 tonnes in 2013 as a result of four reactors closing permanently. These shutdowns reflected the challenging economics facing nuclear power producers in the US that are competing with emerging cheap gas power plants to supply domestic energy needs. Although there is a short term risk that some smaller reactors or ones that require significant site works and upgrades may also close, substantial closures are not projected in the medium term. This is because US gas prices are not forecast to remain at current low levels (particularly if the US becomes an LNG exporter) and because nuclear power generation will become more cost competitive with fossil fuel based power plants under recently implemented climate change action plans to cost carbon emissions. There are currently three reactors under construction in the US that are scheduled to start-up before 2018 and would provide an additional 3.6 GWe of nuclear power generation capacity. These new reactors, as well as higher output rates from existing reactors, are projected to support uranium consumption in the US increasing 17 per cent from 2013 to 2018 to total 26 400 tonnes.

Uranium consumption in the Middle East is projected to grow substantially in the medium and longer term. While countries in this region have large domestic reserves of oil and gas, their domestic energy policies are seeking to diversify their energy mix to reduce dependence fossil fuels and the rate of their resource depletion. The UAE is currently developing its first nuclear power plant with two of the planned four reactors at this plant already under construction. The first of these reactors is scheduled to start-up in 2017 and when complete the power plant will have a total capacity of around 5.6 GWe. Saudi Arabia is also developing plans to build up to 16 nuclear reactors with a combined capacity of 17 GWe, although the first reactor is not scheduled to come online until 2022.

* OECD Nuclear Energy Agency, International Atomic Energy Agency (2011), Uranium 2011: Resources, Production and Demand.

Production

In 2013, primary uranium production is forecast to increase 2 per cent relative to 2012 and to total 68 100 tonnes. Production disruptions at Areva's Somair mine in Niger are expected to be more than offset by the increases in production at other mines around the world. Although prices have declined further in 2013 recently commissioned mines in Kazakhstan and Africa have continued to ramp up production towards their full capacity in anticipation of a sharp decrease in secondary supplies when the US-Russian HEU program concludes in December 2013. This continued production growth combined with lower consumption has resulted in a short term oversupply of uranium in the market which has led to sustained decline in prices in 2013. Uranium spot prices have decreased to a level that is below the operating cash cost of some existing uranium mines and the required price to support investment decisions on new projects.

Primary uranium production is forecast to increase by a further 4 per cent to total 70 700 tonnes in 2014. First output from the Cigar Lake mine in Canada is now expected in the first quarter of 2014 after technical problems led to a delayed start of commercial operation. Production of around 900 tonnes of U_3O_8 is forecast for the Cigar Lake mine in 2014 with production assumed to commence in the first quarter of 2014. Kazakhstan's production is forecast to increase 3 per cent in 2014 to around 26 500 tonnes of U_3O_8. Kazakhstan's large in-situ recovery (ISR) mines are mainly at the lower end of the cost curve and are better placed to manage this period of low prices. In the US production is forecast to increase by 18 per cent, albeit from a low starting base, to around 2800 tonnes in 2014. This increase will be underpinned by the expected start-up of new, but relatively smaller mines, and higher production at recently commissioned mines.

The uranium market balance is expected to tighten in 2014 with the end of the US-Russian HEU agreement. Nevertheless, the prospects of a substantial price increase remain limited due to a number of nuclear power plant operators taking advantage of low prices in 2013 to sign long term supply agreements, a prevalence of uranium inventories built up in 2013 and continuing subdued demand in Japan. Over the period 2014 to 2018, world primary uranium production is projected to grow at an average rate of 6 per cent a year to total 90 300 tonnes in 2018. The growth in output will be underpinned by substantial growth in output from existing uranium producing countries and there are also prospects for new market suppliers to emerge.

Kazakhstan is projected to remain the world's largest uranium producing country and produce 29 900 tonnes of U_3O_8 in 2018. Its production growth rate between 2014 and 2018 is projected to be lower than most competitor countries at 13 per cent, but this is starting from a considerably higher base. The projected growth in Kazakhstan's uranium production will be supported mainly by further expansions at existing mines where additional ISR wells can be created and processing mills expanded more economically than new greenfield mines.

Uranium production in Canada is projected to increase 51 per cent from 2014 to total 17 100 tonnes of U_3O_8 in 2018. This increase will be underpinned by the Cigar Lake mine which is projected to ramp up to full operating capacity of around 7700 tonnes of U_3O_8 a year by 2018, making it the second largest uranium mine in the world behind the McArthur River mine, also in Canada, that has a projected output of around 8500 tonnes of U_3O_8 in 2018. Canada has a number of uranium deposits that are still being explored and measured. Despite their high ore grades, these potential mines are unlikely to be developed before 2018 based on current uranium mine development times and because current uranium prices are not currently conducive to investment outlays for new mines.

Over the outlook period, countries in Africa will become increasing important to supplying world uranium markets. In 2013 combined production from Niger, Namibia, Malawi and South Africa is forecast to total around 11 700 tonnes of U_3O_8. In 2018 this combined production is projected to grow by over 6500 tonnes, or 64 per cent, relative to 2013 and total 19 300 tonnes. This growth is mainly attributable to production starting at the Imouraren mine in Niger and Husab mine in Namibia. At full production, these mines together will produce around 12 000 tonnes of U_3O_8 a year but this is not expected to occur until after 2018. Areva's Trekkopje mine in Namibia is also expected to be completed and commence initial production in the second half of the outlook period. Low market prices led project developers Areva to put construction of the Trekkopje mine on hold in 2012 despite it being nearly completed. Growing demand and the projected recovery of uranium prices after 2015 are expected to support the project being completed and to start initial commercial production in 2016.

In the medium term, uranium supply is expected to become much tighter compared with 2013. The end of the US-Russian HEU agreement in December 2013 is expected to restore some balance in 2014; however there a number of large uranium mines opening over the next three years that will more than offset this drop in (secondary) supply. Although a number of planned uranium mines have been delayed, so have a number of planned nuclear power reactors. As a result, the previously anticipated market shortfall and price recovery are now projected to occur later. Nevertheless, the projected increase in world nuclear power generating capacity will require more uranium mines to open after 2018. Based on current estimates of operating costs for planned mines, this will require a sustained period of prices above US$65 a tonne. While the current period of lower uranium prices provides some short term benefits to power companies, the risk of future market imbalances is increasing. The potential future supply shortfalls followed by periods of over-investment to rapidly increase supply may magnify the fluctuations.

Australia

Production

Australia's production of uranium in 2012–13 is estimated to have increased 16 per cent, relative to 2011–12, to total 8919 tonnes (U_3O_8). This increase in production was mainly due to ERA's Ranger Mine returning to full production in the September and December quarters of 2012 after heavy wet season rains left excessive volumes of water in the main pit in early 2012 and limited ore extraction. In 2013–14 production is forecast to decrease 18 per cent to 7270 tonnes (U_3O_8) due to the Ranger mine processing lower grade stockpiled ores through its mill following the closure of Pit 3.

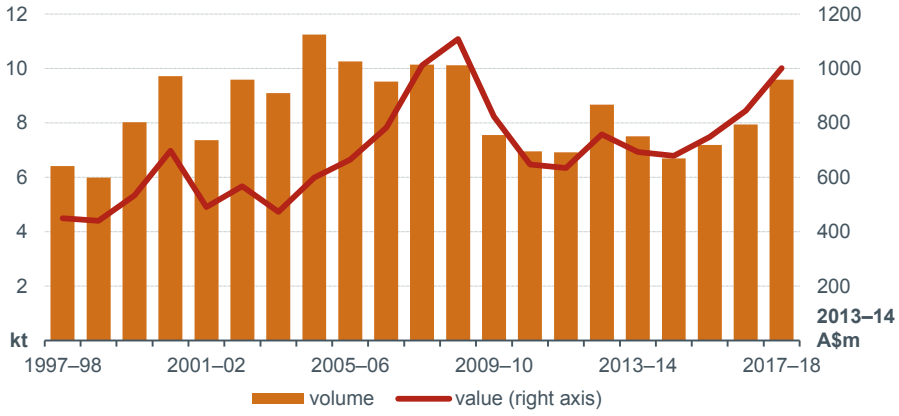
Between 2013–14 and 2017–18 Australia's uranium production is projected to increase by 32 per cent to total 9590 tonnes. This projected increase will be underpinned by the start-up of Alliance Resources' Four Mile mine in South Australia, a return to ore extraction from a new underground mine at Ranger and the start-up of Toro Energy's Wiluna mine in Western Australia. There are additional uranium mining projects being planned in Australia that may receive an investment decision to proceed with construction during the outlook period; however based on current planning and construction times for uranium mines these are not expected to start commercial production before 2017–18. Like many types of mines in Australia, proposed uranium mines are faced with challenging economics from the combination of low market prices and escalating construction costs. The cost of constructing mines in Australia is expected to moderate over the medium term although market prices are not projected to support planned mines, such as Cameco's Kintyre and Yeelirrie projects as well as potential projects in Queensland, until after 2016.

Exports

BREE's initial estimate is that Australia exported around 8700 tonnes of uranium (U_3O_8) in 2012–13, an increase of 25 per cent from 2011–12. Due to uncertainty on the timing of shipments and level of inventories held at mines, this amount may be lower but as Australia does not have any nuclear power plants (or plans to develop any) all produced uranium produced is exported eventually. Estimated growth in export volumes underpinned uranium export values increasing 21 per cent to total $739 million in 2012–13.

In 2013–14 lower mine production is forecast to result in a 13 per cent decrease in Australia's uranium export volumes. The value of uranium exports is forecast to decline by a proportionally lower 6 per cent and to total $692 million due to a lower Australian dollar exchange rate. Over the remainder of the outlook period, growth in Australia's uranium production is projected to support export volumes increasing at an average annual rate of 6 per cent to around 9600 tonnes in 2017–18. Combined with higher Australian dollar received prices, the value of uranium exports is projected to grow at an average annual rate of 10 per cent to around $1 billion (in 2013–14 dollars) in 2017–18.

Figure 3: Australia's uranium exports



Sources: BREE, ABS.

Table 1: Uranium outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Production	**kt**	**63.3**	**67.0**	**68.1**	**70.7**	**75.3**	**81.0**	**86.4**	**90.3**
Africa b	**kt**	**10.4**	**11.9**	**11.7**	**12.5**	**13.1**	**14.3**	**16.1**	**19.3**
Canada	**kt**	**10.8**	**10.2**	**10.2**	**11.3**	**13.6**	**16.1**	**17.5**	**17.1**
Kazakhstan	**kt**	**22.9**	**24.8**	**25.7**	**26.5**	**27.8**	**28.4**	**29.6**	**29.9**
Russian Federation	**kt**	**3.5**	**3.0**	**3.3**	**3.6**	**3.6**	**3.7**	**4.4**	**4.4**
Consumption	**kt**	**73.8**	**75.1**	**73.6**	**81.2**	**84.8**	**89.8**	**92.7**	**97.5**
China	**kt**	**4.8**	**7.7**	**7.1**	**9.5**	**13.4**	**12.4**	**13.1**	**14.2**
European Union c	**kt**	**23.4**	**22.6**	**22.6**	**22.8**	**22.8**	**25.0**	**22.8**	**24.4**
Japan	**kt**	**3.3**	**0.4**	**0.4**	**0.7**	**2.0**	**3.9**	**5.2**	**6.5**
Russian Federation	**kt**	**5.8**	**6.5**	**6.0**	**6.8**	**5.0**	**6.7**	**5.9**	**5.2**
United States	**kt**	**21.7**	**23.3**	**22.4**	**24.9**	**25.7**	**25.3**	**27.4**	**26.4**
Spot price	**US$/lb**	**56.8**	**48.4**	**38.3**	**44.8**	**54.8**	**63.5**	**59.0**	**68.0**
– real d	**US$/lb**	**58.5**	**49.3**	**38.3**	**44.4**	**53.7**	**61.6**	**56.4**	**64.2**

		2010 –11	2011 –12	2012 –13 s	2013 –14 f	2014 –15 z	2015 –16 z	2016 –17 z	2017 –18 z
Australia									
Production	**t**	**7 069**	**7 657**	**8 919**	**7 270**	**6 690**	**7 190**	**7 940**	**9 590**
Export volume	**t**	**6 950**	**6 917**	**8 675**	**7 508**	**6 690**	**7 190**	**7 940**	**9 590**
– nominal value	**A$m**	**610**	**607**	**739**	**692**	**695**	**783**	**904**	**1 094**
– real value e	**A$m**	**647**	**635**	**757**	**692**	**679**	**748**	**845**	**1 001**

b **Includes Niger, Namibia, South Africa, Malawi and Zambia.** c **Regarded as 27 countries for all years.** d **In 2013 US dollars.** e **In 2013–14 Australian dollars.** f **BREE forecast.** z **BREE projection.**
Sources: **BREE; ABARES; Australian Bureau of Statistics, Canberra; Department of Industry, Canberra; Ux Consulting.**

Resources outlook

Steel and steel-making raw materials

Tom Shael

World steel consumption

In 2013, world steel consumption is forecast to increase by 3.0 per cent, compared with 2012, to total 1.57 billion tonnes. The growth will be supported mostly by increased infrastructure construction activity in emerging economies, particularly in Asia.

Over the outlook period, world steel consumption is projected to increase at an average annual rate of 2.7 per cent to total 1.79 billion tonnes in 2018 (see Table 1). The majority of this growth is projected to come from non-OECD economies, driven by assumed robust economic growth and higher rates of investment in steel-intensive capital formation to support increasing urban populations. Growth in steel consumption in OECD economies is projected to be subdued due to a lesser requirement for investment in steel-intensive capital and assumed lower economic activity.

Table 1: World steel consumption and production (Mt)

	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
Crude steel consumption								
EU 27	169	166	165	166	168	170	172	175
US	96	98	99	100	101	102	103	104
Brazil	28	28	29	30	31	32	32	33
Russia	47	49	50	52	53	54	55	55
China	650	669	703	730	755	780	800	820
Japan	70	73	74	74	75	75	75	76
South Korea	59	62	60	62	64	65	67	68
India	74	78	83	88	93	99	104	110
World steel consumption	**1485**	**1526**	**1572**	**1623**	**1663**	**1704**	**1746**	**1789**

	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
Crude steel production								
EU 27	176	167	167	168	170	172	174	177
US	86	89	87	88	89	91	93	95
Brazil	35	35	35	36	37	38	39	40
Russia	69	71	70	72	74	76	79	83
China	683	709	762	788	809	829	846	861
Japan	108	107	109	110	110	111	112	112
South Korea	68	69	67	69	71	73	74	76
India	72	77	80	85	90	96	103	110
World steel production	**1510**	**1534**	**1586**	**1631**	**1668**	**1709**	**1749**	**1788**

Sources: BREE; World Steel Association.

In 2013, China's steel consumption is forecast to increase by 5 per cent to total 703 million tonnes. This growth is expected to be supported by continued growth in commercial and residential construction, as indicated by a rise in housing sales that began in late 2012 and has continued into early 2013 that has not yet been met with increased construction activity. Government announced infrastructure investment packages, particularly the plan to expand rail networks, which were announced in late-2012 will also be a source of additional demand for steel.

Over the period 2014 to 2018, China's steel consumption is projected to increase at an average annual rate of 3.1 per cent to total 820 million tonnes in 2018. The growth is expected to be supported by increasing demand for urban dwellings and associated infrastructure as people relocate from rural to urban areas. Although the growth in China's steel demand is forecast to be robust going forward, it is unlikely that the high rates of growth that have occurred in recent years will continue. This is expected, in part, as a result of a slowing in housing and property investment brought about by Chinese Government policies designed to reduce over-investment in the sector and a gradual shift towards a more consumption driven economy. A downside risk to these projections is the possibility that the Chinese economy undergoes this structural shift sooner, thus reducing its rate of fixed asset investment. This could result in China's steel consumption, and also production, being substantially lower than projected.

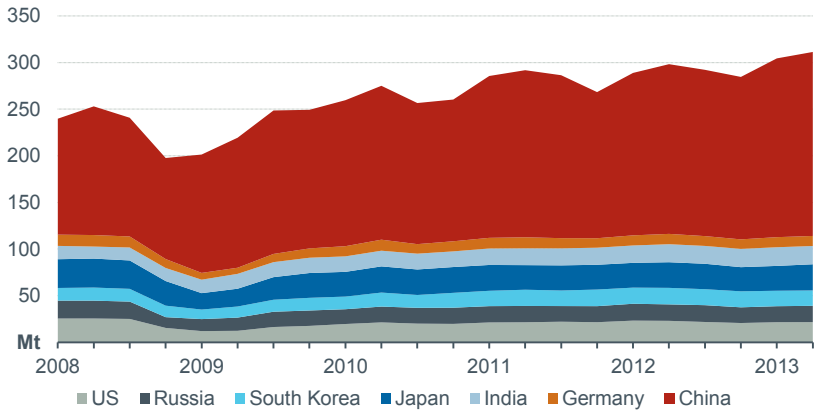
In 2013, India's steel consumption is forecast to increase 6 per cent to total 83 million tonnes. The increase in consumption is expected as a result of government spending on infrastructure projects and higher consumption of consumer durables. Over the outlook period, consumption is projected to grow at an average annual rate of 6 per cent to total 110 million tonnes in 2018. Increases in India's steel consumption are expected to be supported by government efforts to increase the coverage and quality of its national infrastructure network. This includes its road networks (including bridges), rail systems and electricity generation and supply network. A gradual increase in consumption of consumer durables in response to rising incomes will also support higher levels of steel consumption.

Compared with consumption growth in non-OECD economies, growth in OCED economies is projected to be more subdued. Steel consumption growth rates in each of Japan, the US and the EU are projected to average around 1 per cent a year to 2018. Steel consumption in Japan is projected to total 76 million tonnes in 2018. Steel consumption in the US and the EU is projected to total 104 and 175 million tonnes, respectively. Neither the US nor the EU is expected to invest in steel-intensive fixed assets that would support substantially higher growth in steel consumption.

World steel production

In 2013, world steel production is forecast to increase by 3.4 per cent, relative to 2012, to total 1.59 billion tonnes. Over the outlook period, global steel production is projected to grow at an average annual rate of 2.6 per cent to total 1.79 billion tonnes in 2018. As with steel consumption, the majority of the growth is projected to occur in emerging economies, particularly those in Asia.

Figure 1: Quarterly steel production



Source: World Steel Association.

To the end of July 2013, every month of China's steel output data has been higher than the previous record for monthly output (61.7 million tonnes) achieved in July 2012. This includes a new record of 67 million tonnes achieved in the 31 days of May. While there have been Government efforts to shut down out-dated capacity in the steel industry to reduce overcapacity, this is not expected to have a material impact on steel output. For 2013 as a whole, steel production is forecast to increase by 7.5 per cent to total 762 million tonnes. The growth in production is forecast to outpace consumption and is expected to result in an increase in China's steel exports in 2013.

Over the medium term, China's steel production is projected to grow at an average of 3.3 per cent a year to total 861 million tonnes in 2018. This is substantially lower than the average growth between 2008 and 2012 of 9 per cent; however, future growth will be from a much higher base. The moderation in incremental production over the five years compared with the previous five is expected as a result of government measures to curb production overcapacity issues (especially in some low-value steel products) and to increase the overall efficiency of the domestic steel industry.

Over the outlook period, India's steel production is projected to increase at an average annual rate of 6 per cent and to total 110 million tonnes in 2018. The increase in steel production is expected to be bolstered by demand from both the public and private sectors. Private steel producers including Tata Steel, Essar Steel and Jindal Steel Power Limited (JSPL) have plans to increase their production capacity. Furthermore, the government-owned corporations Steel Authority of India Limited (SAIL) and Rashtriya Ispat Nigam Limited (RINL) have expansion plans to increase combined production capacity by around 15 million tonnes by 2015.

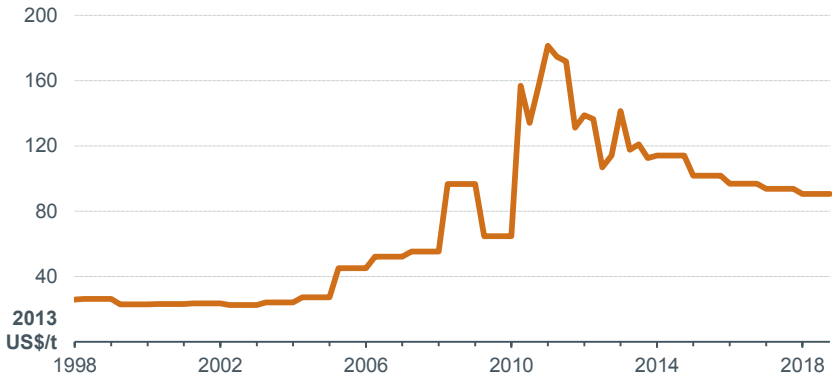
In OECD economies, only a modest increase in steel production is projected to the end of 2018. Steel production in both the US and Japan is projected to grow at an average rate of around 1 per cent a year to 2018, to reach 95 million tonnes and 112 million tonnes, respectively. Capacity utilisation rates at steel mills in the EU are expected to begin increasing in 2014 and 2015, in line with an assumed improvement in economic activity in key producing regions. Steel production in the EU is expected to increase at an average annual rate of 0.9 per cent over the outlook period and to total 177 million tonnes in 2018.

Iron ore prices

Spot prices for cargoes of 62 per cent iron free on board (FOB) Western Australia averaged US$118 a tonne in the June quarter 2013, down from an average of US$141 a tonne in the March quarter. Spot prices have since recovered and are expected to average around US$122 for the September quarter. This rebound in spot prices in the September quarter is contrary to what has happened in recent years, and primarily reflects lower port inventories of iron ore in China compared to previous years. For 2013 as a whole, spot prices are forecast to average US$125 a tonne (US$121 for contract prices; see Figure 2), although there is a possibility of a stronger price decline in the December quarter 2013 as additional supply enters the market.

Over the remainder of the outlook period, spot and contract prices are projected to decline year-on-year to average around US$91 a tonne in 2018 (in 2013 US dollars). The decrease in prices is expected in response to substantial increases in seaborne supply from mining projects that are already under construction as well as planned mines that are expected to begin producing in the medium term.

Figure 2: Iron ore prices, FOB Australia



Note: JFY contract prices until April 2010, average spot prices thereafter.
Sources: BREE; Bloomberg.

World trade in iron ore

In 2013, world trade of iron ore is forecast to increase by 8 per cent, relative to 2012, to total 1.22 billion tonnes supported by imports into Asian economies. Over the medium term, world iron ore trade is projected to increase at an average rate of 4.7 per cent a year to total 1.49 billion tonnes in 2018 (see Table 2). China's imports are projected to continue growing strongly, with the majority of additional exports expected to be supplied by producers in Australia and Brazil.

Table 2: World iron ore trade (Mt)

	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
Iron ore imports								
EU 27	133	128	129	130	132	134	136	137
Japan	128	131	133	133	134	135	136	136
China	687	745	831	872	908	936	967	998
South Korea	65	65	63	65	67	68	70	71
Australia	438	492	570	669	729	775	828	847
Brazil	331	327	336	371	391	406	423	447
India (net exports)	48	25	12	26	25	19	15	13
Canada	31	35	35	35	30	29	28	26
South Africa	42	47	49	49	50	50	50	50
World trade	**1085**	**1126**	**1216**	**1307**	**1359**	**1404**	**1452**	**1487**

Sources: BREE; Bloomberg; UNCTAD.

Iron ore imports

In 2013, China is forecast to increase its imports of iron ore by 12 per cent to total 831 million tonnes. An important factor determining Chinese imports in the past has been the cost and ore grade of domestic production. More recently, the availability of domestic supply has also become significant; with domestic run of mine production remaining flat between 2011 and 2012, and production so far in 2013 is on track for a similar outcome. Declining average ore grades of production, however, have resulted in production of a grade that is comparable to that of imports declining.

Over the medium term, Chinese steel producers are projected to increase their reliance on imported ores. This is expected as a result of declining ore grades and production levels of domestic ores, an increasing concentration of steel mills on the eastern seaboard that have rapid access to ports, and concerted efforts to raise the quality of China's steel, which, in turn, requires higher grade ores (such as ores from Australia and Brazil). Although China aims to have around 40 per cent of its iron ore imports supplied by Chinese owned foreign projects by 2015, whether or not this target is met, China is projected to increase its reliance on imports over the medium term. To 2018, China's imports are projected to grow at an average rate of 5 per cent a year to reach 998 million tonnes in 2018, which equates to around two-thirds of world trade.

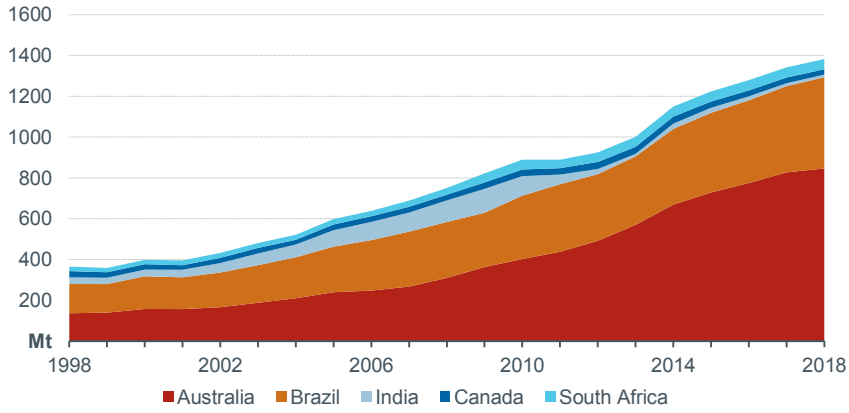
Imports into South Korea are projected to increase by around 2 per cent a year over the outlook period. This projected growth rate is lower than recent years as a result of moderating demand for steel in car and ship manufacturing. Imports into the EU and Japan are expected to continue to increase in line with the moderate growth projected for steel production, with imports growing at an average rate of around 1 per cent a year to 2018.

Iron ore exports

Australia is the world's largest exporter of iron ore, and is projected to remain so over the outlook period. In 2013, Australia's exports of iron ore are forecast to increase by 16 per cent to total 570 million tonnes. The increase will be supported by forecast higher production at a number of mines including those operated by Rio Tinto and BHP Billiton as well as the ramp up of production at Fortescue's Chichester Hub and Solomon Hub expansion projects. Investment over the past several years in expansions to existing mines as well as new mines, predominantly in Western Australia, are expected to support substantial growth in iron ore exports from Australia over the outlook period. Australia's iron ore exports are projected to increase at an average annual rate of 8 per cent a year between 2014 and 2018 to total 847 million tonnes in 2018 (see Figure 3). The strong growth is supported by many of the mines in the Pilbara region of Western Australia being at the lower end of the cost curve. The competitiveness of some of these mines, as well as some future developments, is set to improve further with the adoption of automated and/or driverless trucks and trains.

Brazil is the world's second largest exporter of iron ore, and supplies around 30 per cent of world trade. Brazil's iron ore exports are forecast to increase by 2.8 per cent in 2013, relative to 2012, to total 336 million tonnes. If safety and commercial issues on the landing of Valemax ships in China are resolved, this could boost Brazil's exports in the short term and also increase exporters' margins. Over 2014 to 2018, Brazil's exports are projected to increase at an annual average rate of 6 per cent to total 447 million tonnes in 2018. Most of the additional tonnage is expected to be sourced from expansions located in the Carajas and South-East iron ore systems that are scheduled to start up in the medium term. The largest and most significant of these projects is Vale's 90 million tonne a year S11D, or Serra Sul project that is scheduled to start production in 2017. However, there is a significant schedule risk associated with developing a greenfield mining project of this scale and technical complexity and a later production start date is possible.

Figure 3: Major iron ore exporters



Sources: BREE; Bloomberg; UNCTAD.

In 2013, India's net exports are forecast to total 12 million tonnes, down from an estimated 25 million tonnes in 2012. Over the next few years, bans on mining in India's key iron ore producing states are expected to continue to impact on production. However, it is expected that in an effort to bolster iron ore exports to take advantage of a devalued rupee, the Indian government will act to reduce bans while also ensuring supply for domestic steel makers. To this end, in mid-September 51 mining leases (around 15 million tonnes) of the worst offending illegal miners in Karnataka were cancelled and are expected to be allotted to steel mills for captive consumption. While it is likely that the Indian Government will soon reduce the export tax on iron ore to 20 per cent, down from 30 per cent, it is not expected to result in a substantial increase in exports, as mining bans in key states are expected to remain in place. As a result, net exports are forecast to increase to 26 million tonnes in 2014 as domestic production increases.

Over the remainder of the outlook period, India's domestic needs are expected to be prioritised and as such net exports are projected to decrease. In 2018, India's net exports are projected to total 13 million tonnes. However, there is an upside risk to this assessment which could eventuate if mining bans are lifted earlier and new mines can be commissioned.

Exports from West Africa are not projected to have a significant impact on world markets within the outlook period. The substantial infrastructure requirements and sovereign risks in the region are expected to inhibit the development of large scale iron ore mining projects within the outlook period. Although exports from West Africa may become important in coming decades, BREE does not expect this to occur over the next five years. Additional export supply from established producing regions (such as in Australia and Brazil) is seen as more commercially viable to supply growing demand in key Asia-Pacific markets over the medium term.

Metallurgical coal prices

Contract prices for high quality metallurgical coal for delivery in the September quarter 2013 settled at around US$145 a tonne FOB Australia, the lowest contract settlement since the GFC-induced low of US$128 a tonne for the 2009 Japanese Financial Year (JFY, April to March). Spot prices have traded higher than this since mid-August 2013, reaching a high of around US$154 a tonne in early September. Reflecting this increase in spot prices, contract prices for delivery in the December quarter settled at US$152 a tonne. For 2013 as a whole, contract prices are forecast to average US$159 a tonne (see Figure 4).

Over the remainder of the outlook period, metallurgical coal prices are projected to drop in the short term due to the continuing over-supply before growing demand balances the market and supports higher prices. Contract prices in 2018 are expected to average around US$163 a tonne (in 2013 US dollars).

Figure 4: Metallurgical coal benchmark prices, FOB Australia

Source: BREE.

World trade in metallurgical coal

In 2013, world metallurgical coal trade is forecast to grow by 4.8 per cent, relative to 2012*, to total 304 million tonnes. Over the medium term, world metallurgical coal trade is projected to increase at an average rate of 3 per cent a year to total 346 million tonnes in 2018 (see Table 3). China is projected to have the largest growth in imports to 2018, with the majority of additional export supply projected to come from Australia. Import demand in other countries, particularly advanced economies, is projected to remain stable reflecting subdued growth in their domestic steel production.

Table 3: World metallurgical coal trade (Mt)

	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
Metallurgical coal imports								
EU 27	46	44	41	45	45	49	49	49
Japan	54	52	52	52	52	53	53	53
China	45	71	87	93	98	104	103	107
South Korea	32	31	32	32	33	33	33	34
India	34	37	40	41	40	42	44	46
Brazil	12	11	13	14	14	15	15	16
Metallurgical coal exports								
Australia	133	145	157	168	178	185	189	196
Canada	28	31	31	32	32	33	33	33
US	63	63	60	57	56	55	52	50
Russia	14	18	14	15	14	13	12	10
World trade	**274**	**290**	**304**	**316**	**326**	**338**	**340**	**346**

Source: BREE.

Over the outlook period, China's imports of metallurgical coal are projected to increase at an average annual rate of 7 per cent to reach 107 million tonnes by 2018 and are projected to grow further as its domestic metallurgical coal resources are of lower quality and generally large distances from steel mills. Together, these contribute to higher production costs relative to imports. The Chinese Government also has an announced metallurgical coal reservation policy that promotes imports to increase the longevity of its domestic reserves.

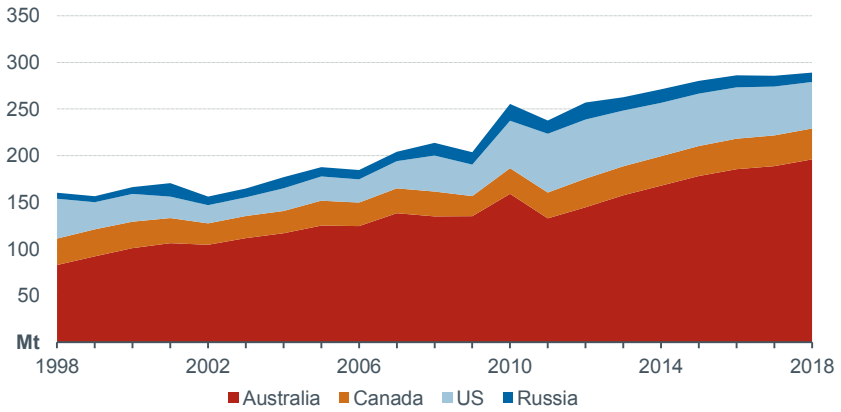
* Based on revised trade data from the IEA.

Imports into Brazil are projected to grow at an average annual rate of 6 per cent to reach 16 million tonnes in 2018. India's imports are projected to increase at an average rate of 3.7 per cent a year to total 46 million tonnes in 2018. The growth in imports into Brazil and India reflect projected strong growth in steel production in those economies. Imports into the EU are projected to increase at a modest 1.9 per cent a year over the outlook period to reach 49 million tonnes in 2018. The growth in imports into the EU is a result of moderate growth in steel production and flat metallurgical coal production in the region.

Metallurgical coal exports

In 2013, exports from Australia are forecast to increase by 9 per cent, relative to 2012, to total 157 million tonnes. Over the period 2014 to 2018, Australia's exports of metallurgical coal are projected to increase at an average rate of 4.5 per cent a year to reach 196 million tonnes in 2018 (see Figure 5). The growth will be supported by the start-up of projects such as BHP Billiton Mitsubishi Alliance's (BMA's) Caval Ridge (8 million tonnes a year) and Daunia projects (4.5 million tonnes); Anglo American's Grosvenor underground mine (5 million tonnes); and the Jellinbah Group's joint venture Lake Vermont expansion (4 million tonnes). While the start-up of these projects will support growth in metallurgical coal production and exports over the next few years, lower projected prices in the short term will likely reduce the prospects of new projects contributing substantially to export volumes towards the end of the outlook period. An upside risk to this projection is if producers in Australia can reduce their operating costs and lower their positions on the global cost curve.

Figure 5: Major metallurgical coal exporters



Sources: BREE; IEA.

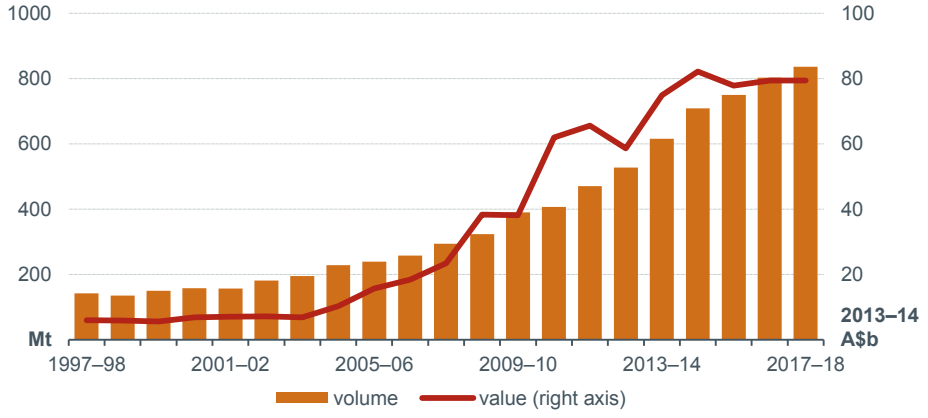
Exports of metallurgical coal from Canada are projected to increase slightly over the medium term while exports from Russia are projected to moderate to total 33 million tonnes and 10 million tonnes, respectively, in 2018. Exports from the US are projected to decline over the medium term and to total 50 million tonnes in 2018. Constraints to infrastructure networks and high freight costs are expected, with the profile of projected prices, to make US metallurgical coal exports less competitive over the outlook period.

Australia's exports

In 2012–13, Australia's export volumes of iron ore increased by 12 per cent, relative to 2011–12, to total 527 million tonnes. The largest portion of the additional tonnage was supplied by Fortescue, with BHP Billiton and Rio Tinto also increasing their output. The value of Australia's iron ore exports in 2012–13 decreased by 9 per cent to total $57.2 billion. The decrease can be attributed to the lower prices that prevailed in the September and December quarters of 2013 which offset higher export volumes.

Australia's exports of iron ore are projected to continue to grow strongly over the medium term. Growth in export volumes is projected to come from expansions to capacity at a number of mines, including Fortescue's Chichester Hub and Solomon Hub expansions, as well as expansions to existing mines. Export volumes are projected to increase at an average annual rate of 10 per cent over the outlook period, to total 836 million tonnes in 2017–18 (see Figure 6). The strong growth in export volumes, combined with an assumed depreciation of the Australian dollar relative to the US dollar, will support export values increasing to $82.5 billion (in 2013–14 dollars) in 2014–15, before a projected moderation in world prices leads to lower export earnings. In 2017–18, export earnings are projected to total $79.6 billion (in 2013–14 dollars).

Figure 6: Australia's iron ore exports

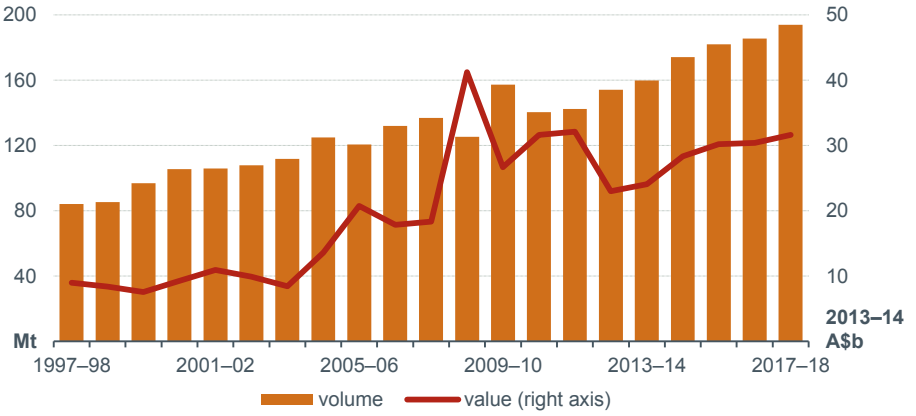


Sources: BREE; ABS.

Australia's metallurgical coal export volumes in 2012–13 increased by 8 per cent to total 154 million tonnes. Although export volumes were higher, lower contract and spot prices resulted in export earnings declining to $22.4 billion.

Over the remainder of the outlook period export volumes of metallurgical coal are projected to increase at an average annual rate of 4.7 per cent to total 194 million tonnes in 2017–18. Higher export volumes, relatively stable projected prices and an assumed depreciation of the Australian dollar against the US dollar are expected to result in export earnings from metallurgical coal increasing to $31.6 billion (in 2013–14 dollars) in 2017–18 (see Figure 7).

Figure 7: Australia's metallurgical coal exports



Sources: BREE; ABS.

Table 4: Steel and steel-making raw materials outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Contract prices b									
Iron ore c									
– nominal	US$/t	**153**	**129**	**121**	**119**	**108**	**101**	**99**	**97**
– real d	US$/t	**158**	**132**	**121**	**118**	**106**	**98**	**94**	**91**
Metallurgical coal e									
– nominal	US$/t	**289**	**210**	**159**	**159**	**165**	**169**	**171**	**173**
– real d	US$/t	**298**	**214**	**159**	**158**	**161**	**164**	**164**	**163**
		2010 –11	2011 –12	2012 –13	2013 –14 f	2014 –15 z	2015 –16 z	2016 –17 z	2017 –18 z
Australia									
Production									
Iron and steel gs	**Mt**	**7.31**	**5.38**	**4.85**	**4.51**	**4.48**	**4.37**	**4.37**	**4.33**
Iron ore	**Mt**	**447**	**504**	**554**	**628**	**719**	**760**	**813**	**846**
Metallurgical coal	**Mt**	**147**	**147**	**158**	**164**	**178**	**186**	**189**	**198**
Exports									
Iron and steel gs	**Mt**	**1.78**	**1.19**	**0.99**	**0.97**	**0.96**	**0.93**	**0.93**	**0.91**
Nominal value	**A$m**	**1 303**	**983**	**820**	**788**	**754**	**745**	**737**	**726**
Real value h	**A$m**	**1 383**	**1 028**	**840**	**788**	**737**	**711**	**689**	**664**
Iron ore	**Mt**	**407**	**470**	**527**	**615**	**709**	**750**	**803**	**836**
Nominal value	**A$m**	**58 387**	**62 695**	**57 201**	**76 213**	**84 480**	**81 548**	**85 110**	**86 967**
Real value h	**A$m**	**61 968**	**65 536**	**58 574**	**76 213**	**82 500**	**77 922**	**79 575**	**79 562**
Metallurgical coal	**Mt**	**140**	**142**	**154**	**160**	**174**	**182**	**185**	**194**
Nominal value	**A$m**	**29 793**	**30 700**	**22 439**	**24 023**	**29 005**	**31 601**	**32 493**	**34 578**
Real value h	**A$m**	**31 620**	**32 091**	**22 977**	**24 023**	**28 326**	**30 196**	**30 380**	**31 633**

b **fob Australian basis, BREE Australia–Japan average contract price assessment**. c **Fines contract, 62% iron content basis.** d **In 2013 US dollars.** e **High-quality hard coking coal. For example, Goonyella export coal.** g **Includes all steel items in ABS, *Australian Harmonized Export Commodity Classification,* chapter 72, 'Iron and steel', excluding ferrous waste and scrap and ferroalloys.** h **In 2013–14 Australian dollars.** f **BREE forecast.** s **BREE estimate.** z **BREE projection.**
Sources: **BREE; ABARES; International Iron and Steel Institute; Coal Services Australia; Queensland Coal Board; United Nations Conference on Trade and Development.**

Gold

Kate Penney and John Barber

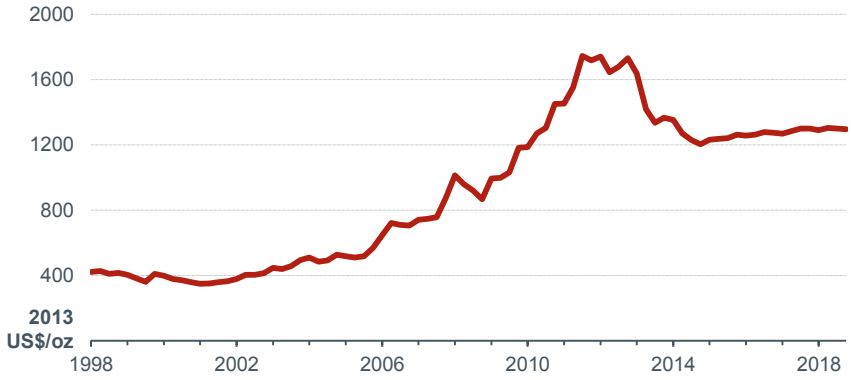
Gold prices

Gold prices fluctuated significantly through early 2013, with investor speculation over the tapering of the US' QE3 bond purchasing program offsetting robust growth in consumption demand. Gold prices started the year at around US$1650 an ounce before declining to around US$1200 an ounce in June. Prices found some support through the September quarter, at first from market concerns over the potential for international military intervention in the Syrian civil war and then from the unexpected announcement from the Federal Open Markets Committee (FOMC) to not taper bond purchases under QE3. Gold prices are expected to rebound in the near term in response to the FOMC announcement and are forecast to average US$1439 an ounce for 2013, 14 per cent lower than 2012. However, speculation on the tapering is likely again in 2014, particularly if more positive US economic data is reported.

This market speculation, as well as investor preferences shifting to other asset classes as interest rates recover to normal levels, are expected to result in lower gold prices in 2014. Although gold consumption demand is forecast to increase, it is not expected to offset these effects, and in 2014 prices are forecast to decline a further 11 per cent to average US$1275 an ounce. Over the period 2013 to 2018, gold prices are projected to decline to a low of US$1243 (in 2013 US dollars) an ounce in 2014 before increasing consumption demand for jewellery and industrial applications support an increase in prices to around US$1297 (in 2013 US dollars) an ounce in 2018.

The purchasing actions of central banks in emerging economies are a key area of uncertainty to these gold price forecasts. Most emerging economy central banks hold a substantially lower proportion of their reserves as gold. As their economies grow their market actions will become increasingly important determinants of gold prices. Should emerging economies accumulate gold reserves to levels comparable to OECD economies, this could support higher prices over the projection period. A longer period of time before the US tapers QE3 or more economies engaging in expansionary monetary policy are factors that could also support higher gold prices than forecast.

Figure 1: Quarterly gold prices



Sources: BREE, LBMA.

Gold demand

In 2013, world gold demand is forecast to decrease by 7.5 per cent, relative to 2012, to around 4142 tonnes. While fabrication consumption is forecast to increase by 14 per cent in response to lower gold prices, investment demand is forecast to decrease by 37 per cent as a result of outflows from Exchange Traded Funds (ETFs).

There have been substantial increases in jewellery purchases in first half of 2013 in response to lower gold prices. Based on World Gold Council data, world jewellery purchases in the first half of 2013 were up 23 per cent relative to the same period in 2012 and totalled 1127 tonnes. Purchases in the second half are expected to moderate due to the depreciating value of the Indian rupee making gold more expensive in key market India. Gold purchases for technological uses are forecast to remain stable in 2013 at around 410 tonnes as a continued decline in the use of gold in dental applications more than offsets moderate growth in industrial applications. Speculation over the tapering of QE3 has led many gold ETFs to sell down their gold holdings and in the first half of 2013 ETF gold outflows were around 580 tonnes, the highest outflow on record. This outflow from ETFs more than offset the combined growth in central bank and retail purchases of gold bar and coins.

In 2014, fabrication consumption is forecast to grow at a more modest 2.3 per cent to 3033 tonnes. The growth in fabrication consumption and a recovery in investment demand are forecast to support total world gold demand increasing by 3.6 per cent to 4290 tonnes. Forecast economic growth and increasing incomes in key emerging economies that are large gold consumers are expected to support higher jewellery purchases while prices are below recent high levels. However, growth in jewellery purchases in India is expected to be limited as the lower rupee exchange rate keeps domestic gold prices elevated and higher taxes discourages gold imports. Retail gold coin and medal purchases are expected to moderate in 2014 following a substantial price induced increase in 2013, but still remain historically high. Further outflows from ETFs are expected in 2014, but these are forecast to be less than 2013 provided market speculation on the tapering of QE3 does not result in similar levels of volatility in 2014.

Over the outlook period, total world gold demand is projected to increase at an average annual rate of 3.4 per cent to around 4894 tonnes in 2018. Growth in fabrication consumption is projected to be offset by declining investment demand, both of which will be the result of lower average prices through the period.

Fabrication consumption is forecast to increase at an average annual rate of 2.5 per cent to 3356 tonnes in 2018. Increasing incomes and the size of the middle class in emerging economies where gold has strong appeal as a luxury item are projected to be the principal drivers of increasing jewellery purchases. Improving economic conditions in the US and the EU are expected to support a rebound in jewellery purchases that have been declining since the GFC. Industrial consumption of gold is expected to increase, underpinned by wider market penetration of smart phones and advanced electronic consumer items.

Investment demand for gold is projected to decrease over the outlook period. The tapering and eventual end of QE3 is projected to end the period of high gold prices that made gold an appealing investment asset. As interest rates return to normal levels in advanced economies, investors are expected to begin moving to different asset classes for higher returns and have less need for gold as an inflation-hedge. Gold purchases by central banks is one of the main areas of uncertainty in projecting investment demand. Purchases are projected to decline to average around 350 tonnes a year based on the expectation that central banks will also respond to lower prices and seek to hold their reserves in US dollars or other traditional safe haven currencies as advanced economies stabilise. However, gold currently accounts for a low proportion of most emerging economies reserves. As these emerging economies continue to grow, if they were to increase the amount of gold in their reserves to ratios similar to advanced economies, it would substantially increase the investment demand for gold.

Gold mine production

World gold mine production in 2013 is forecast to grow by 2.7 per cent, relative to 2012, to 2940 tonnes. Although lower gold prices have led to some mines either closing or being placed on care and maintenance, these are mostly smaller operations. The decrease in production from these closures is forecast to be offset by a number of larger mines commencing production. These include Barrick Gold and Goldcorp's joint venture Pueblo Veijo mine in the Dominican Republic (30 tonnes), Detour Gold's Detour Lake operation in Canada (20 tonnes), and Rio Tinto and Turquoise Hill's Oyu Tolgoi in Mongolia (13.5 tonnes).

Over the remainder of the outlook period, world gold mine production is projected to increase at an annual average rate of 2 per cent to 3246 tonnes in 2018. Gold mine production in Russia is projected to increase at an annual average rate of 4 per cent to 283 tonnes in 2018. This increase will be supported by a number of new mines scheduled to start production during the projection period. These include Kinross' Dvoinoye mine (7 tonnes), Polyus Gold's Natalka mine (15 tonnes) and Norlisk Nickel's Bystrinskoye mine (6 tonnes) which are scheduled to be completed in 2017. Canada also has a number of gold mines, either under construction or committed, that will support production increasing at an annual average rate of 9 per cent 192 tonnes in 2018. This will see Canada overtake South Africa and Peru to become the world's fourth largest gold producer. Increased production will be underpinned by Detour Gold's Detour Lakes mine (20 tonnes), Goldcorp's Elanore mine (18 tonnes) and Newgold's Blackwater mine (17 tonnes).

Australia's gold production

Australian gold mine production declined marginally in 2012–13, remaining at around 254 tonnes. Higher production at Newcrest Mining's Cadia Valley operations, Crocodile Gold's Cosmo mine and Inova Resources Osborne mine was offset by lower production at Polymetals' White Dam mine, Citigold's Charters Towers and Ramelius Resources' Wattle Dam.

The rapid decline in gold prices in the first half of 2013 affected the profitability of Australian gold operations, with the depreciation of the Australian dollar insufficient to offset the price fall. Australia has become a high-cost producer over the past decade, with average cash costs increasing from around US$237 an ounce (in 2012 dollars) in 2002 to US$857 an ounce in 2012. In 2012, Australia was the second most expensive location to produce gold, after South Africa. Since cash costs are only a small proportion of the expenses incurred to operate a mine, the World Gold Council has introduced a new cost reporting mechanism to illustrate mine profitability (see Box 1).

Table 1: Gold production costs, 2012

	Cash cost	Total production cost
	US$/oz	US$/oz
Latin America	614	822
North America	639	823
Australia	857	1065
South Africa	1029	1232
other	740	913
World	738	928

Source: Thomson Reuters GFMS 2013.

Box 1: Gold production cost measurement

The cash cost of gold production includes expenses incurred on the mine site, such as mining, processing and other administrative costs; royalties and production taxes; and refining charges. Gold cash costs increased progressively over the past decade, stemming largely from rising energy and labour outlays. Despite this, and falling gold prices, many companies remained profitable using this measure when in practice they were facing increasing financial pressure.

As a result, in June 2013, the World Gold Council developed the concepts of 'all-in sustaining costs' and 'all-in costs' to increase the transparency and understanding of gold project economics by government, investors, communities and other stakeholders. These measures build upon the traditional cash cost measure to incorporate all costs relating to sustaining production at an operation, such as financing costs, write-downs, ongoing capital expenditures, indirect costs and other overheads. As such, they provide a more complete picture of the cost of operating a mine, and the gold price required to remain profitable.

Given the varied reporting cycles of companies around the world, it is expected that most companies will be reporting on this measure from 1 January 2014.

As a result of declining profitability, a number of Australian gold companies are reviewing production plans, cutting exploration activities, delaying expansions and looking for opportunities to reduce their costs. Furthermore, some large companies, such as Barrick Gold and Alacer, are also looking to divest their Australian assets. During the June quarter 2013, several gold mines were announced to be placed under care and maintenance over the next 12–18 months. Should gold prices continue to decline, as forecast by BREE, there could be further announcements of production cutbacks and closures. Reflecting this, Australian gold production is forecast to decrease by 3 per cent in 2013–14 to 242 tonnes.

In Australia, new, large-scale mines are scheduled to be commissioned over the outlook period that are expected to offset the decline in production from mine closures. The largest of these is the Tropicana joint venture between AngloGold Ashanti and Independence Group, which has a planned capacity of around 14 tonnes a year. First production is expected in late 2013. Australian gold mine production is projected to increase progressively as these projects expand production towards capacity to reach 271 tonnes in 2016–17. In 2017–18, production is projected to fall by 3 per cent to 264 tonnes because of a scheduled decline in output from the Tropicana mine and the end of operations at a few small-scale mines that exhaust their deposits.

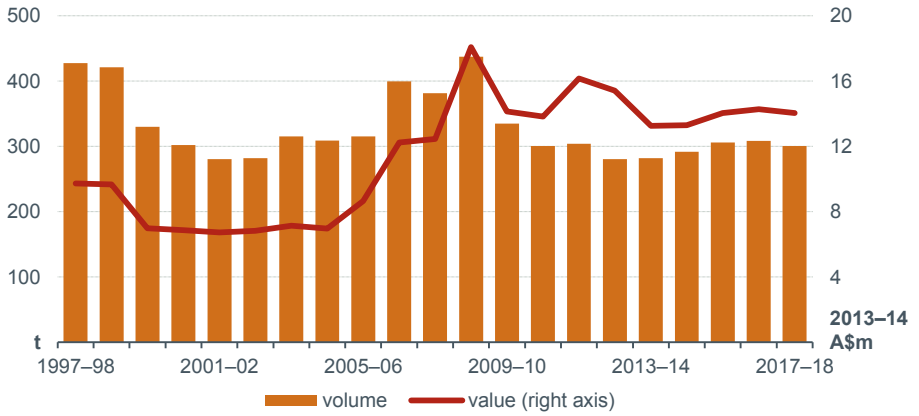
Australia's gold exports

Australian exports of gold bullion are produced using a combination of domestically sourced ore, and imports of gold dore (impure gold) and scrap. In 2012–13, Australian gold exports declined by 8 per cent to 280 tonnes, largely reflecting lower use of imported dore and scrap. Earnings from gold exports totalled $15 billion in 2012–13 which was 2.7 per cent lower than 2011–12.

In 2013–14, lower domestic gold mine production is expected to be offset by increased imports of dore. As a result, Australia's gold export volumes are forecast to increase by 0.4 per cent to 282 tonnes. However, forecast lower gold prices are expected to result in the value of Australian gold exports declining by 12 per cent to $13.2 billion.

Australia's gold export volumes are projected to peak at 308 tonnes in 2016–17, supported by increased output from new gold mines, before declining to 301 tonnes in 2017–18. Projected lower gold prices are expected to reduce earnings from gold exports over the outlook period. In 2017–18, the value of Australia's gold exports is projected to be around $14 billion (in 2013–14 dollars), 14 per cent lower than in 2012–13.

Figure 2: Australia's gold exports



Sources: BREE; ABS.

Table 2: Gold outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Fabrication consumption	**t**	**2 758**	**2 608**	**2 965**	**3 033**	**3 075**	**3 179**	**3 277**	**3 356**
Mine production	**t**	**2 839**	**2 862**	**2 940**	**3 037**	**3 132**	**3 212**	**3 249**	**3 246**
Scrap sales	**t**	**1 669**	**1 617**	**1 390**	**1 314**	**1 248**	**1 186**	**1 127**	**1 070**
Residual net stock	**t**	**(1750)**	**(1870)**	**(1366)**	**(1318)**	**(1305)**	**(1220)**	**(1099)**	**(960)**
official sector	**t**	**(457)**	**(536)**	**(500)**	**(450)**	**(350)**	**(350)**	**(350)**	**(350)**
private sector	**t**	**(1304)**	**(1294)**	**(876)**	**(893)**	**(980)**	**(920)**	**(799)**	**(660)**
producer	**t**	**11**	**(40)**	**10**	**25**	**25**	**50**	**50**	**50**
Price b									
– nominal	**US$/oz**	**1 569**	**1 668**	**1 439**	**1 275**	**1 266**	**1 308**	**1 346**	**1 375**
– real c	**US$/oz**	**1 618**	**1 699**	**1 439**	**1 264**	**1 243**	**1 268**	**1 288**	**1 297**

		2010 –11	2011 –12	2012 –13	2013 –14 f	2014 –15 z	2015 –16 z	2016 –17 z	2017 –18 z
Australia									
Mine production	**t**	**265**	**255**	**254**	**242**	**255**	**270**	**271**	**264**
Export volume	**t**	**301**	**304**	**280**	**282**	**292**	**306**	**308**	**301**
Export value									
– nominal	**A$m**	**13 016**	**15 462**	**15 043**	**13 259**	**13 608**	**14 695**	**15 261**	**15 352**
– real d	**A$m**	**13 814**	**16 162**	**15 404**	**13 259**	**13 289**	**14 042**	**14 269**	**14 045**
Price									
– nominal	**A$/oz**	**1 389**	**1 621**	**1 561**	**1 464**	**1 451**	**1 496**	**1 541**	**1 589**
– real d	**A$/oz**	**1 474**	**1 695**	**1 599**	**1 464**	**1 417**	**1 429**	**1 441**	**1 453**

b London Bullion Market Association AM price. c In 2013 US dollars. d In 2013–14 Australian dollars. f BREE forecast. z BREE projection.
***Note*: Net purchasing and dehedging shown in brackets.**
S*ources:* BREE; ABARES; Gold Fields Mineral Services; Australian Bureau of Statistics; London Bullion Market Association.

Aluminium

Simon Cowling

Prices

The aluminium spot price averaged US$1830 a tonne in the June quarter 2013, a decrease of 8 per cent quarter-on-quarter. The average price for 2013 is forecast to fall around 7 per cent, relative to 2012, to US$1867 a tonne (see Figure 1). The large volume of global aluminium stocks and a moderation in consumption growth are expected to underpin in this decrease in prices. Announced production curtailments of around 3 million tonnes, predominantly from China, Russia and Canada are not expected to support higher prices until excess capacity and accumulated stocks are removed from the market.

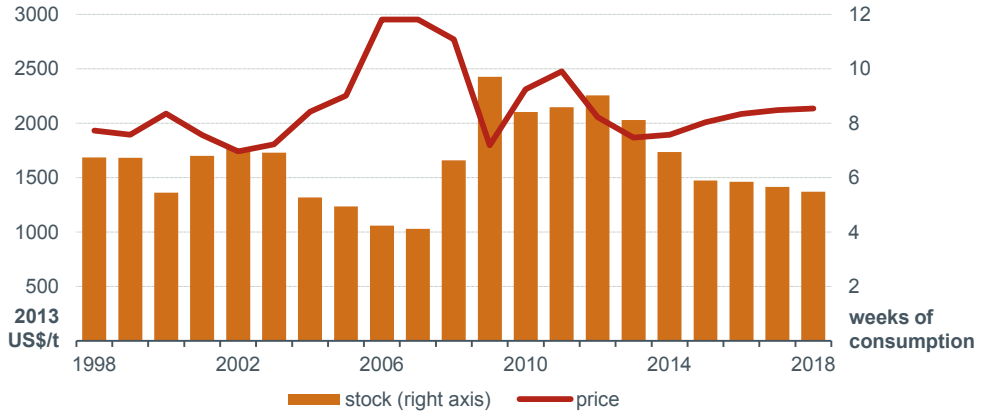
In 2014, the average aluminium spot price is forecast to increase by around 2.4 per cent to total US$1911 a tonne. The increase is expected as a result of forecast growth in aluminium consumption increasing at a faster rate than growth in production. This is due to sustained high levels of consumption from the automotive sector, particularly in China and in the US with the latter experiencing ongoing growth. Oversupply in the market is forecast to moderate in 2014 as a result of production curtailments implemented in 2013, supporting further growth in 2014.

Figure 1: Quarterly aluminium prices

Sources: BREE; LME.

Over 2015 to 2018, the aluminium spot price is projected to increase by an average annual rate of 3.0 per cent to US$2135 (in 2013 US dollars) in 2018. A forecast increase in consumption, particularly from the growing middle classes of emerging economies, and subsequent move to a higher part of the cost curve, will support this increase in prices. New more efficient smelters in Asia with access to cheaper energy sources are expected to start up over the outlook period and limit price growth in key Asia-Pacific markets.

Figure 2: Annual aluminium prices and stocks



Sources: BREE; LME.

Consumption

World aluminium consumption is forecast to increase to around 46.2 million tonnes in 2013, an increase of 2.1 per cent relative to 2012. This increase in consumption has been supported by growth in India and China as well as a rebound in demand from North America. India's consumption is forecast to increase by 6 per cent to total 1.8 million tonnes, driven by growth in infrastructure and rising household incomes. China's consumption is forecast to increase by 5 per cent to total 21.3 million tonnes, supported by increasing automobile production, driven by consumer demand, and growth in packaging. China's increase in the use of aluminium in packaging is forecast to grow by 3.4 per cent in 2013. For example, China's year to date automobile production has increased 12 per cent, relative to the same period in 2012. A recovery in the North American automotive sector will underpin an increase in consumption within the region, with growth in the construction sector providing additional support. Consumption in Europe is expected to offset these increases due to the ongoing influence of the sovereign debt crisis and slowed economic recovery, decreasing 2.8 per cent relative to 2012 to 7.7 million tonnes.

In 2014, world aluminium consumption is forecast to increase by a further 3.5 per cent to total 47.8 million tonnes. China is forecast to be the principal driver of growth in consumption, albeit at a slower rate than in the previous decade. Consumption in China is forecast to increase by 6 per cent, compared to 2013, to total 22.5 million tonnes, underpinned by sustained growth in the automotive industry. Growth in production from the automotive sector and construction industries is expected to support higher consumption in the US, with consumption increasing 3.2 per cent to 5.1 million tonnes. Motor vehicles assemblies in the US have increased by 10 per cent in the twelve months ending August 2013, and are forecast to continue in 2014. Aluminium consumption in Europe is forecast to decrease slightly in 2014, underpinned by a struggling automotive sector and continuing recovery from austerity measures.

World aluminium consumption is projected to increase at an average annual rate of 3.3 per cent over the outlook period, to total around 55.1 million tonnes in 2018. The main drivers of the consumption increase will be growth in the BRIC countries (Brazil, Russia, India and China). Consumption in the US is projected to increase at an average annual rate of 2.1 per cent to total 5.5 million tonnes in line with continued economic growth. European consumption growth is projected to remain subdued and potentially decline if the recovery from recession does not continue through the outlook.

Aluminium consumption in China is projected to increase at an average annual rate of around 6 per cent to total 28 million tonnes in 2018. Growth in the building and construction sector is projected to be the main driver behind the increase. Automotive production is projected to moderate over the outlook period in response to slowing growth in demand. Increased availability of second-hand cars is expected to erode the proportion of new car sales within the total market, as they provide a cheaper alternative to the growing middle-class.

Consumption in the US is projected to increase at an average annual rate of 2.1 per cent from 2013 to 2018 to total 5.5 million tonnes in 2018. This projected increase will be supported by growth in the transportation manufacturing and construction industries associated with improving economic conditions and incomes. In addition to increasing car sales, the proportion of aluminium used per car is projected to increase as manufacturers strive to reduce vehicle weight and improve fuel efficiency. Similar shifts in the aerospace industry towards efficiency are expected to support higher consumption of aluminium over the outlook period.

Consumption levels in Europe are projected to remain stable at 7.9 million tonnes over the outlook period as a result of austerity measures impacting several key economies. Germany is projected to increase its consumption by an average annual rate of 0.8 per cent over the outlook period to total 2.2 million tonnes, with growth being limited by projected low growth in automobile production.

Production

In 2013, world aluminium production is forecast to decrease by 1.2 per cent, relative to 2012, to total 45.6 million tonnes. Announced production curtailments and smelter closures to correct market oversupply will drive this forecast decrease. Total capacity cuts of around 3 million tonnes are expected by the end of 2013 as companies respond to lower prices and market oversupply. To date, Chalco has announced capacity cuts of 380 000 tonnes, UC Rusal cuts of 357 000 tonnes and Alcoa cuts of 269 000 tonnes for 2013 across various refineries. Elevated price premiums that have been supporting otherwise unprofitable aluminium production in the first half of 2013 have been declining and may lead to further production curtailments.

The largest capacity cuts by country are expected in China, totalling over 1.9 million tonnes. The decrease is part of a broader result of government policy to reduce excess production capacity and eliminate out-dated or inefficient manufacturers in several industries by 2014. In July, China's Ministry of Industry and Information Technology (MIIT) released a statement ordering more than 1400 companies in 19 industries including aluminium to cut excess production capacity in 2013. The purpose of cuts is to shift China towards more sustainable future growth and reduce energy and environmental costs.

In 2013, production in the US is forecast to decrease by 7 per cent, relative to 2012, to total 1.93 million tonnes. The decrease is underpinned by production curtailments of around 90 000 tonnes at Ormet's Hannibal smelter and 40 000 tonnes at Alcoa's Massena East smelter, due to high energy costs and lower prices. The risk of additional production curtailments from Century Aluminium's Hawesville smelter in Kentucky is possible unless long-term competitively priced electricity can be sourced.

World aluminium production is forecast to increase by around 3.2 per cent in 2014, to total 47.8 million tonnes. Higher growth from the Middle East, India and China from new efficient smelters will support the increase and offset production decreases in Europe and North America. China is forecast to increase production by 3.0 per cent to total 21.5 million tonnes as the shutdown out-dated capacity from 2013 is replaced by more efficient operations.

Over the outlook period, world production is projected to increase at an average annual rate of 3.0 per cent to total 55.1 million tonnes in 2018. Additional start-ups and ramp ups in production from new smelters in India, the Middle East and China will underpin the production increase and offset cuts in Europe and the US. Rising production costs, particularly energy, are a downside risk to production in advanced economies and may result in a faster shift in production to emerging economies in the Asia-Pacific region.

China's aluminium production is projected to increase at an average annual rate of around 3.6 per cent over the outlook period to total 25 million tonnes in 2018. Production increases will be supported by new smelter start-ups in the northwest regions over the outlook period. This expected shift in production is expected due to projected lower energy prices in these regions which have abundant coal resources.

Production in India is projected to increase by 138 per cent from 1.7 million tonnes in 2013, to 4.2 million tonnes in 2018. Large production capacity projects, such as Vedanta's Jharsuguda II project (1.25 million tonnes, Hindalco's Aditya (360 000 tonnes) and Jharkhand (360 000 tonnes) projects, coming online and ramping up to full production during the outlook period will be substantial drivers of the increase. Over the outlook period, production in the Middle East is projected to increase at an average annual rate of 10 per cent, to total 7.8 million tonnes in 2018. High levels of capital investment in the industry, supported by access to cheap energy in the region, will underpin the increase over the outlook period.

Rising costs of production are projected to limit growth in aluminium production in US from 2014 to 2018, despite the emergence cheap energy from increased use of shale gas in electricity generation. Aluminium production is projected to decrease to around 1.9 million tonnes at an average annual rate of 1.4 per cent. Production curtailments due to an expected increase energy costs will underpin the decrease in the medium term.

Over the outlook period, aluminium production in Europe is projected to decrease by 3.4 per cent to total 8 million tonnes in 2018. This projected decrease is underpinned by production curtailments as a result of poor market conditions, including oversupply, lower prices and rising production costs. The shutdown of Alcoa's Portovesme smelter (closed in 2012) in Italy, Rio Tinto Alcan's Lynemouth smelter (2012) in the UK, and Kombinat Aluminijuma Pedgorica smelter (2013) in Montenegro are projected to remain closed over the outlook period. Russia is projected to increase production over 2014 to 2018, increasing production to 4 million tonnes in 2018 at an average annual rate of 2.0 per cent. Restarts of idled capacity as market conditions improve and new greenfield projects expected to reach full production by 2017 will support the increase. Russia's contribution to total European production is projected to increase to around 50 per cent in 2018.

Australia

Production

In 2012–13, production in Australia decreased by 8 per cent, relative to 2011–12, to total 1.78 million tonnes. The closure of the Kurri Kurri smelter in New South Wales underpinned the decrease, removing around 177 000 tonnes of aluminium production. The closure of the smelter was in response to lower world prices and overcapacity within the industry. Production levels at the other Australian operations remained steady in 2012–13 compared to 2011–2.

Production in Australia is forecast to decrease by a further 1.8 per cent in 2013–14, to total 1.76 million tonnes. Poor market conditions and rising energy costs are likely to result in minor production curtailments. Production at Alcoa's Point Henry smelter is expected to continue through 2013–14 with the supported of a Federal and Victorian Government assistance packages approved in 2012. This assistance package expires in mid-2014; if similar support is not available there is the risk of production curtailments or potential closure of the smelter.

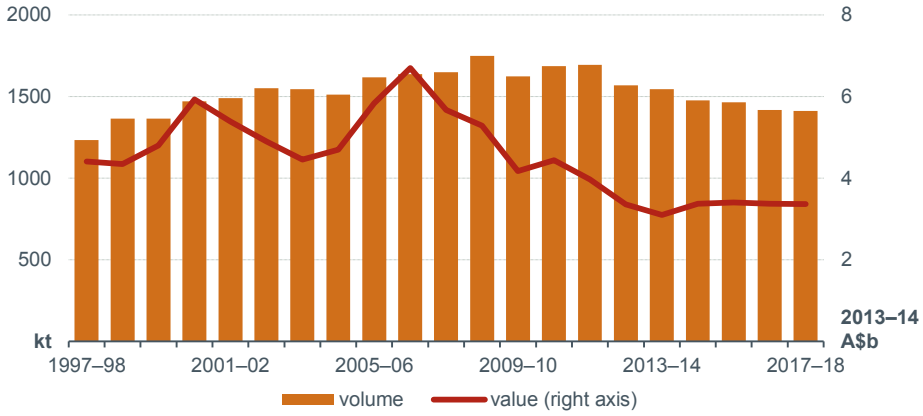
Over the outlook period, Australia's aluminium production is projected to decrease to total 1.6 million tonnes in 2017–18. The decrease is projected due to expected increases in energy costs over the outlook period resulting in minor production curtailments. The risk of additional global production curtailment decisions by major aluminium producing companies over the outlook period provide downside risks to higher growth in Australia's production by 2017–18. No new smelters are expected to start-up over the outlook period.

Exports

Australia's aluminium export volumes decreased by 7 per cent in 2012–13, compared to 2011–12, to total 1.57 million tonnes, as a result of lower production volumes and lower overseas demand. The decrease in export volumes and a lower Australian dollar aluminium price resulted in export earnings decreasing 14 per cent year on year to $3.3 billion (see Figure 3). In 2013–14, export volumes are forecast to decrease by 1.5 per cent to total 1.55 million tonnes, in line with the forecast decline of 1.8 per cent in domestic aluminium production. Export values are forecast to decrease by 6 per cent to total $3.1 billion.

Australia's aluminium export volumes are projected to total 1.4 million tonnes by the end of the outlook period, decreasing at an average annual rate of around 2.1 per cent. Projected price increases over the outlook period are expected to be offset by lower export volumes, with the value of Australian aluminium exports remaining stable at $3.4 billion (in 2013–14 dollars).

Figure 3: Australia's aluminium exports



Sources: BREE; ABS.

Alumina

Prices

In the June 2013 quarter, alumina spot prices decreased 4.1 per cent quarter-on-quarter to total US$327 a tonne. In 2013, alumina spot prices are forecast to decrease to average US$322 a tonne for the year, a fall of 0.9 per cent compared to 2012. Lower global aluminium production in 2013 and a global oversupply of alumina will be the main drivers of this decrease. In 2014, forecast growth in global alumina production, particularly from China, will exacerbate the market surplus and result in prices declining a further 3.9 per cent to average US$309 a tonne. From 2014 to 2018, the average alumina spot price is projected to increase to US$343 (in 2013 US dollars) a tonne in 2018 in line with projected higher aluminium prices.

Australia's alumina production

In 2012–13 Australia's alumina production increased by 12 per cent, relative to 2011–12, to total 21.6 million tonnes. Increased production at Rio Tinto Alcan's Yarwun refinery near Gladstone and BHP Billiton's Worsley refinery in Western Australia ramping up production following recent expansions underpin the increase. The Yarwun and Worsley expansions add around 2 million tonnes and 1.1 million tonnes respectively of additional capacity to Australia's production capabilities. Production from Pacific Aluminium's Gove refinery near Nhulunbuy was down slightly in 2012–13. This was due to production disruptions in the June quarter 2013, which are expected to continue through the next two quarters, as repairs and maintenance are made to a number of heat exchangers used in the digestion stage.

Australia's alumina production is forecast to increase by 3.5 per cent in 2013–14 to total 22.4 million tonnes. The recent capacity expansions operating at full capacity will be the principal source of this growth and should offset the short term production disruptions at the Gove refinery. Alumina production over the remainder of the outlook period is projected to remain relatively stable as no new smelters or expansion projects are expected to start up. Production is projected to total 22.9 million tonnes in 2017–18, increasing at an average annual rate of 1.1 per cent.

Australia's alumina exports

In 2012–13 Australia's alumina export volumes increased 14 per cent, relative to 2011–12, to total 18.9 million tonnes. The fall in Australian aluminium production resulted in surplus alumina being exported overseas, driving the increase. In 2013–14, alumina export volumes are forecast to remain steady at around 19 million tonnes. Further growth over the outlook period will be limited as no new alumina refining projects are expected to come online by 2017–18. Export volumes are projected to increase at an average annual rate of 0.9 per cent to total 19.8 million tonnes in 2017–18, driven by increased alumina production and exports of surplus domestic requirements.

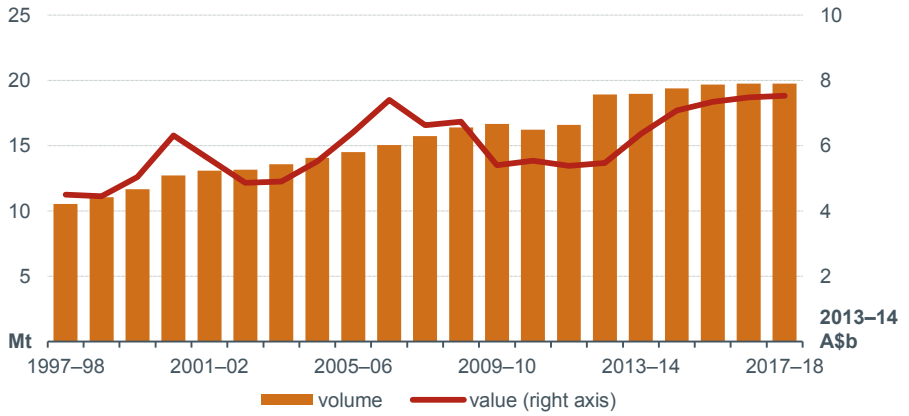
In 2012–13, the value of Australia's alumina exports increased by 3.8 per cent, relative to 2011–12, to total $5.3 billion. An increase in alumina export volumes underpinned this rise and offset lower alumina prices. A forecast higher Australian alumina price will support an increase in the value of Australia's alumina exports in 2013–14. The value of exports is forecast to increase by 19 per cent from 2012–13 to total $6.4 billion. Over the outlook period alumina export values are projected to increase by an average annual rate of 7 per cent to total $7.5 billion (in 2013–14 dollars) in 2017–18, underpinned by higher export volumes and Australian dollar prices.

Bauxite exports

Australia's bauxite export volumes increased by 19 per cent in 2012–13, relative to 2011–12, to total 12.6 million tonnes (see Figure 3). An increase in production volumes from the bauxite producing states of Western Australia, Queensland and the Northern territory underpinned the increase. Over the outlook period, export volumes are projected to increase to total 23.9 million tonnes as a result new production from Cape Alumina's Pisolite Hills mine (7 million tonnes per annum) and Rio Tinto's South of Embley mine (22.5 million tonnes per annum). Most of this additional production is likely to be surplus to Australia's alumina refining requirements and support growth in export volumes.

In 2012–13, Australia's bauxite export earnings increased to $382 million dollars, a rise of 29 per cent compared to 2011–12. Supported by growth in export volumes the value of Australia's bauxite exports in 2017–18 is projected to increase at an average annual rate of 11 per cent to around $672 million (in 2013–14 dollars).

Figure 4: Australia's alumina exports



Sources: BREE; ABS.

Table 1: Aluminium outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Production									
Primary aluminium	**kt**	**44 723**	**46 131**	**45 576**	**47 013**	**49 054**	**51 468**	**53 272**	**55 175**
Consumption									
Primary aluminium	**kt**	**42 398**	**45 292**	**46 225**	**47 844**	**49 794**	**51 339**	**53 250**	**55 148**
Closing stocks									
Primary aluminium b	**kt**	**6 999**	**7 860**	**7 210**	**6 380**	**5 640**	**5 769**	**5 791**	**5 818**
– weeks consumption	**wks**	**8.6**	**9.0**	**8.1**	**6.9**	**5.9**	**5.8**	**5.7**	**5.5**
Prices									
World aluminium c									
– nominal	**US$/t**	**2 402**	**2 017**	**1 867**	**1 911**	**2 048**	**2 149**	**2 216**	**2 263**
	USc/lb	**109**	**91**	**85**	**87**	**93**	**97**	**101**	**103**
– real d	**US$/t**	**2 476**	**2 055**	**1 867**	**1 895**	**2 010**	**2 084**	**2 120**	**2 135**
	USc/lb	**112**	**93**	**85**	**86**	**91**	**95**	**96**	**97**
Alumina									
– nominal spot	**US$/t**	**374**	**319**	**322**	**309**	**328**	**343**	**353**	**364**
– real spot d	**US$/t**	**386**	**325**	**322**	**307**	**321**	**333**	**338**	**343**
		2010 –11	2011 –12	2012 –13	2013 –14 f	2014 –15 z	2015 –16 z	2016 –17 z	2017 –18 z
Australia									
Production									
Primary aluminium	**kt**	**1 938**	**1 938**	**1 788**	**1 756**	**1 677**	**1 665**	**1 610**	**1 605**
Alumina	**kt**	**19 041**	**19 283**	**21 645**	**22 395**	**22 660**	**22 930**	**22 905**	**22 880**
Bauxite	**Mt**	**69**	**73**	**79**	**79**	**81**	**81**	**96**	**98**
Consumption									
Primary aluminium	**kt**	**252**	**235**	**220**	**211**	**201**	**200**	**193**	**193**
Exports									
Primary aluminium	**kt**	**1 686**	**1 693**	**1 569**	**1 545**	**1 476**	**1 465**	**1 417**	**1 412**
Nominal value	**A$m**	**4 178**	**3 797**	**3 277**	**3 096**	**3 455**	**3 563**	**3 606**	**3 677**
Real value e	**A$m**	**4 434**	**3 969**	**3 355**	**3 096**	**3 374**	**3 405**	**3 371**	**3 363**
Alumina	**kt**	**16 227**	**16 592**	**18 909**	**18 971**	**19 390**	**19 683**	**19 766**	**19 750**
Nominal value	**A$m**	**5 218**	**5 146**	**5 339**	**6 357**	**7 250**	**7 685**	**7 999**	**8 228**
Real value e	**A$m**	**5 538**	**5 379**	**5 467**	**6 357**	**7 080**	**7 344**	**7 479**	**7 527**
Bauxite	**kt**	**8 595**	**10 518**	**12 560**	**11 694**	**12 791**	**13 321**	**19 337**	**23 869**
Nominal value	**A$m**	**229**	**296**	**382**	**357**	**393**	**410**	**595**	**734**
Real value e	**A$m**	**243**	**310**	**391**	**357**	**384**	**392**	**556**	**672**
Total value									
– nominal	**A$m**	**9 625**	**9 239**	**8 997**	**9 811**	**11 098**	**11 658**	**12 200**	**12 639**
Real value e	**A$m**	**10 215**	**9 657**	**9 213**	**9 811**	**10 838**	**11 140**	**11 406**	**11 563**

b **Producer and LME stocks.** c **LME cash prices for primary aluminium.** d **In 2013 US dollars.** e **In 2013–14 Australian dollars.** f **BREE forecast.** z **BREE projection.**

Sources: **BREE; ABARES; London Metal Exchange; World Bureau of Metal Statistics.**

Copper

Simon Cowling

Prices

Copper prices are forecast to average US$7281 a tonne in 2013, a decrease of 8 per cent from 2012 (see Figure 1). Slower growth in emerging economies has moderated growth in copper consumption, combined with a surge in both mine and refined production capacity the copper market has started to move into an oversupply situation, as evidenced by lower prices and growing stocks. World copper stocks are forecast to rise to 3.3 weeks by the end of 2013, up from 2.7 weeks at the end of 2012.

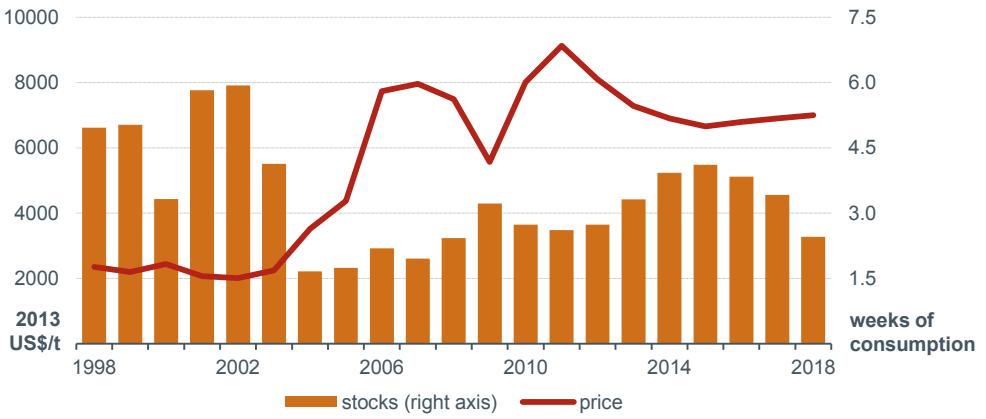
In 2014, the average copper price is forecast to decrease 4.4 per cent, relative to 2013, to US$6963 as the oversupply continues to grow. Refined copper consumption is forecast to increase in 2014; however this increase will not be enough to remove the market imbalance and support growth in prices.

Figure 1: Quarterly copper prices

Sources: BREE; LME.

Over the medium term, average copper prices are expected to reach a low point in the latest cycle around 2015 before the growing consumption restores market balance and supports higher prices. The average copper price is projected to decrease to around US$6654 (in 2013 US dollars) a tonne in 2015 as a result of a continuing production growth and market oversupply (see Figure 2). Prices are projected to rebound later in the outlook period to average US$7024 (in 2013 US dollars) as consumption grows and works through the high stock levels. Stocks are projected to peak at 4.1 weeks of consumption in 2015 before declining to around 2.5 weeks in 2018. Financial sector reforms in China that restrict the use of copper as collateral in commercial financing may result in more unmeasured copper stocks entering the market over the outlook period which could place additional downwards pressure on prices.

Figure 2: Annual copper prices and stocks



Sources: BREE; LME; WBMS.

Consumption

World consumption in 2013 is forecast to increase around 1.8 per cent, relative to 2012, to total 20.5 million tonnes. Robust consumption growth is forecast within the emerging Asian economies and Middle East as investment in electricity networks increases. Consumption in the world's biggest consumer, China, is forecast to rise 1.7 per cent to total 9 million tonnes in 2013, underpinned by growth in residential and commercial construction. Based on this forecast increase, China is estimated to account for 44 per cent of world copper consumption in 2013.

A recovery in the US housing sector and continued growth in China's residential building activity are forecast to be the main drivers behind increased copper consumption in 2014. Global copper consumption is forecast to increase by 3.1 per cent from 2013 to total 21.2 million tonnes in 2014. China's consumption is forecast to increase 4.0 per cent to 9.4 million tonnes as a result of robust residential construction and infrastructure expenditure continuing into 2014. Consumption in Europe is forecast to increase by 2.0 per cent to 3.7 million tonnes as the euro zone moves out of recession.

Over the medium term, world copper consumption is forecast to increase at an average annual rate of 3.5 per cent to total 24.8 million tonnes in 2018. Emerging economies are projected to be the principal driver of higher world copper consumption based on assumed higher urbanisation and economic growth rates. To a lesser extent, a sustained rebound in residential construction in the US is also expected to support growth in copper consumption but a forecast slower recovery in the European housing market should only support moderate growth in copper consumption in the region.

Copper consumption in China is projected to increase at an annual average rate of around 4.9 per cent over the outlook period to total 11.8 million tonnes in 2018. Continued urbanisation and associated investment in residential construction and electricity networks will be the main drives of this growth. Later in the period, expected financial market reforms are expected to reduce the current practice of using copper as collateral in commercial financing and moderate growth slightly.

Over the outlook period, consumption in emerging economies such as Brazil, India and Turkey is projected to increase. India's average annual growth (5.6 per cent to 630 000 tonnes) is projected to outpace the growth in Turkey (4.4 per cent to 556 000 tonnes) and in Brazil (3.5 per cent to 528 000 tonnes). The rate of expansion of electrical transmission systems in India are a key downside risk. Financing and regulatory requirements could both hold up the investments required to deliver the network enhancements to support India's plans for economic growth.

A projected recovery in residential construction and manufacturing activity in the US will support a rise in copper consumption. US copper consumption is projected to increase at an average annual rate of around 1.5 per cent to total 1.9 million tonnes in 2018. Despite the growth in consumption, the US is not projected to return pre-GFC copper consumption levels in the medium term.

Production

Mine production

New mines starting or ramping up to full capacity will support a forecast increase in mined copper production in 2013. Mine production is forecast to increase to around 17.6 million tonnes in 2013, 3.2 per cent higher than 2012. Production growth has been below its potential as a result of mine accidents, labour strikes and disputes between mine operators and Governments. An April landslide at Rio Tinto's Bingham Canyon Copper mine that shut down operations will constrain US copper production growth this year. In May, a fatal tunnel collapse at Freeport McMoRan's 750 000 tonne Grasberg mine in Indonesia shutdown production for a month while safety inspections and enquires were conducted. The mine returned to its full production capacity in September and annual production is forecast to be around 390 000 tonnes.

In 2014, world copper mine production is forecast to increase by 4.7 per cent year on year to total 18.5 million tonnes. Ongoing increases in production as mines start to achieve full capacity will be the principal driver of growth. Ramp ups in production at the Antapaccay mine in Peru (160 000 tonnes) and Oyu Tolgoi mine in Mongolia (430 000 tonnes), as well as near full production at the Grasberg mine following the 2013 shutdown will be the main contributors to the rise.

Over the outlook period, world copper mine production is projected to increase at an average annual rate of 5.2 per cent to around 23.2 million tonnes in 2018. Additional large capacity copper mines in emerging economies are expected to open by 2018, supporting a production increase. Peru is projected to increase mined production at an average annual rate of 13 per cent over the outlook period and to total 2.7 million tonnes in 2018. The scheduled start up, and subsequent ramp up in production at Xstrata's Las Bambas mine (400 000 tonnes), Monterrico Metals' Rio Blanco mine (190 000 tonnes), and Chinalco's Toromocho mine (250 000 tonnes) are expected to be the main contributors to the projected growth in production.

Chile is projected to remain the largest mined copper producer in the medium term and account for 26 per cent of production in 2018. Chile's copper production is projected to grow at an average annual rate of 1.9 per cent, relative to 2012, to total around 6.1 million tonnes in 2018. This will be supported by large scale copper mines starting up such as Codelco's Mina Minestro Hales mine (170 000 tonnes), Pan Pacific Copper's Caserones mine (180 000 tonnes), and the KGHM-Sumitomo Sierra Gorda mine (227 000 tonnes). Teck's Quebrada Blanca Phase 2 expansion (200 000 tonnes) was scheduled to begin production in 2016; however, due to current market conditions it has been postponed to later in the outlook period.

Refined production

In 2013 world refined copper production is forecast to increase by 1.8 per cent, relative to 2012, to total 20.8 million tonnes. Higher production in China will be the main contributor to the rise, increasing by 6 per cent to total 6.2 million tonnes. Ramp ups in production from recently completed expansion projects will underpin the increase and will offset announced plans to close 650 000 tonnes of out-dated and excess capacity in 2013.

In 2014, new refineries starting production in China will support world copper production increasing to 21.5 million. The largest projects include Jinchuan Non-ferrous Metal Company's Jinchuan Fangchenggang refinery (600 000 tonnes), Tongling Non-Ferrous Metals Group's Tongling refinery (400 000 tonnes), and Zhongtiaoshan Nonferrous Metals Company's Zhongtiaoshan Houma expansion project (170 000 tonnes).

Over the outlook period, world refined copper production is projected to increase at an average annual rate of around 3.0 per cent, to total 24.4 million tonnes in 2018. This growth will mainly occur in emerging economies, particularly those expected to support growth in consumption. China is projected to be the main driver of growth as new projects achieve full production capacity. Production in China is projected to total 8 million tonnes in 2018, increasing at an average annual growth rate of 5.3 per cent. India's production of refined copper is projected to increase by an average annual rate of 8.5 per cent, to total 1.1 million tonnes in 2018.

Australia

Mine production

Australian copper mine production in 2012–13 increased 4 per cent, relative to 2011–12, to total 963 000 tonnes. A production ramp up at Sandfire Resources' recently completed DeGrussa mine (77 000 tonnes) in Western Australia and start-up of Glencore Xstrata's Mount Margaret mine (28 000 tonnes) were the principal sources of the growth. This increase offset lower production at BHP Billiton's Olympic Dam mine in South Australia associated with a scheduled smelter shut down in December 2012. In 2013–14, copper mine production is forecast to increase by 6.2 per cent to total 1 million tonnes, supported by production ramp up at Xstrata's Cloncurry copper project, the start of production at CuDeco's Rocklands mine, Olympic Dam returning to full production and higher production rates at most mines across Australia.

Australian copper mine production is projected to total around 1.2 million tonnes by 2017–18, an average annual increase of 4.4 per cent over the outlook period. Most of this growth is expected to come from mines that either start or ramp up to full production early in the outlook period. The largest potential copper project in Australia is BHP Billiton's Olympic Dam expansion project (570 000 tonnes) which was postponed in 2012 to consider more cost effective development options. Significant production from this project is not expected to occur in the outlook period.

Refined production

Australian production of refined copper in 2012–13 decreased 7 per cent compared to 2011–12, to total 454 000 tonnes. Lower production levels at Olympic Dam, due to scheduled outages, and Xstrata's Townsville refinery, from lower concentrate production used as refinery production input, were the substantial contributors to the decrease. These refineries returning to full production will drive an increase in production in 2013–14. Refined production is forecast to grow by 10 per cent in 2013–14, relative to 2012–13, to total 498 000 tonnes.

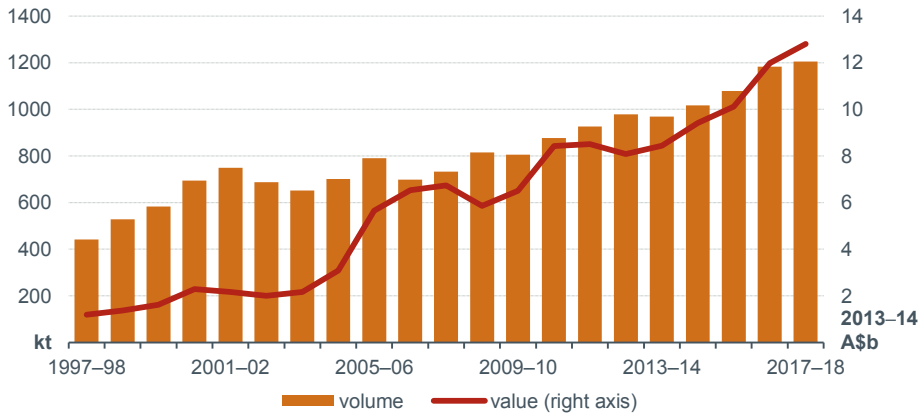
The Townsville copper refinery's scheduled closure in 2016 is projected to result in a decrease in Australian refined copper production over the outlook period. This is indicative of the emerging global trend of metals refining shifting to emerging economies that have lower production costs and aim to have the higher value adding activities located domestically to support their economic growth. Australia's refined copper production is projected to decrease to 220 000 tonnes in 2017–18. No new Australian refined copper projects are expected to start-up in the medium term.

Exports

In 2012–13, the volume of Australian copper exports (by metallic content) increased by 6 per cent, relative to 2011–12, to total 979 000 tonnes. Higher exports of ores and concentrates exports offset a decrease in refined copper exports. Australia's copper export earnings for 2012–13 totalled $8.1 billion, a decrease of 5 per cent from 2011–12 due to lower in copper prices (see Figure 3). Copper exports (by metallic content) are forecast to total 969 000 tonnes in 2013–14, a 1.0 per cent decrease relative to 2012–13. A forecast lower Australian dollar exchange rate is expected to offset lower copper prices in 2013–14 and support export values increasing 4.4 per cent to total $8.4 billion.

Over the outlook period, Australia's copper export volumes are projected to total 1.2 million tonnes, increasing at an annual average rate of 4.5 per cent, relative to 2012–13. A projected increase in ores and concentrates exports will offset a decline in refined copper exports. Australia's copper export earnings are projected to increase at an average annual rate of 7 per cent to total $11.7 billion (in 2012–13 dollars) in 2017–18, underpinned by higher export volumes and higher received Australian dollar prices.

Figure 3: Australia's copper exports



Sources: BREE; ABS.

Table 1: Copper outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Production									
– mine	**kt**	**16 294**	**17 079**	**17 630**	**18 455**	**20 074**	**21 837**	**22 564**	**23 201**
– refined	**kt**	**19 814**	**20 417**	**20 785**	**21 466**	**22 259**	**22 916**	**23 720**	**24 357**
Consumption	**kt**	**19 565**	**20 183**	**20 537**	**21 175**	**22 112**	**22 967**	**23 848**	**24 756**
Closing stocks	**kt**	**981**	**1 061**	**1 309**	**1 600**	**1 747**	**1 696**	**1 568**	**1 170**
– weeks consumptio	**wks**	**2.6**	**2.7**	**3.3**	**3.9**	**4.1**	**3.8**	**3.4**	**2.5**
Price LME									
– nominal	**US$/t**	**8 852**	**7 948**	**7 281**	**6 963**	**6 779**	**7 006**	**7 209**	**7 444**
	USc/lb	**401.5**	**360.5**	**330.3**	**315.8**	**307.5**	**317.8**	**327.0**	**337.6**
– real b	**US$/t**	**9 126**	**8 098**	**7 281**	**6 903**	**6 654**	**6 795**	**6 897**	**7 024**
	USc/lb	**413.9**	**367.3**	**330.3**	**313.1**	**301.8**	**308.2**	**312.9**	**318.6**

	2010 –11	2011 –12	2012 –13	2013 –14 f	2014 –15 z	2015 –16 z	2016 –17 z	2017 –18 z
Australia								
Mine output	**952**	**926**	**963**	**1 023**	**1 071**	**1 131**	**1 199**	**1 203**
Refined output	**485**	**486**	**454**	**498**	**499**	**489**	**310**	**220**
Exports								
– ores and conc. c	**1 750**	**1 814**	**2 194**	**1 942**	**2 116**	**2 376**	**3 288**	**3 635**
– refined	**375**	**395**	**360**	**395**	**397**	**388**	**246**	**175**
Nominal value	**8 422**	**8 501**	**8 077**	**8 436**	**9 413**	**10 114**	**11 986**	**12 830**
Real value d	**8 938**	**8 886**	**8 271**	**8 436**	**9 192**	**9 665**	**11 207**	**11 738**

b **In 2013 US dollars.** c **Quantities refer to gross weight of all ores and concentrates.** d **In 2013–14 Australian dollars.** f **BREE forecast.** z **BREE projection.**
Sources: **BREE; ABARES; Australian Bureau of Statistics; International Copper Study Group; World Bureau of Metal Statistics.**

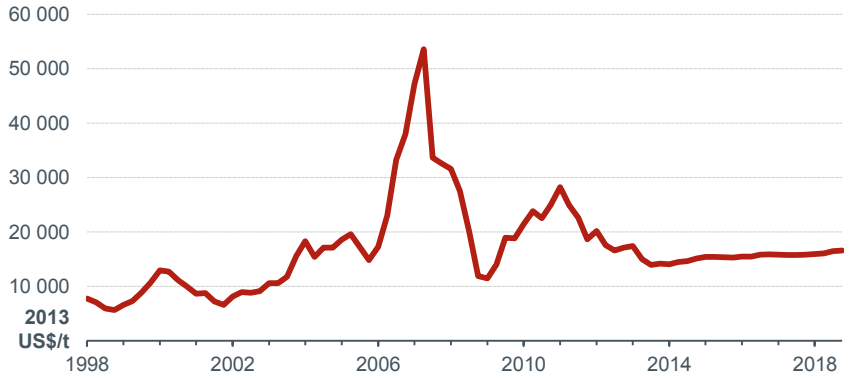
Nickel

Simon Cowling

Prices

The average spot price of nickel decreased 14 per cent in the June 2013 quarter, relative to the previous quarter, to US$14 960 (see Figure 1). The average spot price of nickel in 2013 is forecast to decrease by 14 per cent to US$15 103 a tonne, relative to 2012. The fall in the June quarter and forecast lower prices through 2013 is a result of a market oversupply arising from increases in refined production outpacing consumption growth. Accordingly, nickel stocks are forecast to increase to 7.9 weeks of consumption by the end of 2013 (see Figure 1). Lower world prices are forecast to continue into 2014, underpinned by an ongoing market oversupply and high levels nickel stocks. Prices are forecast to decline by a further 2.7 per cent in 2014, relative to 2013, to average US$14 566 a tonne.

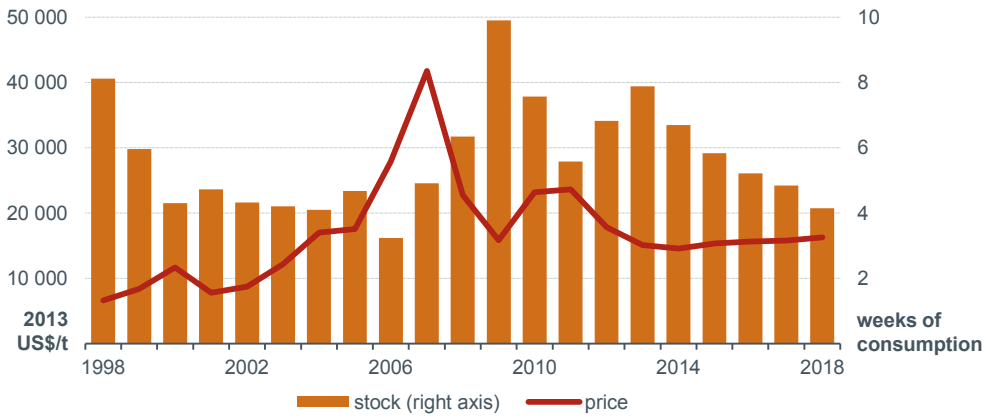
Figure 1: Quarterly nickel prices



Sources: BREE; LME.

Nickel spot prices are projected to increase over the period 2014 to 2018 and average US$16 250 a tonne in 2018 (in 2013 US dollars). This represents an average annual growth rate of 1.5 per cent (see Figure 2). Increased construction activity in emerging Asian economies and a rebound in European economic activity will underpin higher demand, and in turn prices over the medium term. Global stocks are projected to decrease from 2014 to 2018 as increases in refined production in Africa and South America are offset by greater consumption growth.

Figure 2: Annual nickel prices and stocks



Sources: BREE; INSG; LME.

Consumption

In 2013, world nickel consumption is forecast to increase by around 7 per cent to total 1.78 million tonnes. The increase will be supported by nickel as an input into higher stainless steel production for use in construction, particularly in emerging Asian economies. China's consumption is forecast to increase by 13 per cent to total 872 000 tonnes in 2013. World nickel consumption is forecast to increase by a further 2.1 per cent in 2014, to total 1.82 million tonnes. Consumption in China is forecast to total 893 000 tonnes in 2014, an increase of 2.4 per cent over 2013 as growth in residential infrastructure continues. The economic recovery in Europe is forecast to slowly increase in 2014, driving nickel consumption to increase by 1.1 per cent to total 370 000 tonnes.

Over the outlook period, world nickel consumption is projected to increase by an average annual rate of 2.7 per cent to around 1.95 million tonnes in 2018. Consumption is projected to grow in Asia and emerging economies as a result of increasing investment in fixed capital. China is projected to remain the largest consumer of nickel, accounting for around half of total world consumption in 2018.

In 2013, nickel consumption in China is forecast to grow by 13 per cent, relative to 2012, to total 872 000 tonnes. Continuing economic development and a growing middle class has fuelled the need for greater residential construction, supporting the increase. Nickel consumption in China over the outlook period is projected to increase at an average annual rate of 3.5 per cent to total around 949 000 tonnes in 2018. The increase will be underpinned by a shift toward greater 300 and 200 series stainless steel production to support infrastructure and housing investment for China's increasing urban population. The 300 series has nickel content of between 10–12 per cent, with the 200 series containing around 1–5 per cent of nickel. Lower nickel prices make these series more attractive compared to the stainless steel 400 series, which uses chromium as a nickel substitute. The use of nickel pig iron (NPI), produced from lower grade nickel laterite ores, is projected to continue in the medium term. The extent to which NPI is consumed in the medium term will be dependent on prevailing market conditions. Projected lower nickel prices over the outlook period will limit NPI production in China, as international imports pose a more attractive prospect.

Nickel consumption in the US, the second largest consumer of nickel, is projected to increase to 143 000 tonnes in 2018, representing average growth of 0.9 per cent a year. Expected increases in construction activity in the medium term will be the main driver of growth.

Mine production

In 2013, world nickel mine production is forecast to decrease marginally compared to 2012 to total 2.15 million tonnes. Forecast production curtailments due to lower prices and surplus market supply will be the substantial drivers of the decrease. These curtailments will offset the expected start-ups of new projects in 2013. Production from Indonesia is forecast to fall by 3.7 per cent from 2012 levels to total 443 000 tonnes in 2013. Mined production in Russia is forecast to decrease to 243 000 tonnes, a fall of 10 per cent relative to 2012.

Mined nickel production is forecast to decrease by a further 2.5 per cent in 2014, to total 2.09 million tonnes. Production in Africa is forecast to fall by 8 per cent to total 104 000 tonnes, with Australian production decreasing by 7 per cent to total 210 000 tonnes. The forecast decrease is a result of capacity reductions from mines entering care and maintenance periods or reaching end-of-mine-life in 2013 not being subsequently replaced. Indonesian production of mined nickel is expected to decrease by 17 per cent to 368 000 tonnes in 2014 as demand for Indonesian laterite ore diminishes. Indonesian laterite ore is used to produce NPI, the production of which is expected to be limited under projected world nickel prices.

World nickel mine production is projected to increase by an average annual rate of 0.9 per cent between 2013 and 2018 to total 2.27 million tonnes. The prospects for new projects starting up over the medium term are limited, with projected increases in production a result of restarting idled capacity and ramp-up in production from recently commissioned mines. Increased production at Sherritt International's joint venture Ambatovy mine in Madagascar (60 000 tonnes) will be the chief driver of growth in production.

In 2018 production in Asia is projected to increase to total 851 000 tonnes, representing marginal growth over the five-year period. Higher production from Indonesia, from 2015 onwards, and the Philippines will underpin the increase. Further increases in production from these countries in the medium term are subject to market and price conditions, with projected prices and a market surplus limiting higher growth.

Refined production

World refined nickel production is forecast to increase to by 4.6 per cent to total 1.83 million tonnes in 2013. Increased production in China, particularly in the Jilin province, and a ramp up in production from the on-site refinery at the Ambatovy project in Madagascar are forecast to underpin the increase. Production curtailments in South America and Russia due to maintenance issues and production disruptions are forecast to limit higher growth in 2013.

In 2014 world refined nickel production is forecast to decrease to 1.78 million tonnes. Curtailments in response to the forecast market oversupply will support lower production levels in 2014. Production in China is forecast to decrease by 8 per cent as excess capacity is eliminated to achieve energy saving and environmental goals set out in China's 12th Five-Year Plan.

Expected production ramp ups from the Glencore Xstrata's Onça Puma and Sherritt International's Ambatovy refineries, and the restart of idled capacity are projected to result in increased refined nickel production over the outlook period. Refined production is projected to increase at an average annual rate of 1.6 per cent to total 1.93 million tonnes in 2018. Production levels of refined nickel in China are projected to remain relatively stable over the medium term, and to total 612 000 tonnes in 2018. Production increases from recently commissioned refineries are projected to offset capacity reductions resultant from the closure of out-dated and excess capacity across 2013 and 2014. Despite this, China is projected to remain the largest contributor to global refined production in the medium term, accounting for around a third of world production.

Production of NPI in China over the outlook period is projected to continue. However, production of NPI is sensitive to prevailing world nickel prices. At current prices it is understood that nickel imports from international markets are more attractive than NPI. While consolidation and cost cutting in the NPI market in China are likely, the extent to which this happens, given projected nickel prices, will ultimately determine the relevance of NPI, and in turn China's production of refined nickel in the medium term.

Australia

Mine production

Australia's production of mined nickel increased by 3.2 per cent to total 242 000 tonnes in 2012–13. The growth is a result of increased production at First Quantum's Ravensthorpe and Minara Resources' Murrin Murrin mines. These increases more than offset lower production from Norlisk's Lake Johnson and Glencore Xstrata's Cosmos due to the mines being placed on care and maintenance, and Glencore Xstrata's Sinclair mine reaching its end of life. The Lake Johnson and Sinclair mine closures occurred within the June quarter 2013 when prices averaged US$ 14 960. As a result of mines being put on care and maintenance, refined production in Australia in 2013–14 is forecast to decrease by 13 per cent to total 210 000 tonnes. In the medium term nickel mine production in Australia will remain below 2012–13 levels. Australian mine production is projected to decease by an average annual rate of 3.4 per cent to total 203 000 tonnes in 2018.

Refined production

Refined nickel production in Australia increased by 10 per cent in 2012–13, compared with 2011–12, to total 135 000 tonnes. Higher production at Minara Resources' Murrin Murrin refinery in Western Australia, from technological and engineering improvements, and at First Quantum's Ravensthorpe project in Western Australia was the main drivers of the increase. In 2013–14, refined production is forecast to decrease to 131 000 tonnes, in line with lower domestic mine production.

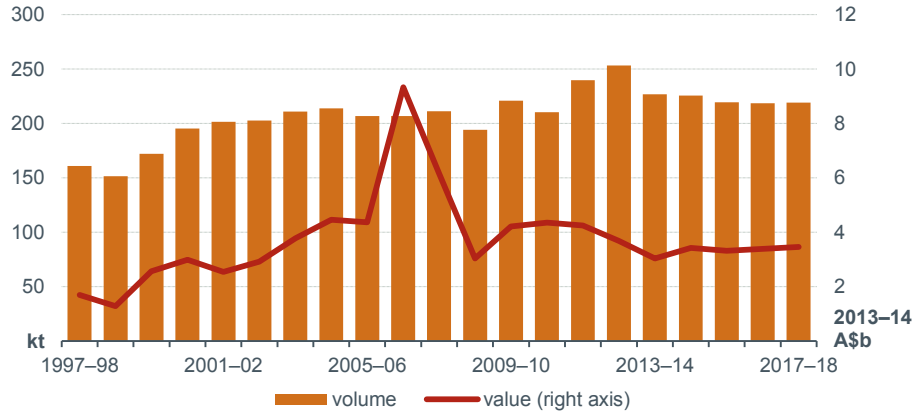
Over the outlook period, refined nickel production is projected to decrease 1.6 per cent year-on-year and to total 124 000 tonnes in 2018. The decrease is due to cost pressures given projected lower world nickel prices in the medium term. It is not expected that any new refineries will start up in Australia by 2018.

Exports

Australian nickel export volumes increased by 6 per cent in 2012–13, relative to 2011–12, to total 253 000 tonnes. The growth was underpinned by higher refined nickel production. The value of Australia's nickel exports decreased 12 per cent to $3.6 billion, primarily due to the fall in the world nickel price (see Figure 3). In 2013–14, Australia's nickel export volumes are forecast to fall 10 per cent to total 227 000 tonnes. This forecast decrease is a result of reduced total mine production. The value of Australia's exports in 2013–14 is forecast to decrease 16 per cent, to $3 billion, driven by a lower world nickel price.

Australia's nickel export volumes are projected to decrease over the remainder of the outlook period and to total 219 000 tonnes in 2017–18. The decrease is in line with lower mined and refined production. The value of Australian nickel exports is projected to decrease by 6 per cent, relative to 2012–13, to $3.5 billion (in 2013–14 dollars) in 2017–18, underpinned by lower Australian dollar nickel price and lower nickel exports.

Figure 3: Australia's nickel exports



Sources: BREE; ABS.

Table 1: Nickel outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Production									
– mine	**kt**	**1 936**	**2 154**	**2 147**	**2 093**	**2 146**	**2 200**	**2 244**	**2 268**
– refined	**kt**	**1 613**	**1 751**	**1 832**	**1 781**	**1 837**	**1 880**	**1 910**	**1 925**
Consumption	**kt**	**1 607**	**1 659**	**1 780**	**1 817**	**1 862**	**1 898**	**1 922**	**1 949**
Stocks	**kt**	**172**	**217**	**269**	**233**	**208**	**190**	**178**	**155**
– weeks consumption		**5.6**	**6.8**	**7.9**	**6.7**	**5.8**	**5.2**	**4.8**	**4.1**
Price LME									
– nominal	**US$/t**	**22 854**	**17 508**	**15 103**	**14 693**	**15 645**	**16 119**	**16 495**	**17 222**
	Usc/lb	**1 037**	**794**	**685**	**666**	**710**	**731**	**748**	**781**
– real b	**US$/t**	**23 560**	**17 838**	**15 103**	**14 566**	**15 356**	**15 634**	**15 782**	**16 250**
	Usc/lb	**1 069**	**809**	**685**	**661**	**697**	**709**	**716**	**737**
		2010	2011	2012	2013	2014	2015	2016	2017
		–11	–12	–13	–14 f	–15 z	–16 z	–17 z	–18 z
Australia									
Production									
– mine cs	**kt**	**195**	**235**	**242**	**210**	**210**	**203**	**203**	**203**
– refined	**kt**	**101**	**122**	**135**	**131**	**129**	**126**	**127**	**124**
– intermediate	**kt**	**60**	**70**	**61**	**64**	**63**	**62**	**59**	**56**
Export volume c	**kt**	**210**	**240**	**253**	**227**	**226**	**219**	**218**	**219**
Export value									
– nominal s	**A$m**	**4 096**	**4 056**	**3 589**	**3 027**	**3 499**	**3 470**	**3 616**	**3 776**
– real es	**A$m**	**4 348**	**4 240**	**3 675**	**3 027**	**3 417**	**3 316**	**3 381**	**3 454**

b In 2013 US dollars. c Nickel content of domestic mine production. d Includes metal content of ores and concentrates, intermediate products and nickel metal. e In 2013–14 Australian dollars. f BREE forecast. s BREE estimate. z BREE projection. *Sources:* BREE; ABARES; Australian Bureau of Statistics; International Nickel Study Group; London Metal Exchange; World Bureau of Metal Statistics.

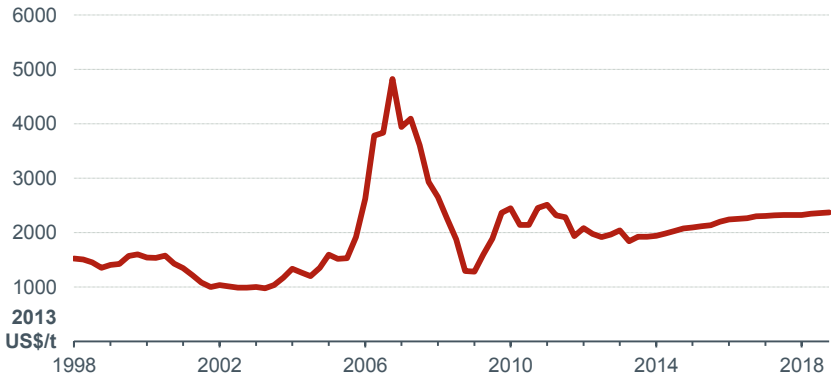
Zinc

Simon Cowling

Zinc prices and stocks

In the June quarter 2013 the spot price of zinc averaged US$1840 a tonne, a 9 per cent decrease from the March quarter 2013 average price. Although consumption of zinc increased in the first half of 2013 relative to 2012, higher production as well as a draw down on zinc stocks and concerns over slowing economic growth in emerging economies have kept downwards pressure on zinc prices. The average price for the full year 2013 is forecast to average US$1934, 0.7 per cent lower than 2012.

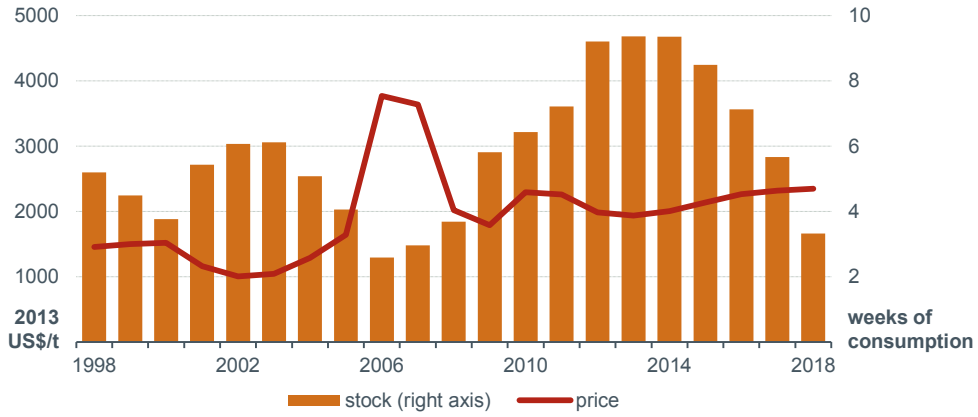
Figure 1: Quarterly zinc prices



Sources: BREE, LME.

Over the outlook period, zinc prices are projected to increase in response to tighter supply conditions. Several large and low cost zinc mines are scheduled to close down over the next 3 years and remove substantial quantities of ore and concentrate production from the market. World zinc consumption is projected to increase at an average annual rate of 4.7 per cent over the next five years, underpinned by growing demand for galvanised steel products in emerging economies. To support this consumption growth a number of new mines will be required to start production. To justify such investment decisions, higher zinc prices will be required to cover the higher operating costs of new mines as well as provide a suitable return on capital. As a result, refined zinc prices are projected to increase at an average annual rate of 2.9 per cent from 2013 to 2018 to average around US$2348 (in 2013 US dollars) in 2018.

Figure 2: Annual zinc prices and stocks



Sources: BREE, LME.

Australia

Production

Australia's mined production of zinc (total metallic content) in 2012–13 decreased by 2.6 per cent, relative to 2011–12, to total 1.53 million tonnes. This decrease was underpinned by Kagara Zinc's Mt Garnet (40 000 tonnes) and Thalanga (15 000 tonnes) mines being placed on care and maintenance. Increases in production from CBH Resources' Rasp Broken Hill mine (34 000 tonnes), Glencore Xstrata's Lady Loretta mine (126 000 tonnes) and George Fisher expansion and the start-up of Glencore Xstrata's McArthur River expansion (200 000 tonnes) are forecast to result in mined zinc production increasing 8 per cent in 2013–14 to 1.65 million tonnes.

In 2014–15, Australia's mined production is projected to increase by 12 per cent to total 1.84 million and then decrease to 1.63 million tonnes in 2017–18. The forecast rise in production in 2014–15 is due to full production capacity being reached at recent commissioned operations by Glencore Xstrata and CBH Resources. The slowing production and then eventual closure of MMG's Century mine (500 000 tonnes) in 2016–17 will then reduce Australia's zinc mine production. The start of production at MMG's Dugald River mine in Queensland (200 000 tonnes) in 2015–16 will only partially offset this decrease.

Refined zinc production in 2012–13 decreased by 1.7 per cent to total 496 000 tonnes, relative to 2011–12. In 2013–14, refined zinc production is forecast to total 500 000 tonnes, an increase of 0.8 per cent compared to 2012–13. Over the outlook period, refined production is projected to decrease to total 481 000 tonnes in 2017–18. Minor refinery curtailments are expected as domestic mined production decreases, particularly from MMG's Century mine.

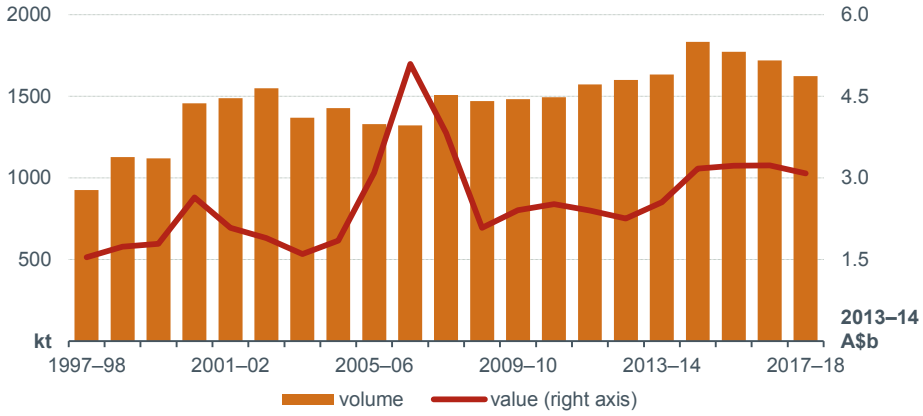
Exports

In 2012–13 Australia's zinc export volumes increased by 1.7 per cent, relative to 2011–12, to total 1.59 million tonnes. Although refined exports decreased this was offset by higher exports of zinc ores and concentrates. Zinc export values decreased 3.9 per cent to total $2.2 billion as a result of lower zinc prices.

In 2013–14, export volumes are forecast to increase by 2.1 per cent to 1.63 million tonnes, supported by further growth in exports of ores and concentrates. A forecast increase in the received price, due to both a moderate increase in zinc prices and a more favourable Australian dollar exchange rate, is expected to support Australia's zinc export earnings increasing 13 per cent to total $2.6 billion.

Over the outlook period, Australian zinc exports are projected to follow a similar pattern to production. Export volumes are projected to increase by 12 per cent in 2014–15 to 1.83 million as new mines support higher production; before decreasing to 1.62 million in 2017–18 as production decreases due to mine closures. Zinc export earnings are projected to increase at an average annual rate of 6 per cent to total $3.1 billion (in 2013–14 dollars) in 2017–18.

Figure 3: Australia's zinc exports



Sources: BREE; ABS.

Table 1: Zinc outlook

	unit	2011	2012	2013 f	2014 f	2015 z	2016 z	2017 z	2018 z
World									
Production									
– mine	**kt**	**12 948**	**13 615**	**13 724**	**14 085**	**14 491**	**14 818**	**15 332**	**15 730**
– refined	**kt**	**13 120**	**12 609**	**13 053**	**13 512**	**14 103**	**14 529**	**15 075**	**15 689**
Consumption	**kt**	**12 754**	**12 395**	**12 922**	**13 423**	**14 200**	**14 817**	**15 425**	**16 327**
Closing stocks	**kt**	**1 769**	**2 195**	**2 326**	**2 415**	**2 318**	**2 030**	**1 680**	**1 042**
– weeks consumpti	**wks**	**7.2**	**9.2**	**9.4**	**9.4**	**8.5**	**7.1**	**5.7**	**3.3**
Price									
– nominal	**US$/t**	**2 191**	**1 947**	**1 934**	**2 023**	**2 177**	**2 333**	**2 421**	**2 489**
	USc/lb	**99**	**88**	**88**	**92**	**99**	**106**	**110**	**113**
– real b	**US$/t**	**2 258**	**1 984**	**1 934**	**2 006**	**2 136**	**2 263**	**2 317**	**2 348**
	USc/lb	**102**	**90**	**88**	**91**	**97**	**103**	**105**	**107**
		2010	2011	2012	2013	2014	2015	2016	2017
		–11	–12	–13	–14 f	–15 z	–16 z	–17 z	–18 z
Australia									
Mine output	**kt**	**1 479**	**1 567**	**1 527**	**1 648**	**1 843**	**1 775**	**1 718**	**1 630**
Refined output	**kt**	**499**	**505**	**496**	**500**	**498**	**498**	**489**	**481**
Exports									
– ore and conc. c	**kt**	**2 317**	**2 382**	**2 490**	**2 566**	**2 995**	**2 863**	**2 771**	**2 583**
– refined	**kt**	**410**	**456**	**432**	**435**	**435**	**436**	**426**	**418**
– total metallic con	**kt**	**1 494**	**1 572**	**1 599**	**1 633**	**1 834**	**1 773**	**1 720**	**1 624**
Total value									
– nominal	**A$m**	**2 373**	**2 292**	**2 208**	**2 553**	**3 249**	**3 370**	**3 451**	**3 367**
– real d	**A$m**	**2 518**	**2 395**	**2 261**	**2 553**	**3 173**	**3 220**	**3 227**	**3 080**

b **In 2013 US dollars.** c **Quantities refer to gross weight of all ores and concentrates.** d **In 2013–14 Australian dollars.** f **BREE forecast.** z **BREE projection.**
Sources: **BREE; ABARES; Australian Bureau of Statistics; International Lead Zinc Study group.**

Resources and Energy Quarterly

Reviews

An overview of China's refined metals consumption

Tom Shael and Simon Cowling*

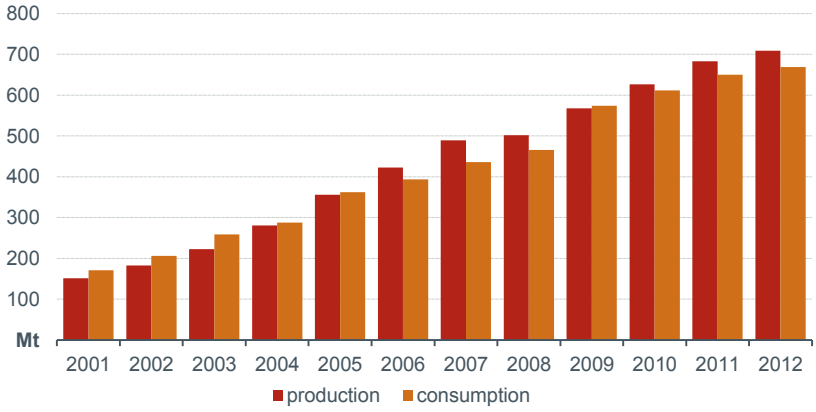
Since China joined the World Trade Organisation in 2001 its economy has gone through a period of rapid growth led by increased capital and consumption expenditure. Coinciding with these increases has been substantial growth in both the consumption and domestic production of refined metals such as steel, aluminium and refined base metals. Although China's GDP growth rate has slowed over the past 18 months, it is still recording growth and as a result consumption of refined metals continues to grow.

This review provides an overview of the growth in China's metals consumption over the past 12 years with, a focus on China's ability to meet its own domestic requirements and its increasing importance in world metals markets.

Steel

China's steel industry, perhaps more than any other refined metal industry, has been the most documented symbol of China's rise as an industrial powerhouse. In 2001 China was already the world's largest producer of steel and accounted for around 20 per cent of world steel production. Since 2001, China's annual crude steel production rate has increased by 558 million tonnes, or 370 per cent, which is more than the rest of the world combined. In fact, 82 per cent of additional steel production in 2012, relative to 2001, is attributable to China.

Figure 1: China's crude steel production and consumption



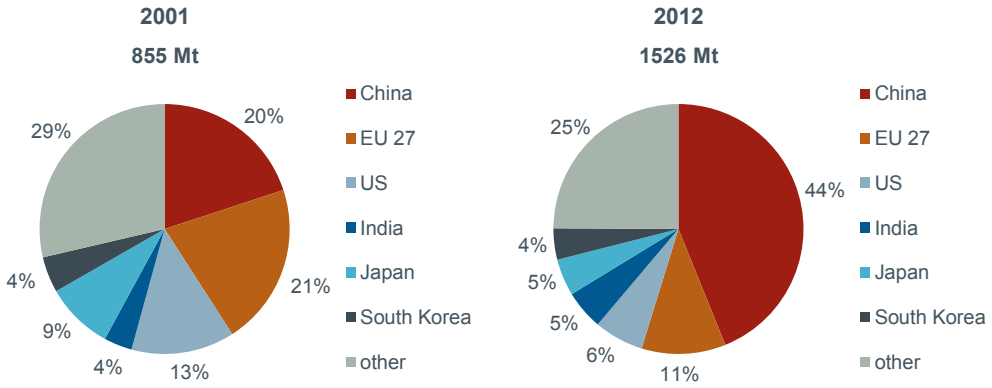
Source: World Bureau of Metal Statistics.

* The views expressed in this review are those of the authors alone and are not necessarily those of the Bureau of Resources and Energy Economics nor the Department of Industry

Across the same period annual consumption has increased by 499 million tonnes, or 292 per cent, at an average rate of 13 per cent a year (see Figure 1). In 2001, consumption was around 20 million tonnes higher than production, but since 2006 this production has been higher than consumption. The only exception to this occurred in 2009, when a 23 per cent increase in consumption prompted by government funded stimulus packages could not be met through domestic production, resulting in a production shortfall of around 7 million tonnes.

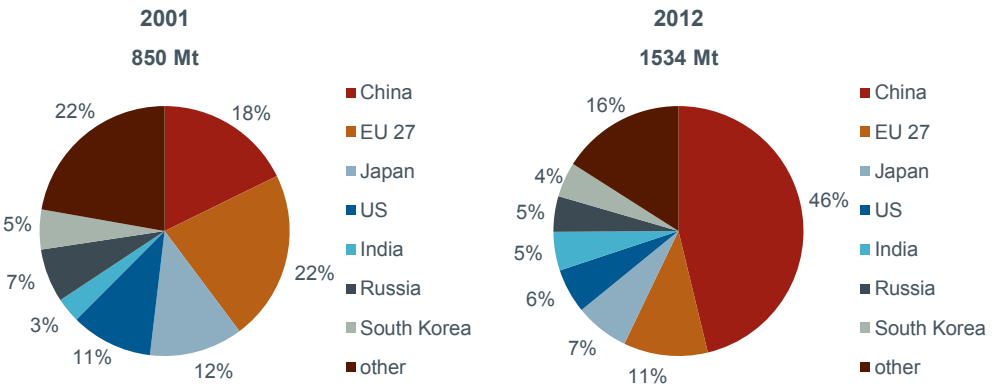
The growth in China's steel production is attributable to the significant growth in its urban population. From 2001 to 2012, an estimated 230 million people moved from rural areas to cities and supported substantial growth in residential and commercial construction as well as considerable investment in infrastructure projects. Since 2001, the amount of building floor space started has increased nearly 400 per cent, an average annual increase of 14 per cent. Residential floor space under construction totalled 600 million m^2 in 2001 increasing to 4300 million m^2 in 2012. This equates to an increase of around 600 per cent over the period.

Figure 2: China's share of world crude steel consumption



Source: World Bureau of Metal Statistics.

Figure 3: China's share of world crude steel production

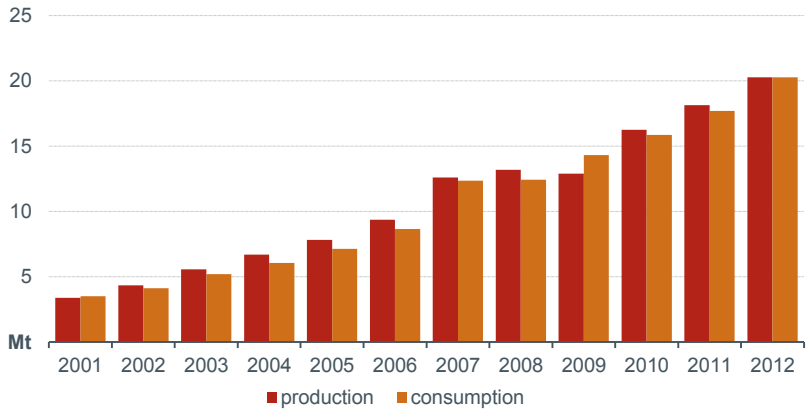


Source: World Bureau of Metal Statistics.

Aluminium

Since 2001 China's consumption of aluminium has increase at an average annual rate of 17 per cent to total 20.3 million tonnes in 2012, up from 3.5 million tonnes in 2001. In total, this increase equates to total growth of nearly 500 per cent (see Figure 4). Higher aluminium consumption is generally associated with rising incomes as it is used mostly in the production of consumer products such as cars, beverage containers and white goods. As China's incomes have increased over the past decade, its consumption of most of these items has increased substantially. For example, car sales in China have increased around 720 per cent between 2001 and 2012 to total 19.3 million cars in 2012.

Figure 4: China's aluminium production and consumption

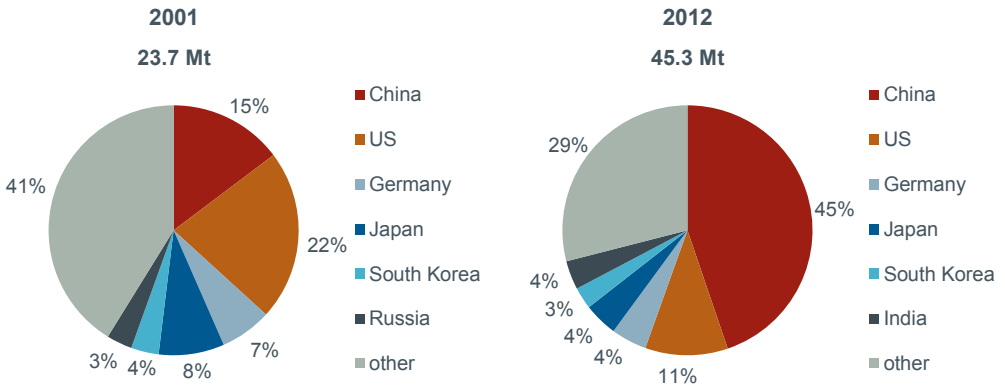


Source: World Bureau of Metal Statistics.

Although China still imports some speciality aluminium products it is mostly self-sufficient in producing refined aluminium as a result of substantial investment in production capacity over the past ten years. Production of aluminium in China has grown at an average rate of 18 per cent a year from 3.4 million tonnes in 2001 to 20.3 million tonnes in 2012. In eight out of ten years since 2003, China has been a net exporter of aluminium with 2009 been the only year it imported significant quantities as it took advantage of falling aluminium prices.

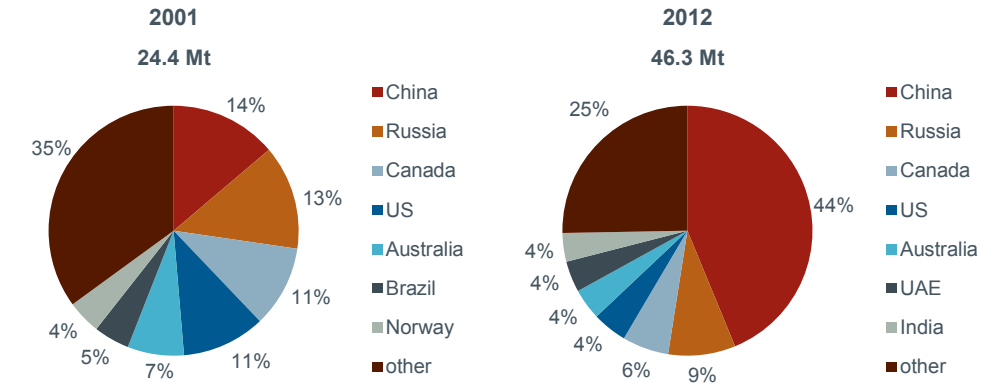
Since 2003, aluminium consumption in most major advanced economies, with the exception of Germany and South Korea, declined. These declines, combined with the rapid growth in consumption in China have made China the key player in world aluminium markets. In 2012 China accounted for 45 per cent of world aluminium consumption, a market share four times higher than the world's second largest consumer, the US (see Figure 5). China is already the world's largest producer of aluminium, and has additional aluminium refineries under construction, particularly in its inland provinces. By comparison, most advanced economies and traditional aluminium producers are announcing production curtailments and refinery closures to manage a global supply glut that is putting downwards pressure on aluminium prices.

Figure 5: China's share of world aluminium consumption



Source: World Bureau of Metal Statistics.

Figure 6: China's share of world aluminium production

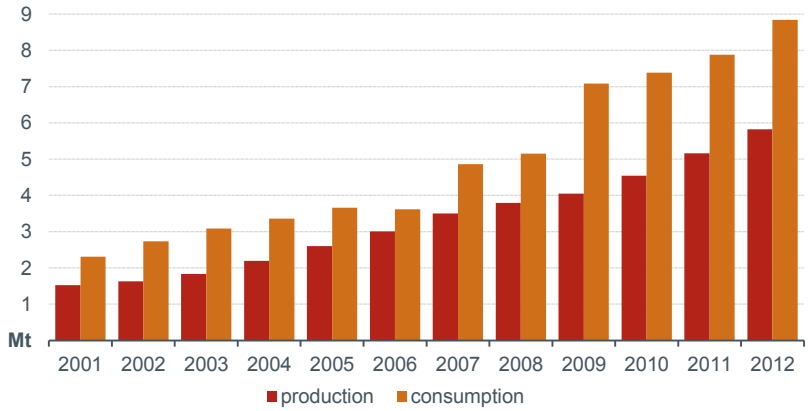


Source: World Bureau of Metal Statistics.

Copper

Over 2001 to 2012, China's refined copper consumption increased at an average annual rate of 13 per cent and was 8.8 million tonnes in 2012 (see Figure 7). This rapid growth rate has been supported by the rapid expansion in China's residential housing stock and also by significant investment in the country's electricity grid. From 2007 to 2012, total electricity construction investment increased 64 per cent to total RMB 747 billion (US$ 118 billion).

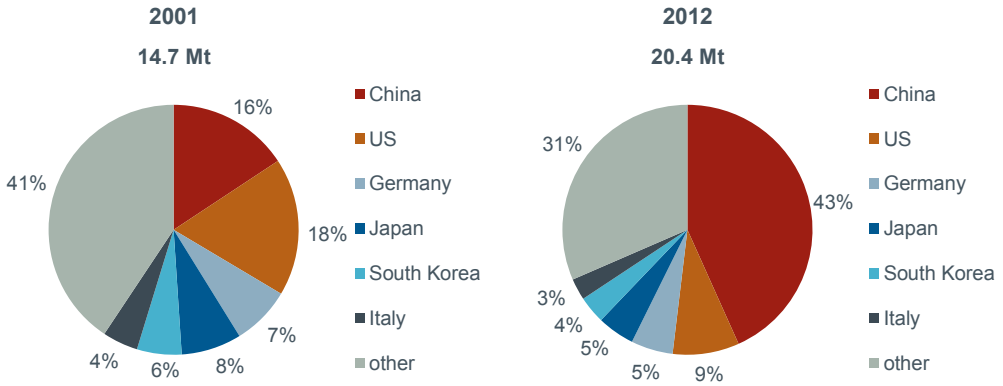
Figure 7: China's refined copper production and consumption



Source: World Bureau of Metal Statistics.

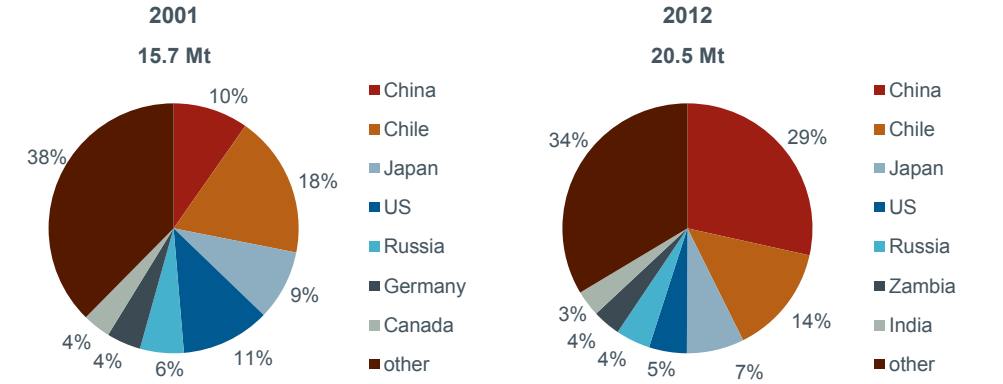
Unlike aluminium, China is heavily reliant on imports to supply its domestic consumption of refined copper as its production has consistently been lower than consumption. In 2001 China's refined copper production was two-thirds of total consumption, and totalled 1.5 million tonnes. Production in 2012 totalled 5.8 million tonnes and remained at around two-thirds of consumption. This has resulted in substantial growth China's imports of refined copper and also its share of world trade (see Figure 10).

Figure 8: China's share of world refined copper consumption



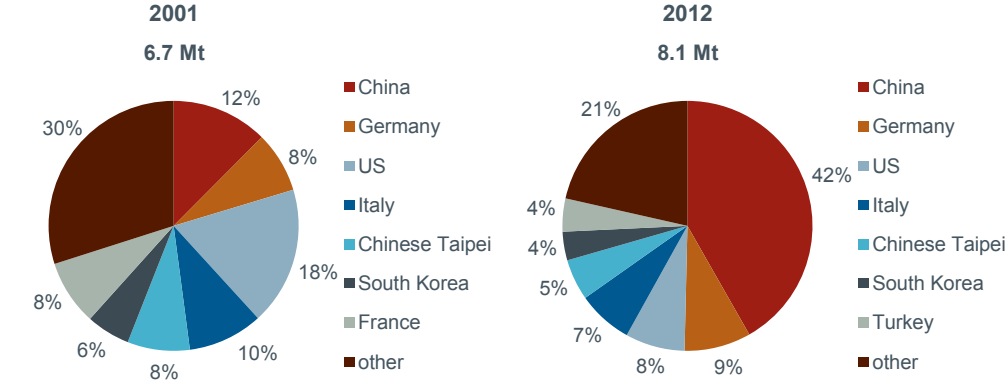
Source: World Bureau of Metal Statistics.

Figure 9: China's share of world refined copper production



Source: World Bureau of Metal Statistics.

Figure 10: China's share of world refined copper imports

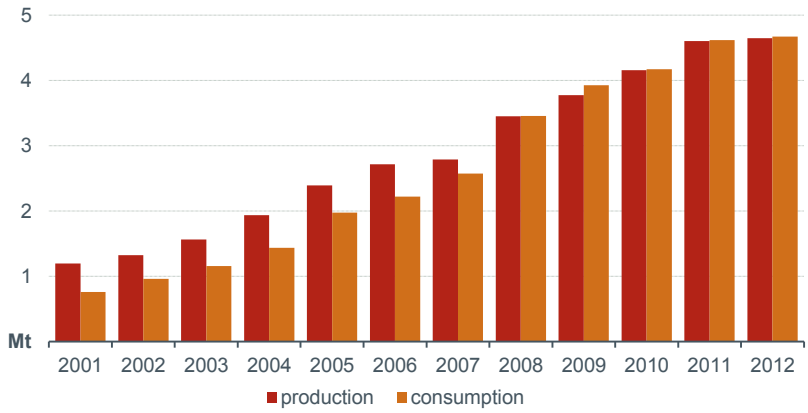


Source: World Bureau of Metal Statistics.

Lead

Refined lead consumption in China has increased by more than 500 per cent over the period 2001 to 2012, increasing from 0.8 million tonnes in 2001 to 4.7 million tonnes in 2012. This represents average annual growth of 18 per cent (see Figure 11). The leading driver of increasing lead consumption has been demand from car manufacturers for use in batteries. Strong growth in the years following the GFC was supported by a government subsidy on auto purchases.

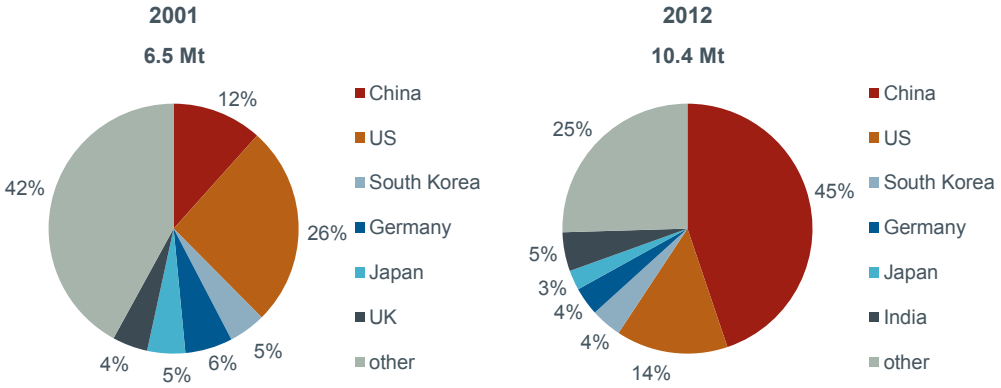
Figure 11: China's refined lead production and consumption



Source: World Bureau of Metal Statistics.

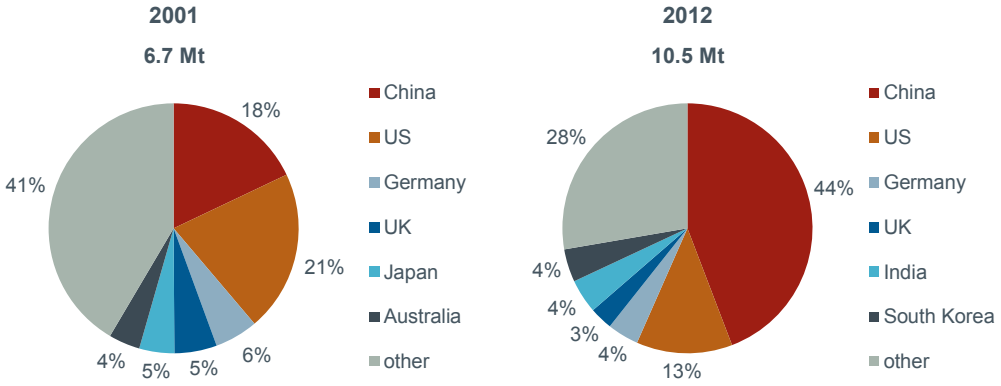
China's production of refined lead increased at an average rate of 13 per cent a year to total 4.6 million tonnes in 2012. Growth in production was markedly lower than that of consumption, which resulted in China moving from a significant exporter of refined lead in 2001, to mostly self-sufficient in recent years (see Figure 14).

Figure 12: China's share of world refined lead consumption



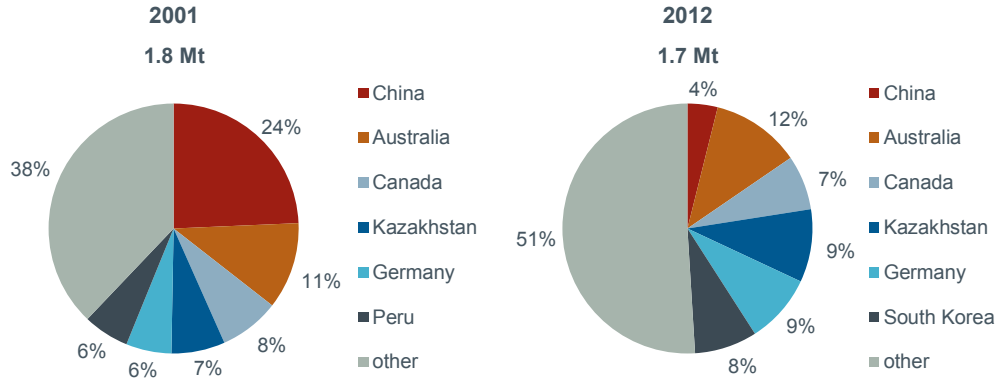
Source: World Bureau of Metal Statistics.

Figure 13: China's share of world refined lead production



Source: World Bureau of Metal Statistics.

Figure 14: China's share of world refined lead exports

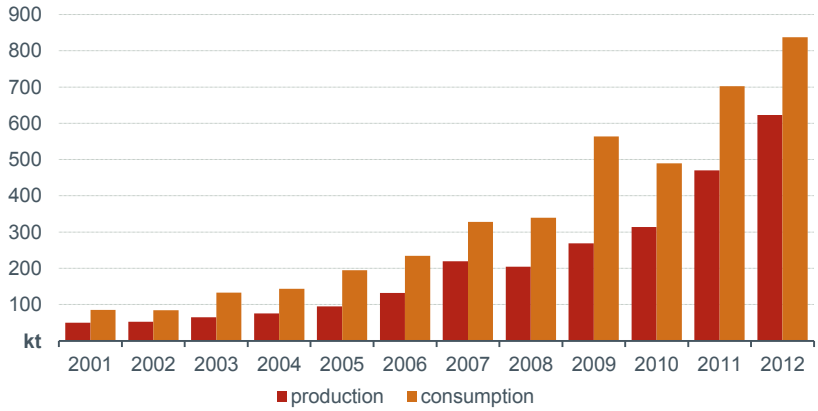


Source: World Bureau of Metal Statistics.

Nickel

China's required annual consumption of refined nickel has consistently outpaced its domestic production since 2001, primarily due to strong growth in steel production over the same period not being matched by as much investment in refined nickel production. Since 2001, China's nickel consumption has increased at an average annual rate of 25 per cent a year to total 837 000 tonnes in 2012 (see Figure 15). Increased investment in housing and residential construction, requiring greater use of nickel-intensive stainless steels, has been the substantial contributor to the increase.

Figure 15: China's refined nickel production and consumption

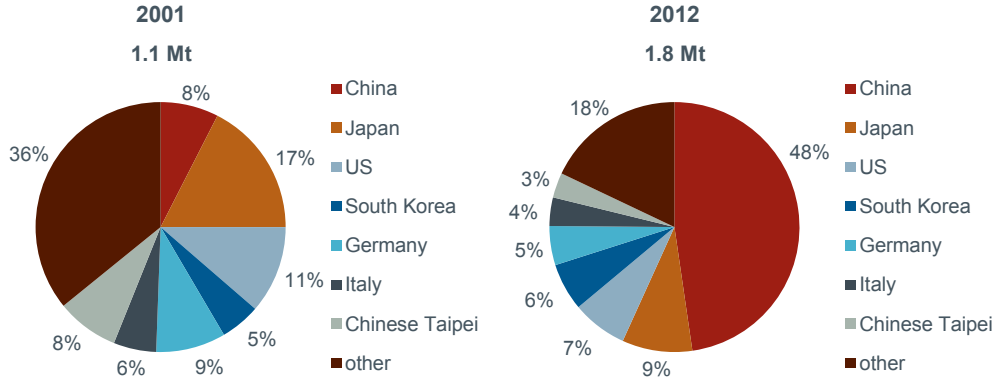


Source: World Bureau of Metal Statistics.

Refined nickel production in China has increased by more than 1000 per cent over 2001 to 2012. Despite this, domestic production has remaind consistently below that required to satisfy domestic consumption, resulting in significant, and increasing amounts or imports (see Figure 18). Production increased from 49 000 tonnes in 2001 to 623 000 tonnes in 2012, representing average annual growth of 27 per cent. Over this period, China's share of total world nickel production has grown from 4 per cent in 2001 to 33 per cent in 2012 (see Figure 17).

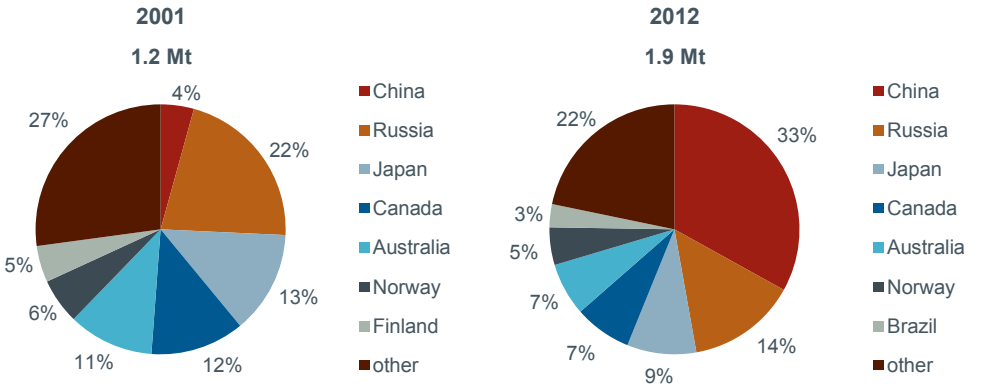
High world nickel prices experienced over the period impacted refined nickel production in China through increased production of nickel pig iron (NPI). NPI, a ferronickel product made from low nickel content laterite ores, is subject to market conditions and prevailing world nickel prices. Higher prices in 2007 resulted in refined nickel production capacity shifting toward the cheaper to produce NPI, a trend that has largely remained. China will continue to produce NPI, however, the amount will depend on global nickel prices.

Figure 16: China's share of world refined nickel consumption



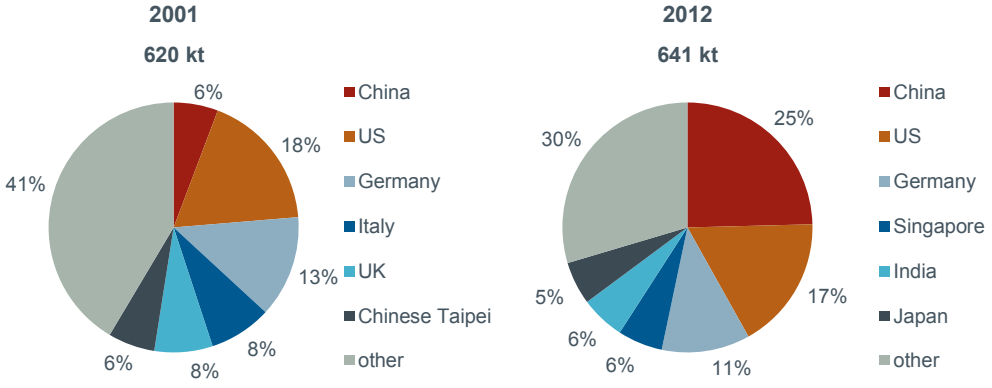
Source: World Bureau of Metal Statistics.

Figure 17: China's share of world refined nickel production



Source: World Bureau of Metal Statistics.

Figure 18: China's share of world refined nickel imports

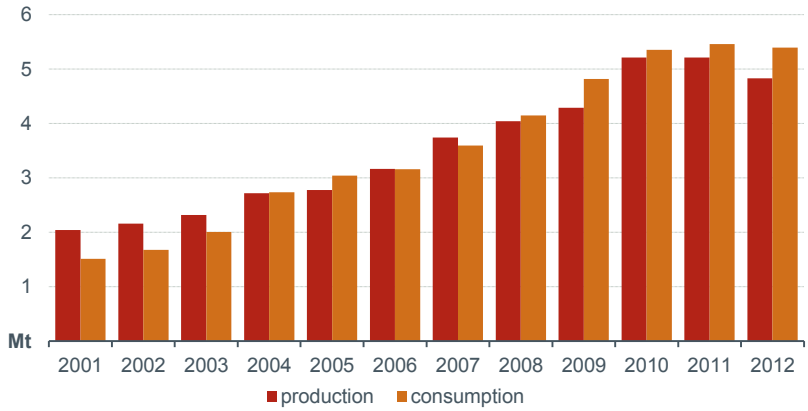


Source: World Bureau of Metal Statistics.

Zinc

China's annual consumption of refined zinc increased by 3.9 million tonnes, or 257 per cent, over 2001 to 2012, to total 5.4 million tonnes in 2012. This is slightly down from a 2011 record high of 5.5 million tonnes (see Figure 19) and can be attributed to falling railway investment. Fixed asset railway investment peaked in 2010 around RMB 843 billion (US$124 billion), before dropping by 33 per cent to RMB 633 billion in 2012 (US$100 billion).

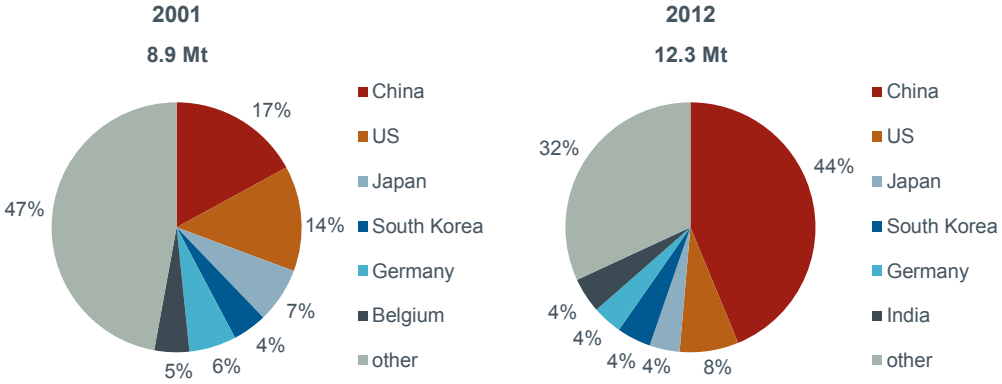
Figure 19: China's refined zinc production and consumption



Source: World Bureau of Metal Statistics.

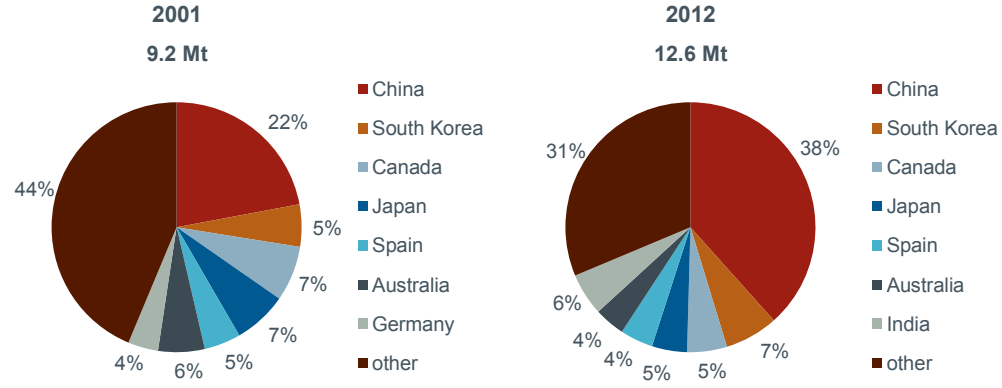
Refined zinc production has followed a similar pattern to consumption, and increased at an average rate of 8 per cent, to total 4.8 million tonnes in 2012. China's zinc production reached an all-time high of 5.2 million tonnes in 2010 before declining in recent years. Stocks of refined zinc in China increased 81 per cent from 172 000 tonnes in 2009 to 311 000 tonnes in 2012, prompting the decrease. The decline in zinc production in recent years have resulted in China becoming a significant importer of zinc in 2012 (see Figure 22). This is a substantial change in China's significance to world markets, as in 2001 the country was the largest supplier of refined zinc to international markets.

Figure 20: China's share of world refined zinc consumption



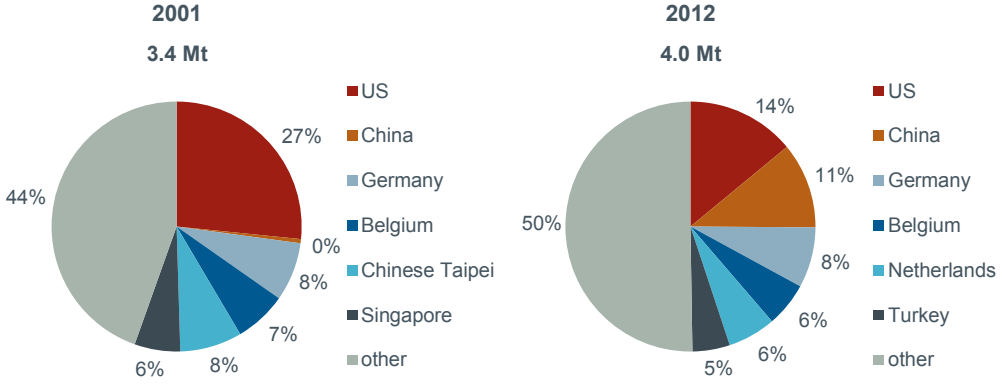
Source: World Bureau of Metal Statistics.

Figure 21: China's share of world refined zinc production



Source: World Bureau of Metal Statistics.

Figure 22: China's share of world refined zinc imports



Source: World Bureau of Metal Statistics.

Summarising comments

Since joining the World Trade Organisation in 2001 China's GDP growth has averaged 10 per cent a year. While this rate is now slowing, it is still likely to maintain solid rates of growth into the future as China's GDP per capita and Gross Fixed Capital per capita are both low compared to advanced economies. While China's economic growth rate may moderate over the medium term as Government policies focus on shifting the basis of growth from investment to domestic consumption, its consumption of resources is not expected to decline, as outlined in the commodity analysis in this edition of the *Resources and Energy Quarterly*. However, a more noticeable trend in China's metals industries over the past decade has been the installation of production capacity for refined metals. In most cases, this indicates a strong preference for undertaking these value adding activities domestically. While this presents a risk for existing world producers of refined metals, particularly higher cost producers, there still remains the opportunity to supply China's growing requirements of ores and concentrates.

Beyond the NEM and the SWIS: 2011–12 Off-Grid Electricity

Emma Richardson*

Electricity in Australia's major interconnected grid systems is well understood. However, there is little publicly available information about electricity in regional and remote areas. Due population growth and growth in the resources and energy sectors it is expected that demand for remote and off-grid power sources is likely to be growing. BREE's (2013b) new report into electricity use in Australia's regional and remote areas is the first of its kind and provides a comprehensive snapshot of off-grid electricity demand and supply in 2011–12 .

The vast majority of Australia's electricity demand and supply occurs in areas serviced by extensive, interconnected electricity generation infrastructure and transmission and distribution networks. This includes the National Electricity Market (NEM), which stretches from just north of Cairns to the Eyre Peninsula in South Australia and Tasmania, and Western Australia's South West Interconnected System (SWIS), which serves Perth, Geraldton, Albany and Kalgoorlie, amongst other locations. Electricity demand and supply in the NEM and the SWIS are well documented however relatively little is known about electricity outside these areas.

There are also sources of electricity demand beyond the NEM and the SWIS. For the purpose of this article 'off-grid' refers to areas of Australia not served by the NEM or the SWIS (see map 1). Demand in off-grid areas originates from a number of sources including: oil and gas production facilities; mining and mineral processing operations; regional and remote communities; defence facilities; pastoral stations; tourism facilities and lighthouses. Some of this demand is met via smaller regional or mini electrical grids. In other cases standalone power stations or generators are used.

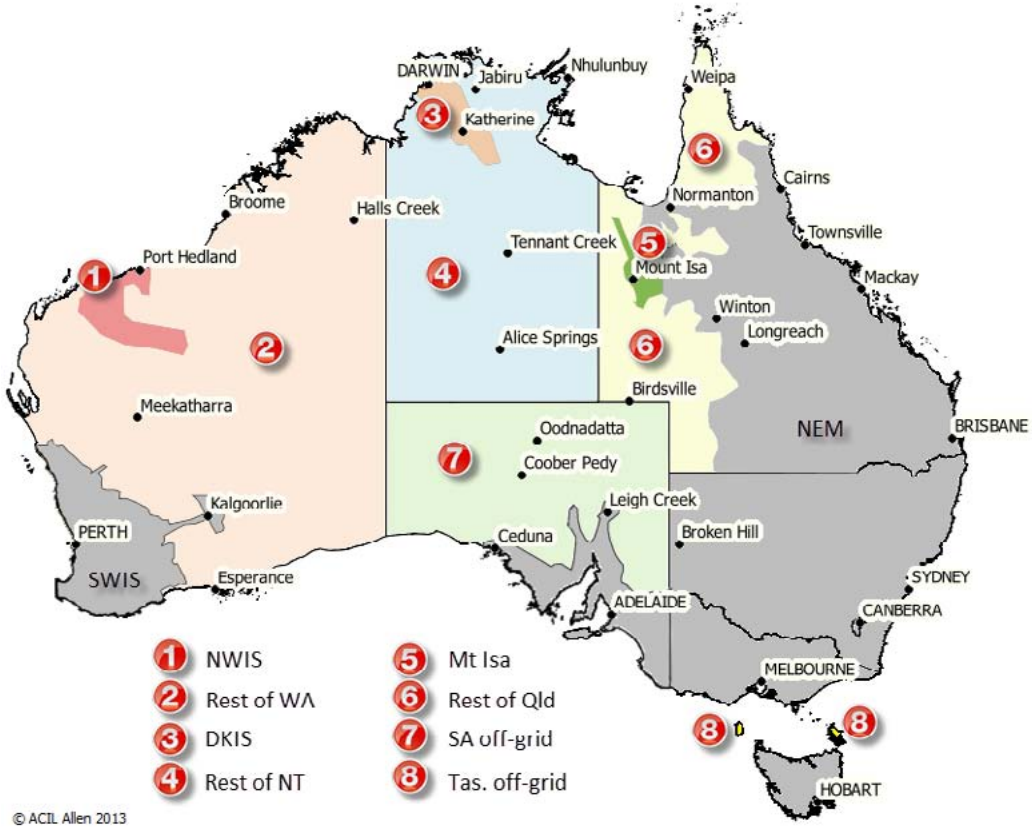
Electricity costs are likely to be high in areas beyond the NEM and SWIS due to their remote location and the lack of existing infrastructure. An accurate assessment of the size and composition of off-grid energy allows opportunities to be identified and informs public policy, planning and private investment including the potential for renewable energy to play a role. Off-grid electricity was estimated for 2011–12 and provides a starting point to measure changes in the future.

* The views expressed in this review are those of the author alone and are not necessarily those of the Bureau of Resources and Energy Economics nor the Department of Industry.
This article is summarises the BREE report Beyond the NEM and the SWIS: 2011–12 regional and remote electricity in Australia, September 2013 and available at www.bree.gov.au.

Estimating Australia's off-grid electricity demand and supply

BREE's analysis is based on a 2013 study by ACIL Allen Consulting, commissioned by the Department of Resources Energy and Tourism. Two complimentary approaches were used to identify demand and supply of off-grid electricity for 2011–12. The first was to identify off-grid electricity demand using information about populations, mining, oil and gas operations, and tourism, agriculture and defence facilities. The second approach was to identify off-grid electricity supply using information about power stations. Once electricity generation was matched to consumption, Australia was broken into nine off-grid regions that allow differences in patterns of demand and supply to be observed (map 1).

Map 1: Off-grid regions of Australia



Note: Region 9 includes off-grid areas of New South Wales, Victoria, the Australian Capital Territory and external territories. These areas are too small and geographically scattered to present in this map. Rest of WA excludes SWIS-connected areas of WA. Rest of Qld excludes NEM-connected regions of Queensland.

Off-grid electricity is defined as all electricity generated outside of the NEM and SWIS regions of Australia. Off-grid electricity can include distributed generation, such as solar PV technology or stand-alone diesel generation. However, distributed generation can be connected to the grid for the purpose of exporting excess energy when it is available. In cases where distributed generation is connected to the NEM or the SWIS it was not captured in the off-grid figures. The off-grid figures provided below also do not capture small-scale generation below 20kw, for example, small homestead generators and rooftop solar.

Electricity demand

Off-grid electricity demand was identified primarily through matching populations and industrial sources of demand with known sources of electricity supply. Firstly, electricity demand was broken into three main categories: residential, commercial and community; energy and resources facilities; and other demand. Secondly, each source of demand was mapped to a known source of electricity supply. Those sources of electricity demand mapped to electricity supply from the NEM or the SWIS were excluded from the analysis, leaving only off-grid demand and supply.

Just under 2 per cent of Australia's population, or approximately 400 000 people were identified as living off-grid and, power sources were identified for around 94 per cent of this population.

Residential, commercial and community demand captures electricity consumption that is associated with residential (in-home) electricity use and population centres. This category captures electricity demand from small stores, petrol stations, schools and other community facilities.

Energy and resources demand is a broad category that includes mining, minerals processing (such as refining or smelting) and oil and gas production. It also includes fertiliser facilities that were grouped within this category to ensure confidentiality. These facilities were matched to power sources with a combination of data from Geoscience Australia's list of operating mines, the Australian Petroleum Production and Exploration Association (APPEA) and National Greenhouse and Energy Reporting Scheme (NGERS) .

Other demand sources are scattered throughout off-grid Australia. Agricultural operations, tourist facilities and defence installations, with a very small demand from miscellaneous sources such as lighthouses are included in this category. Information was provided on pastoral energy use, collected by the Northern Territory Government through a survey of 35 station owners. This information was used to estimate the aggregate amount of pastoral station electricity generation for off-grid areas of Queensland and Western Australia.

Electricity supply

Identification of off-grid electricity supply involved a two-step process. The first step was to form a list of electricity generation facilities and their rated capacity. The second step was to identify the type of fuel used and the output of each generation facility. This list of electricity generators was then mapped to communities, energy and resource operations, tourism facilities or other sources of electricity demand.

Information on the rated capacity of electricity generators is readily available. Key sources for capacity information include Geoscience Australia's published list of power stations, information published by the Energy Supply Association of Australia, and the Western Australian Government's Energy and Resources and Infrastructure map (and related data).

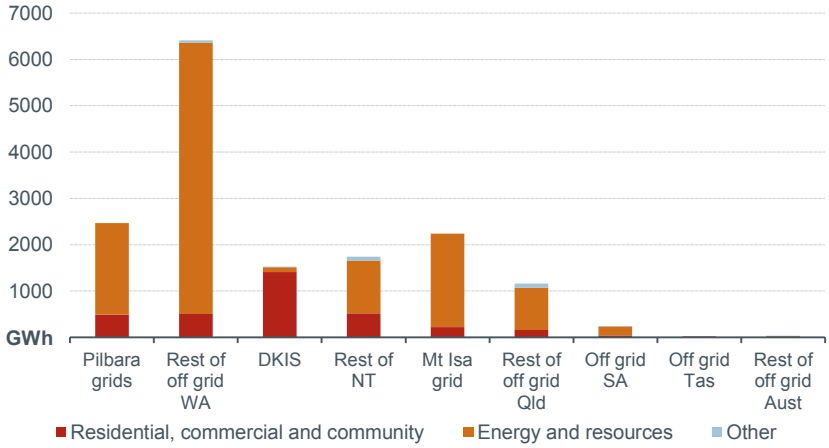
Information on fuel used and output of off-grid generators is often not publicly available. Data relating to electricity output and fuel was obtained through NGERS. This was limited to corporations with identified off-grid electricity generation assets. Other sources included published information on remote community power supply from government entities or utilities. Company reports and websites were also used.

Australia's off-grid electricity demand and supply, 2011–12

Consumption

In 2011–12 off-grid electricity consumption in Australia was almost 16 000 GWh. Energy and resource facilities dominate off-grid electricity consumption, accounting for more than three-quarters (77 per cent) of total consumption in 2011–12 (see Table 1 and Figure 1). Residential, commercial and community demand accounted for a further 21 per cent of total consumption and other sources accounted for just 2 per cent. Energy and resources projects comprised the largest portion of off-grid electricity demand in all regions except the Darwin-Katherine Interconnected System region (see Figure 1).

Figure 1: Australia's off-grid electricity consumption, by user category, 2011–12 (GWh)



Source: ACIL Allen Consulting 2013.

Table 1 excludes off-grid NSW, Victoria, the ACT and the external territories to preserve the confidentiality of data in any one usage category. The excluded regions comprise around 0.3 per cent of total off-grid electricity demand, and estimates closely approximate national off-grid consumption.

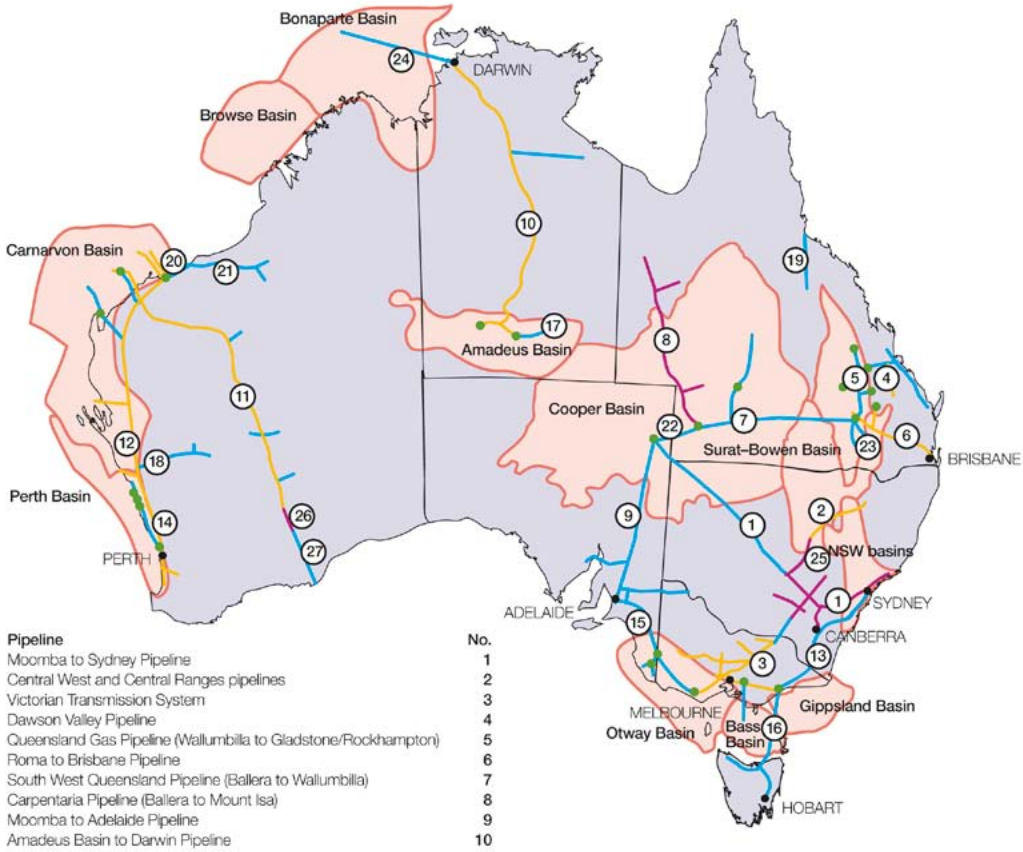
Table 1: Summary of Australian off-grid electricity demand, by user, 2011–12

Consumer type	Cons. (sent out)	Cons. shares	Dwellings, facilities	Cons./ dwelling	Population	Cons./ population
	GWh	%	No.	MWh	No.	MWh
Residential, commercial and community	3365	21	150 180	22.4	376 733	8.9
Energy and resources	12 202	77	100			
Other	244	2	1546			
TOTAL	15 812	100				

Note: Excludes off-grid NSW, ACT, Victoria and external territories. Dwellings/facilities only include observations where details on power supply have been obtained. Totals may not add due to rounding.
Source: ACIL Allen Consulting 2013.

The composition of off-grid demand varies significantly from state to state. The primary source of demand in off-grid Western Australia is resources and energy related, accounting for 80 per cent of total consumption in the regions not served by the SWIS. In comparison, the Northern Territory is dominated by consumption associated with population centres (defined as residential, commercial and community demand) with almost 60 per cent of electricity consumption, and the resources and energy sector consuming around 38 per cent. The high proportion of consumption from communities in the Northern Territory is a reflection of the classification of off-grid electricity for this study because it incorporates the Darwin Katherine Interconnected System, linking communities from Darwin to Katherine (see Map 2).

Map 2: Australia's natural gas basins and transmission pipelines



Pipeline	No.
Moomba to Sydney Pipeline	1
Central West and Central Ranges pipelines	2
Victorian Transmission System	3
Dawson Valley Pipeline	4
Queensland Gas Pipeline (Wallumbilla to Gladstone/Rockhampton)	5
Roma to Brisbane Pipeline	6
South West Queensland Pipeline (Ballera to Wallumbilla)	7
Carpentaria Pipeline (Ballera to Mount Isa)	8
Moomba to Adelaide Pipeline	9
Amadeus Basin to Darwin Pipeline	10
Goldfields Gas Pipeline	11
Dampier to Bunbury Natural Gas Pipeline	12
Eastern Gas Pipeline (Longford to Horsley Park)	13
Parmelia Pipeline	14
SEA Gas Pipeline	15
Tasmanian Gas Pipeline	16
Palm Valley to Alice Springs Pipeline	17
Midwest Pipeline	18
North Queensland Gas Pipeline	19
Pilbara Pipeline	20
Telfer Pipeline	21
QSN Link	22
Berwyndale to Wallumbilla Pipeline	23
Bonaparte Pipeline	24
Central West Pipeline	25
Kalgoorlie to Kambalda Pipeline	26
Kambalda to Esperence Pipeline	27

Source: Australian Energy Regulator, 2013.

Generation

In 2011–12 generation of off-grid electricity was 15 575 GWh, representing 6 per cent of Australia's total electricity generation. Fossil fuels account for almost all off grid electricity supply in Australia, with natural gas comprising 78 per cent of total generation and liquid fuels 20 per cent. The dominance of natural gas in off-grid Australia contrasts sharply with on-grid Australia where coal is estimated to have accounted for 70 per cent of total generation in 2011–12 (BREE 2013c).

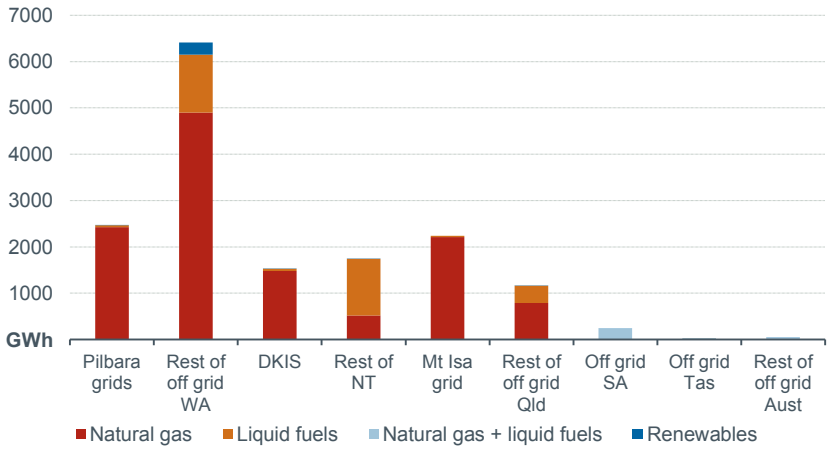
Table 2 excludes South Australia, NSW, Victoria, the ACT and the external territories, to preserve confidentiality. After excluding these states the data presented covers over 98 per cent of off-grid electricity supply identified, and so provides a representative view of electricity supply by fuel across off-grid Australia.

Table 2: Australian off-grid electricity generation, by fuel, 2011–12

Fuel type	Capacity	Gen. (sent out)	Gen. shares	Capacity factor	Fuel use	Thermal efficiency	Emissions	Emissions intensity
	MW	GWh	%	%	TJ	%	kt CO_2-e	tCO_2-e/ MWh
Natural gas	3 557	12 312	79.0	40	156 842	28	8 051	0.65
Liquid fuels	1 187	2 986	19.2	29	27 254	39	1 908	0.64
Wind	13.0	25.7	0.2	22	0	-	0	0.00
Solar	3.4	5.1	<0.1	17	0	-	0	0.00
Other renewables	37.2	246.8	1.6	76	0	-	0	0.00
TOTAL	4 797	15 575	100	37	184 096	-	9 959	0.64

Source: ACIL Allen Consulting 2013.

Figure 2: Australia's off-grid electricity generation, by fuel, 2011–12 (GWh)



Source: ACIL Allen Consulting 2013.

Implications

Off-grid electricity generation is approximately 6 per cent of total generation in Australia, or around 15 812 GWh in 2011–12. Growth in the resources and energy sectors in regional areas of Australia is creating interest in the opportunities for the off-grid electricity market. The BREE off-grid study is a first step in overcoming information gaps in the prediction of off-grid electricity supplies.

Off-grid electricity consumption was dominated by the resources and energy sector in 2011–12, accounting for around 77 per cent of total off-grid electricity consumption. Western Australia consumes the majority off-grid electricity in Australia reflecting the high proportion of resources and energy facilities in the state. Off-grid Western Australia accounts for almost 56 per cent of Australia's total off-grid electricity consumption, or 8 882 GWh in 2011–12. Western Australia's dominance of the off-grid electricity market could be expected to continue because of the investment in new resources and energy projects in the state. As at May 2013 Western Australia has 28 resources and energy projects at the committed stage, the most of any state in Australia (Barber, et al. 2013).

Resources and energy operations in the Mt Isa region and the Pilbara region are highly dependent on natural gas as a fuel source for electricity. Natural gas prices are projected to rise by around 45 per cent (from 6.41–9.33 $/GJ) in Queensland between 2012 and 2020 (BREE 2012). The off-grid areas of Mt Isa are supplied natural gas by pipelines that also supply gas to NEM-connected generators. As growth in Australia's exports of natural gas lead to adjustments in domestic gas markets, generators in Mt Isa may experience the same cost pressures as anticipated in the NEM. Comparatively, gas prices in the Pilbara are projected to rise by a smaller amount than in the east coast. Large amounts of gas from the major Western Australian basins are already exported, and the transition to export parity prices is underway.

Renewable energy generation accounted for just 2 per cent of off-grid electricity in 2011–12. This figure compares to renewables accounting for almost 10 per cent of total electricity generation in Australia in 2011–12 (BREE 2013a). Energy costs are likely to be high in areas classified as off-grid, due to their remote location and lack of infrastructure. By 2030 some solar photovoltaic and wind electricity generation technologies are projected to have the lowest levelised cost of electricity of any electricity generating technology (Syed, A. 2012). As renewable technologies become more cost competitive, the potential for increased use of solar, wind and geothermal is relatively high in some off-grid areas. There may be potential for renewable energy sources to play a role in meeting off-grid power demand in the future.

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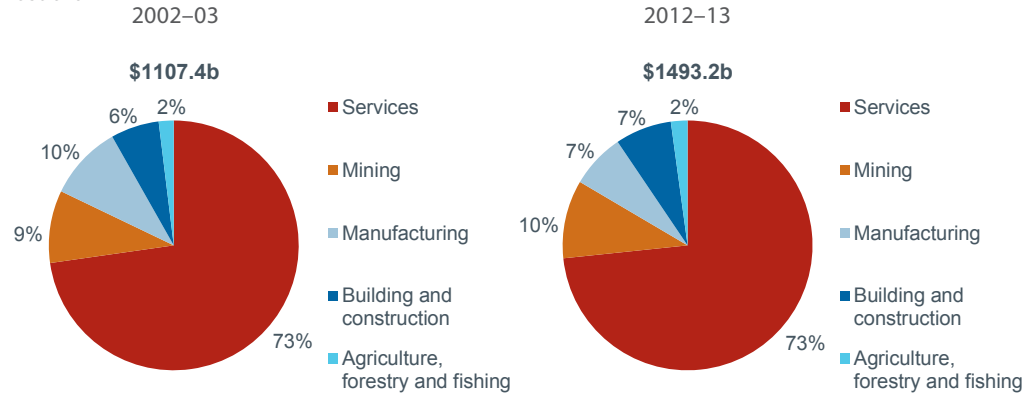
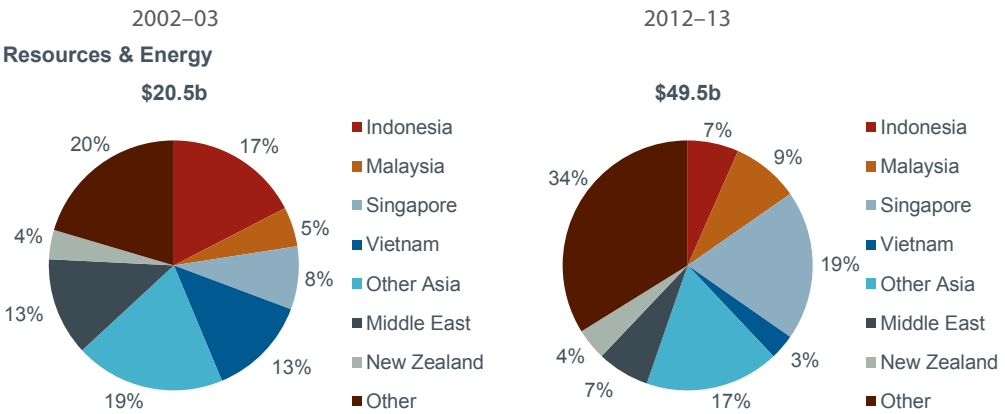
Statistical tables

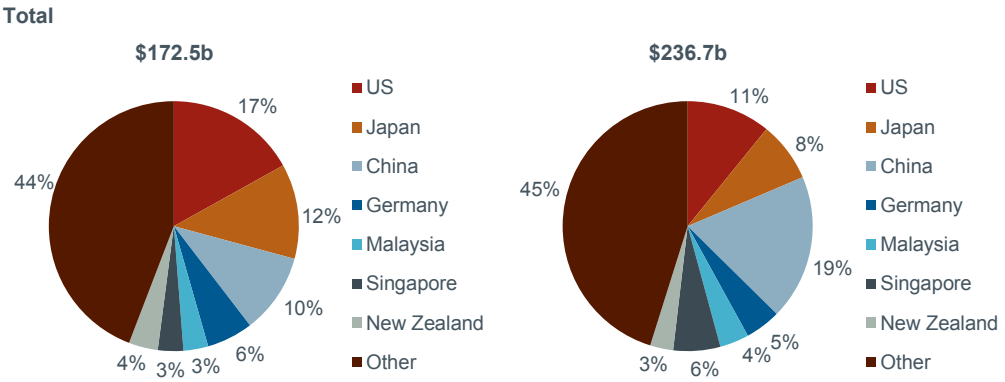
Contribution to GDP

Australia



Principal markets for Australian imports in 2012–13 dollars



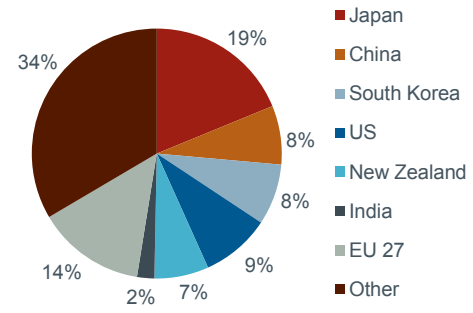


Principal markets for Australian exports in 2012–13 dollars

Total

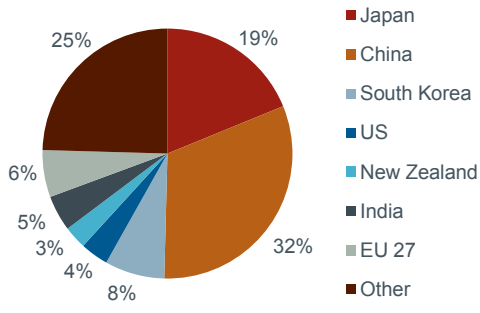
2002–03

$149.7b



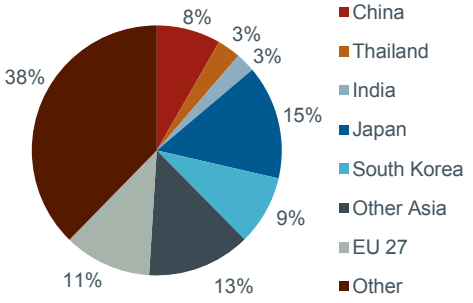
2012–13

$247.2b

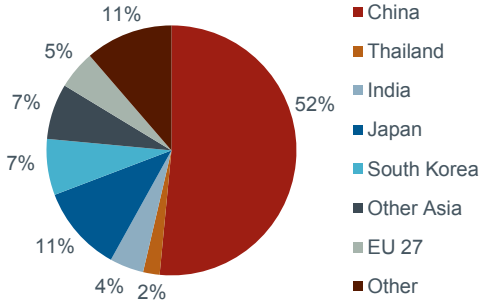


Resources

$41.9b

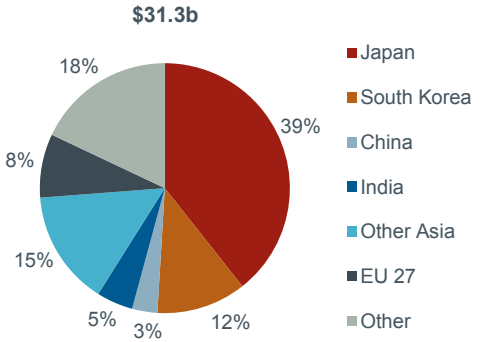


$104.1b

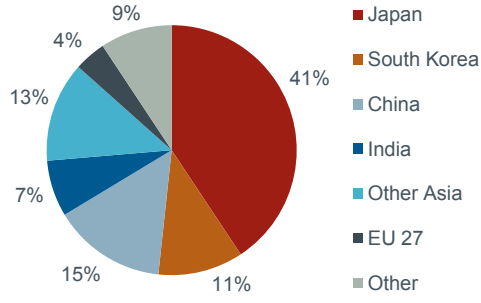


Energy

$31.3b

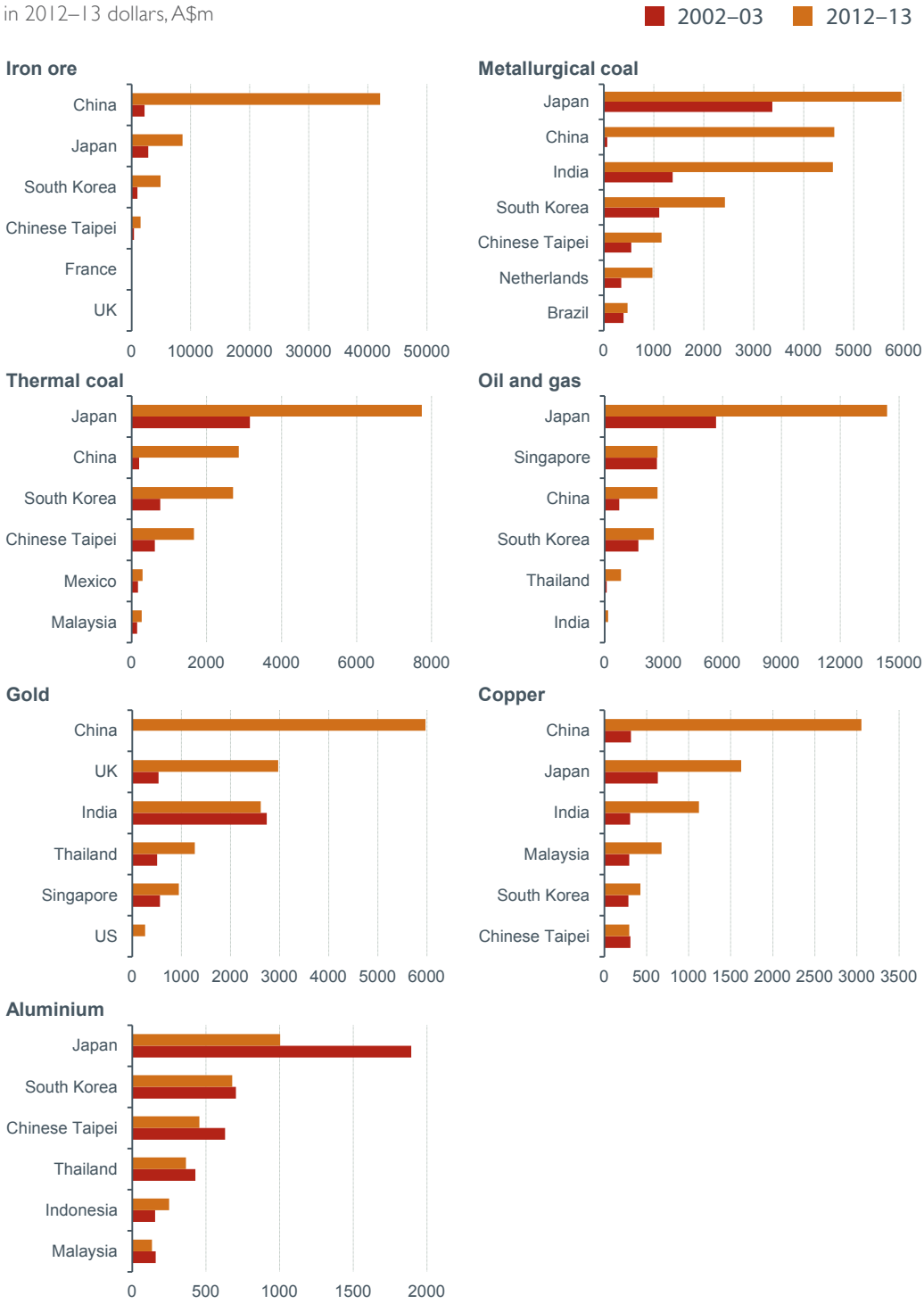


$69.5b



Principal markets for resources and energy exports

in 2012–13 dollars, A$m



Annual export summary, balance of payments basis

Australia

	2007–08 $m	2008–09 $m	2009–10 $m	2010–11 $m	2011–12 $m	2012–13 $m
At current prices						
Resources and energy						
Coal, coke and briquettes	**24 603**	**54 954**	**36 787**	**44 101**	**48 216**	**38 850**
Other fuels	**18 889**	**20 706**	**18 984**	**23 594**	**25 691**	**27 534**
Metalliferous ores and other minerals as	**41 930**	**52 725**	**54 081**	**79 814**	**85 812**	**80 103**
Gold	**12 272**	**17 508**	**14 300**	**14 256**	**16 650**	**16 219**
Other metals bs	**18 211**	**14 358**	**14 031**	**15 963**	**14 564**	**13 128**
Total s	**115 904**	**160 251**	**138 183**	**177 729**	**190 934**	**175 833**
Total commodities sector s	**145 875**	**194 168**	**168 656**	**212 095**	**228 304**	**214 668**
Other merchandise s	**37 047**	**37 447**	**33 121**	**34 884**	**36 805**	**34 470**
Total merchandise s	**182 922**	**231 615**	**201 777**	**246 979**	**265 109**	**249 138**
Services	**50 891**	**52 283**	**51 359**	**50 343**	**50 835**	**51 505**
Total goods and services	**233 813**	**283 898**	**253 136**	**297 322**	**315 944**	**300 643**
Chain volume measures c						
Resources and energy						
Coal, coke and briquettes	**37 311**	**39 032**	**46 390**	**44 101**	**46 017**	**50 679**
Other fuels	**19 196**	**20 303**	**21 997**	**23 593**	**21 404**	**22 879**
Metalliferous ores and other minerals as	**68 059**	**67 511**	**77 746**	**79 781**	**90 219**	**101 132**
Gold	**18 541**	**20 618**	**16 070**	**14 256**	**14 202**	**14 118**
Other metals bs	**13 907**	**14 358**	**13 668**	**14 356**	**15 216**	**15 345**
Total s	**157 014**	**161 822**	**175 871**	**176 087**	**187 058**	**204 153**
Total commodities sector s	**184 479**	**191 907**	**206 280**	**208 178**	**223 261**	**241 939**
Other merchandise s	**38 076**	**35 146**	**37 459**	**38 801**	**38 311**	**37 468**
Total merchandise s	**222 555**	**227 053**	**243 739**	**246 979**	**261 572**	**279 407**
Services	**54 730**	**54 430**	**52 412**	**50 344**	**49 593**	**49 263**
Total goods and services	**277 537**	**281 597**	**296 556**	**297 322**	**311 165**	**328 669**

a **Includes diamonds, which are not included in the balance of payments item by the ABS.** b **Includes BREE estimates for steel and nickel, which are retained as confidential by the ABS.** c **For a description of chain volume measures, see ABS, *Introduction of chain volume measures,* in the Australian National Accounts, cat. no. 5248.0, Canberra. Reference year is 2009–10.** s **BREE estimate.** f **BREE forecast.** na **Not available.**
Sources: **BREE; ABARES; Australian Bureau of Statistics, *Balance of Payments and International Investment Position, Australia,* cat. no. 5302.0, Canberra.**

2 Unit export returns

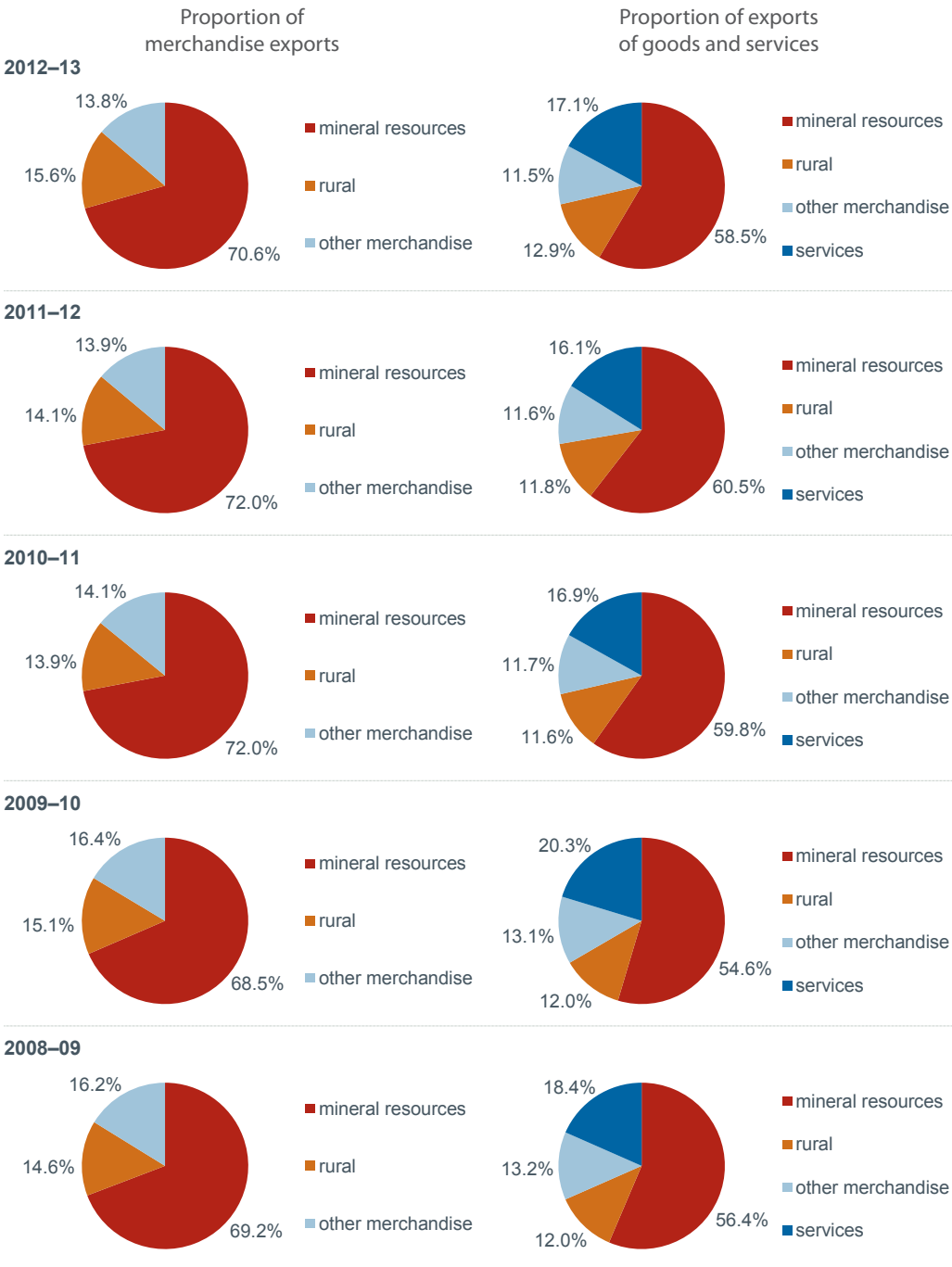
Australia

Annual indexes a	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Metals and other minerals	**201.5**	**199.8**	**225.8**	**210.3**	**281.2**	**270.9**	**236.2**
Energy	**206.6**	**235.8**	**398.3**	**258.9**	**319.1**	**343.7**	**281.1**
Total resources and energy	**204.3**	**214.3**	**290.6**	**229.3**	**296.3**	**298.7**	**253.7**

In Australian dollars. Base: 1989–90 = 100.
Sources: **BREE; ABARES.**

3 Contribution to exports by sector, balance of payments basis

Australia



Rural includes farm, forest and fisheries products.
Sources: BREE; ABS.

4 Industry gross value added [a, b]

Australia

	unit	2008–09	2009–10	2010–11	2011–12	2012–13
Agriculture, forestry and fishing	$m	30 622	30 062	32 157	34 208	32 115
Mining						
Mining (excludes services to mining)	$m	115 515	125 365	122 548	128 784	140 361
Exploration and mining support services	$m	8 215	7 974	8 560	10 170	10 819
Total	$m	123 310	133 015	131 109	138 953	151 179
Manufacturing						
Food, beverage and tobacco product	$m	22 556	24 205	24 085	22 886	22 814
Textile, clothing and other manufacturing	$m	9 386	7 331	6 855	6 707	6 538
Wood and paper products	$m	6 909	7 191	7 092	7 000	7 151
Printing and recorded media	$m	4 319	4 133	4 125	3 839	4 173
Petroleum, coal, chemical, etc, product	$m	17 259	17 903	17 913	18 012	17 792
Non-metallic mineral products	$m	5 172	5 073	4 971	4 621	4 556
Metal products	$m	22 660	21 296	22 203	22 354	21 154
Machinery and equipment	$m	19 579	20 731	20 566	21 207	21 286
Total	$m	107 250	107 760	107 808	106 628	105 462
Construction	$m	98 381	98 639	103 338	108 033	108 973
Electricity, gas, water and waste services	$m	32 335	33 200	33 811	33 357	33 018
Taxes less subsidies on products	$m	91 632	91 198	93 524	93 711	94 517
Statistical discrepancy	$m	0	23	0	4 705	8 460
Gross domestic product	$m	1 342 514	1 370 560	1 403 888	1 451 824	1 493 171

a **Chain volume measures, reference year is 2010–11.** b **ANZSIC 2006.**
Source: **Australian Bureau of Statistics,** ***Australian National Accounts: National Income, Expenditure and Product,*** **cat. no. 5206.0, Canberra.**

5 Volume of production indexes

Australia

	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14 [f]
Mine [a]						
Energy	127.1	118.7	120.9	126.7	134.6	137.1
Metals and other minerals	119.6	123.2	138.9	141.0	143.6	145.2
Total resources and energy	123.7	120.8	129.6	133.5	139.1	141.1

a **Uranium is included with energy.** s **BREE estimate.** f **BREE forecast.**
Note: **The indexes for the different groups of commodities are calculated on a chained weight basis using Fisher's ideal index with a reference year of 1997–98 = 100.**
Sources: **BREE; ABARES; Australian Bureau of Statistics.**

6 Employment [a, b]

Australia

	2007–08 '000	2008–09 '000	2009–10 '000	2010–11 '000	2011–12 '000	2012–13 '000
Agriculture, forestry and fishing	**355**	**363**	**369**	**350**	**335**	**321**
Mining						
Coal	**26**	**35**	**41**	**47**	**55**	**48**
Oil and gas extraction	**11**	**15**	**15**	**13**	**15**	**21**
Metal ore	**47**	**49**	**52**	**69**	**82**	**82**
Other mining (including services)	**62**	**72**	**66**	**75**	**97**	**116**
Total	**146**	**170**	**173**	**204**	**249**	**266**
Manufacturing						
Food, beverages and tobacco	**230**	**227**	**228**	**228**	**227**	**225**
Textiles, clothing, footwear and leather	**50**	**48**	**46**	**44**	**39**	**40**
Wood and paper product	**70**	**68**	**64**	**56**	**55**	**54**
Printing, publishing and recorded med	**54**	**51**	**52**	**55**	**42**	**48**
Petroleum, coal and chemical product	**98**	**90**	**88**	**84**	**88**	**90**
Non-metallic mineral product	**42**	**40**	**37**	**37**	**38**	**35**
Metal product	**159**	**157**	**146**	**147**	**146**	**131**
Other manufacturing	**360**	**348**	**343**	**334**	**319**	**331**
Total	**1 063**	**1 029**	**1 004**	**986**	**955**	**954**
Other industries	**9 144**	**9 338**	**9 459**	**9 750**	**9 881**	**10 022**
Total	**10 708**	**10 899**	**11 003**	**11 290**	**11 419**	**11 563**

a **Average employment over four quarters.** b **ANZSIC 2006. Caution should be used when using employment statistics at the ANZSIC subdivision and group levels due to estimates that may be subject to sampling variability and standard errors too high for most practical purposes.**

Source: **Australian Bureau of Statistics,** ***Labour Force, Australia,*** **cat. no. 6291.0, Canberra.**

7 Business income

Australia

	2008–09	2009–10	2010–11	2011–12	2012–13
	$m	$m	$m	$m	$m
Company profits in selected industries [a]					
Mining	**67 402**	**49 889**	**76 563**	**69 853**	**47 944**
Manufacturing					
Food, beverages and tobacco	**6 166**	**8 168**	**na**	**5 609**	**4 847**
Textiles, clothing, footwear and leather	**245**	**409**	**na**	**449**	**167**
Wood and paper product	**667**	**615**	**719**	**542**	**589**
Printing, publishing and recorded media	**170**	**439**	**na**	**461**	**151**
Petroleum, coal and chemical product	**2 159**	**3 676**	**3 164**	**2 184**	**2 225**
Non-metallic mineral product	**978**	**1 155**	**1 008**	**833**	**769**
Metal product	**3 781**	**2 662**	**2 277**	**- 750**	**222**
Machinery and equipment	**2 695**	**3 383**	**3 657**	**1 484**	**2 162**
Other manufacturing	**637**	**712**	**na**	**452**	**227**
Total	**17 498**	**21 219**	**na**	**11 264**	**11 359**
Other industries (including services)	**73 482**	**100 419**	**na**	**104 078**	**111 312**
Total (including services)	**158 382**	**171 527**	**199 708**	**185 195**	**170 615**

a **Company profits before income tax, based on ANZSIC 2006.**
Sources: **BREE; Australian Bureau of Statistics, *Australian National Accounts: National Income, Expenditure and Product*, cat. no. 5206.0, Canberra; Australian Bureau of Statistics, *Company Profits, Australia,* cat. no. 5651.0, Canberra; Australian Bureau of Statistics, *Business Indicators, Australia,* cat. no. 5676.0, Canberra; Australian Bureau of Statistics, *Australian Industry,* cat. no. 8155.0, Canberra.**

8 All banks lending to business [a]

Australia

	2011–12				2012–13			
	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun
	$b	$b	$b	$b	$b	$b	$b	$b
Agriculture, fishing and forestry	**60.3**	**57.6**	**58.0**	**59.7**	**60.5**	**58.7**	**58.1**	**60.7**
Mining	**13.5**	**14.3**	**15.3**	**17.0**	**18.8**	**18.1**	**18.8**	**21.0**
Manufacturing	**41.2**	**40.7**	**43.3**	**42.2**	**41.0**	**39.7**	**39.5**	**39.6**
Construction	**29.3**	**28.2**	**28.1**	**29.2**	**28.9**	**27.6**	**27.8**	**27.5**
Wholesale, retail trade, transport and storage	**95.3**	**96.6**	**98.4**	**100.8**	**100.5**	**102.3**	**102.2**	**103.0**
Finance and insurance	**93.4**	**96.9**	**99.5**	**101.1**	**102.7**	**103.0**	**104.2**	**107.2**
Other	**315.4**	**334.4**	**335.1**	**343.7**	**342.4**	**344.5**	**347.1**	**351.3**
Total	**648.4**	**668.9**	**677.9**	**693.8**	**694.8**	**694.0**	**697.7**	**710.4**

a **Includes variable and fixed interest rate loans outstanding plus bank bills outstanding.**
Source: **Reserve Bank of Australia, *Bank Lending to Business – Selected Statistics,* Bulletin Statistical Table D8.**

9 Capital expenditure of private enterprises

Australia

	2008–09 $m	2009–10 $m	2010–11 $m	2011–12 $m	2012–13 $m
At current prices					
Gross fixed capital formation a					
All sectors	**353 116**	**357 400**	**372 434**	**410 725**	**425 427**
New capital expenditure					
Mining b	**37 977**	**35 185**	**46 847**	**81 997**	**94 718**
Manufacturing					
Food, beverages and tobacco	**2 492**	**2 566**	**2 882**	**2 721**	**2 517**
Textiles, clothing, footwear and leather	**118**	**140**	**70**	**115**	**154**
Wood and paper product	**897**	**719**	**610**	**787**	**413**
Printing, publishing and recorded media	**450**	**452**	**187**	**257**	**157**
Petroleum, coal and chemical product	**2 239**	**2 207**	**2 320**	**2 802**	**2 734**
Non-metallic mineral product	**609**	**731**	**806**	**795**	**652**
Metal product	**4 608**	**3 689**	**4 017**	**4 323**	**1 884**
Machinery and equipment	**1 160**	**1 112**	**1 340**	**1 366**	**799**
Other manufacturing	**108**	**126**	**111**	**60**	**86**
Total	**12 682**	**11 743**	**12 343**	**13 227**	**9 458**
Total surveyed industries	**113 201**	**107 104**	**119 341**	**154 841**	**160 450**
Chain volume measures c					
Gross fixed capital formation a					
All sectors	**351 930**	**358 787**	**372 434**	**411 924**	**423 877**
New capital expenditure					
Mining	**38 013**	**35 331**	**46 847**	**80 701**	**92 146**
Manufacturing	**12 234**	**11 423**	**12 343**	**13 338**	**9 610**
Other selected industries	**58 787**	**58 564**	**60 151**	**60 827**	**57 945**
Total surveyed industries	**109 126**	**105 507**	**119 341**	**154 868**	**159 701**

a **Estimates taken from ABS national accounts, which include taxation-based statistics.** b **ANZSIC 2006 Division B.** c **Reference year is 2009–10.**

Sources: **BREE; ABARES; Australian Bureau of Statistics,** ***Australian National Accounts: National Income, Expenditure and Product,*** **cat. no. 5206.0, Canberra; Australian Bureau of Statistics,** ***Private New Capital Expenditure and Expected Expenditure, Australia,*** **cat. no. 5625.0, Canberra.**

10 Private mineral exploration expenditure

Australia

	2007–08 $m	2008–09 $m	2009–10 $m	2010–11 $m	2011–12 $m	2012–13 $m
At current prices						
Energy						
Petroleum						
Onshore	**493.8**	**492.3**	**748.6**	**756.5**	**919.7**	**1 363.2**
Offshore	**2541.1**	**3318.4**	**2 745.5**	**2 558.9**	**2 277.3**	**3 430.2**
Total	**3 034.9**	**3 810.7**	**3 494.1**	**3 315.4**	**3 197.0**	**4 793.4**
Coal	**234.8**	**297.3**	**321.2**	**519.7**	**834.3**	**544.0**
Uranium	**231.5**	**185.2**	**169.1**	**213.9**	**153.6**	**69.5**
Total	**3 501.2**	**4 293.2**	**3 984.4**	**4 049.0**	**4 184.9**	**5 406.9**
Metals and other minerals [a]						
Gold	**592.6**	**438.0**	**575.4**	**652.2**	**768.0**	**661.8**
Iron ore	**449.8**	**588.7**	**524.1**	**665.0**	**1 150.6**	**1 011.3**
Base metals, silver and cobalt [b]	**783.2**	**519.1**	**457.2**	**669.5**	**795.5**	**563.6**
Mineral sands	**37.0**	**30.6**	**na**	**na**	**na**	**37.8**
Diamonds	**21.7**	**10.0**	**na**	**na**	**na**	**6.3**
Other	**110.8**	**154.3**	**147.2**	**196.2**	**na**	**161.1**
Total metals and other minerals [a]	**1 995.1**	**1 740.7**	**1 742.3**	**2 217.7**	**2 965.1**	**2 441.9**
Total expenditure	**5 496.3**	**6 033.9**	**5 726.7**	**6 266.7**	**7 150.0**	**7 848.8**

a **Uranium is included with energy.** b **Base metals include copper, lead, nickel and zinc.**

Source: **Australian Bureau of Statistics,** ***Mineral and Petroleum Exploration, Australia,*** **cat. no. 8412.0, Canberra.**

Annual world indicator prices for selected commodities

Australia

	unit	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14 f
Energy							
Crude oil							
Dubai	**US$/bbl**	**63.9**	**73.4**	**75.1**	**109.2**	**105.7**	**106.2**
West Texas Intermediate	**US$/bbl**	**70.3**	**75.2**	**89.3**	**94.3**	**91.8**	**106.0**
Brent dated	**US$/bbl**	**68.8**	**74.5**	**96.0**	**110.7**	**108.2**	**110.4**
Uranium (U_3O_8) a	**US$/lb**	**51.25**	**43.81**	**57.13**	**51.47**	**43.36**	**38.06**
Minerals and metals b							
Aluminium	**US$/t**	**1 868**	**2 016**	**2 383**	**2 166**	**1 937**	**1 829**
Copper	**US$/t**	**4 919**	**6 691**	**8 671**	**8 193**	**7 675**	**6 962**
Gold c	**US$/oz**	**874**	**1 092**	**1 372**	**1 671**	**1 605**	**1 337**
Iron ore (negotiated) d	**USc/dmtu**	**84**	**56**	**104**	**132**	**107**	**106**
Lead	**US$/t**	**1 454**	**2 098**	**2 396**	**2 127**	**2 132**	**2 144**
Manganese (negotiated) e	**US$/t**	**1 340.1**	**544.9**	**768.0**	**544.1**	**499.1**	**na**
Nickel	**US$/t**	**13 322**	**19 390**	**23 963**	**19 275**	**16 390**	**14 205**
Silver	**USc/oz**	**1 289**	**1 688**	**2 880**	**3 309**	**2 894**	**2 259**
Tin	**US$/t**	**13 576**	**16 202**	**23 960**	**20 011**	**21 466**	**21 127**
Zinc	**US$/t**	**1 405**	**2 065**	**2 241**	**2 020**	**1 929**	**1 950**

a **Average of weekly restricted spot prices over the period, published by Ux Consulting.** b **Average LME spot price unless otherwise stated.** c **London gold fix, London Bullion Market Association.** d **Australian hematite fines to Japan (fob) for Japanese Fiscal Year commencing 1 April. BREE Australia–Japan average contract price assessment.** e **Japanese Fiscal Year commencing 1 April.** f **BREE forecast.** na **Not available.**

Sources: **BREE; Australian Bureau of Statistics; International Energy Agency; ISTA Mielke and Co.; London Bullion Market Association; The London Metal Exchange Ltd; Reuters Ltd; Ux Consulting Company; Platts Oilgram; US Department of Energy; World Bureau of Metal Statistics.**

12 World production, consumption, stocks and trade for selected commodities [a]

	unit	2009	2010	2011	2012	2013 f	2014 f
Energy							
Crude oil							
Production							
World [b]	**mbd**	**85.6**	**87.2**	**84.5**	**91.1**	**91.7**	**93.2**
OPEC [c]	**mbd**	**34.1**	**34.6**	**35.0**	**37.6**	**37.1**	**37.3**
Consumption [b]	**mbd**	**85.6**	**88.4**	**88.8**	**89.9**	**90.8**	**92.0**
Coal							
Production							
Hard coal [d]	**Mt**	**5 866**	**6 218**	**6 637**	**6 443**	**na**	**na**
Brown coal	**Mt**	**913**	**930**	**935**	**954**	**na**	**na**
Exports							
Metallurgical coal	**Mt**	**224**	**279**	**274**	**290**	**304**	**316**
Thermal coal	**Mt**	**739**	**806**	**867**	**989**	**1 007**	**1 034**
Uranium (U_3O_8)							
Production [es]	**kt**	**60.4**	**63.9**	**63.3**	**67.0**	**68.1**	**70.7**
Consumption	**kt**	**73.4**	**79.8**	**73.8**	**75.1**	**73.6**	**81.2**
Metals							
Bauxite production	**kt**	**193 038**	**203 460**	**242 256**	**258 606**	**255 223**	**263 273**
Alumina production	**kt**	**73 667**	**81 023**	**89 289**	**92 359**	**91 151**	**94 026**
Aluminium							
Production	**kt**	**37 187**	**41 502**	**44 723**	**46 131**	**45 576**	**47 013**
Consumption	**kt**	**34 765**	**40 173**	**42 398**	**45 292**	**46 225**	**47 844**
Closing stocks [g]	**kt**	**6 485**	**6 502**	**6 999**	**7 860**	**7 210**	**6 380**
Iron and steel							
Production							
Iron ore [h]	**Mt**	**1 588**	**1 845**	**1 915**	**1 887**	**1 964**	**2 114**
Pig iron	**Mt**	**900**	**1 037**	**1 086**	**1 107**	**1 156**	**1 190**
Crude steel	**Mt**	**1 220**	**1 415**	**1 510**	**1 534**	**1 586**	**1 631**
Iron ore trade	**Mt**	**955**	**1 055**	**1 060**	**1 080**	**1 167**	**1 307**
Gold							
Mine production	**t**	**2 611**	**2 741**	**2 839**	**2 862**	**2 940**	**3 037**
Supply	**t**	**4 380**	**4 464**	**4 597**	**4 478**	**4 142**	**4 290**
Fabrication consumption [i]	**t**	**2 517**	**2 784**	**2 758**	**2 608**	**2 965**	**3 033**

Continued

12 World production, consumption, stocks and trade for selected commodities [a]

continued

	unit	2009	2010	2011	2012	2013 [f]	2014 [f]
Base metals							
Copper							
Production [j]	**kt**	**18 612**	**19 261**	**19 814**	**20 417**	**20 785**	**21 466**
Consumption	**kt**	**18 178**	**19 337**	**19 565**	**20 183**	**20 537**	**21 175**
Closing stocks	**kt**	**1 125**	**1 017**	**981**	**1 061**	**1 309**	**1 600**
Lead							
Production [j]	**kt**	**9 054**	**9 682**	**10 372**	**10 653**	**11 099**	**11 507**
Consumption	**kt**	**9 069**	**9 683**	**10 216**	**10 556**	**10 881**	**11 264**
Closing stocks	**kt**	**390**	**447**	**623**	**720**	**938**	**1 181**
Nickel							
Production [j]	**kt**	**1 317**	**1 440**	**1 613**	**1 751**	**1 832**	**1 781**
Consumption	**kt**	**1 234**	**1 465**	**1 607**	**1 659**	**1 780**	**1 817**
Closing stocks	**kt**	**234**	**213**	**172**	**217**	**269**	**233**
Tin							
Production [j]	**kt**	**333**	**356**	**369**	**361**	**382**	**383**
Consumption	**kt**	**322**	**368**	**386**	**361**	**368**	**374**
Closing stocks	**kt**	**46**	**35**	**30**	**34**	**47**	**57**
Zinc							
Production [j]	**kt**	**11 282**	**12 885**	**13 120**	**12 609**	**13 053**	**13 512**
Consumption	**kt**	**10 920**	**12 637**	**12 754**	**12 395**	**12 922**	**13 423**
Closing stocks	**kt**	**1 221**	**1 562**	**1 769**	**2 195**	**2 326**	**2 415**

[a] Some figures are not based on precise or complete analyses. [b] 1 million litres (1 megalitre) a year equals about 17.2 barrels a day. [c] Includes OPEC natural gas liquids. [d] Includes anthracite and bituminous coal, and for the United States, Australia and New Zealand, sub-bituminous coal. [e] World production data have been revised to exclude reprocessed uranium. [g] LME and producer stocks. [h] China's iron ore production adjusted to world average. [i] Includes jewellery consumption. [j] Primary refined metal. [s] BREE estimate. [f] BREE forecast. [na] Not available.

Sources: **BREE; ABARES; Australian Bureau of Statistics; Consolidated Gold Fields; Economic Commission for Europe; Gold Fields Mineral Services; International Atomic Energy Agency; International Energy Agency; International Iron and Steel Institute; International Lead–Zinc Study Group; International Nickel Study Group; ISTA Mielke and Co.; Metallgesellschaft A.G.; UNCTAD Trust Fund on Iron Ore; United Nations; World Bureau of Metal Statistics.**

13 Commodity production

Australia

	unit	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Energy							
Coal							
Black, saleable	**Mt**	**326.2**	**339.6**	**367.4**	**345.2**	**363.9** s	**401.4** s
Black, raw	**Mt**	**422.8**	**446.2**	**475.2**	**454.0**	**480.2** s	**526.6** s
Brown	**Mt**	**66.0**	**68.3**	**68.8**	**65.7**	**na**	**na**
Petroleum							
Crude oil and condensate	**ML**	**25 610** k	**26 407** k	**25 583** k	**25 772** k	**24 068**	**22 257**
Petroleum products a	**ML**	**39 575**	**39 546**	**37 200**	**38 393**	**36 081**	**35 163**
Gas b	**Gm^3**	**41.7**	**44.5**	**50.4**	**53.1**	**55.8**	**59.0**
LPG (naturally occurring)	**ML**	**3 971**	**3 930**	**4 097**	**3 907**	**3 813**	**3 607**
Uranium (U_3O_8)	**t**	**10 123**	**10 311**	**7 109**	**7 069**	**7 657**	**8 919**
Metalliferous minerals and metals							
Aluminium							
Bauxite	**Mt**	**63.5**	**64.1**	**67.8**	**68.8**	**72.9**	**78.9**
Alumina	**kt**	**19 359**	**19 597**	**20 057**	**19 041**	**19 283**	**21 645**
Aluminium (ingot metal)	**kt**	**1 964**	**1 974**	**1 920**	**1 938**	**1 938**	**1 788**
Copper							
Mine production d	**kt**	**847**	**890**	**819**	**952**	**926**	**963**
Refined, primary	**kt**	**444**	**499**	**395**	**485**	**486**	**454**
Gold							
Mine production d	**t**	**229.7**	**217.8**	**239.8**	**264.7**	**254.5**	**254.4**
Iron and steel							
Ore and concentrate e	**Mt**	**324.7**	**353.2**	**423.4**	**447.0**	**503.8**	**554.3**
Iron and steel	**Mt**	**8.2**	**5.6**	**6.9**	**7.3**	**5.4**	**4.9**
Lead							
Mine production d	**kt**	**641**	**596**	**617**	**697**	**634**	**628**
Refined g	**kt**	**203**	**213**	**189**	**190**	**174**	**159**
Bullion	**kt**	**152**	**155**	**148**	**133**	**144**	**148**
Manganese							
Ore, metallurgical grade	**kt**	**5 428**	**3 730**	**5 795**	**6 784**	**7 104**	**7 390**
Metal content of ore	**kt**	**2 188**	**1 504**	**2 365**	**2 756**	**2 893**	**2 972**
Nickel h							
Mine production d	**kt**	**190**	**185**	**157**	**195**	**235**	**242**
Refined, class I s	**kt**	**105**	**95**	**114**	**90**	**107**	**125**
Refined, class II i	**kt**	**15**	**15**	**6**	**10**	**16**	**9**
Total ore processed j	**kt**	**222**	**213**	**197**	**236**	**278**	**285**

Continued

13 Commodity production *continued*

Australia

	unit	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Metalliferous minerals and metals (continued)							
Silver							
Mine production d	**t**	**1 867**	**1 764**	**1 809**	**1 792**	**1 862**	**1 602**
Refined	**t**	**605**	**751**	**698**	**712**	**847**	**1 057**
Tin							
Mine production d	**t**	**1 767**	**4 045**	**19 829**	**18 410**	**8 150** s	**6 637** s
Refined	**t**	**na**	**na**	**na**	**na**	**na**	**na**
Titanium							
Ilmenite concentrate s	**kt**	**2 205**	**1 932**	**1 398**	**1 275**	**1 331**	**1 335**
Leucoxene concentrate s	**kt**	**153**	**117**	**123**	**200**	**228**	**228**
Rutile concentrate s	**kt**	**332**	**285**	**361**	**467**	**454**	**465**
Synthetic rutile s	**kt**	**672**	**732**	**553**	**542**	**480**	**484**
Titanium dioxide pigment s	**kt**	**201**	**214**	**222**	**204**	**204**	**204**
Zinc							
Mine production d	**kt**	**1 431**	**1 288**	**1 362**	**1 479**	**1 567**	**1 527**
Refined	**kt**	**507**	**506**	**515**	**499**	**505**	**496**
Zircon concentrate s	**kt**	**563**	**485**	**408**	**674**	**706**	**613**
Other minerals							
Diamonds	**'000 ct**	**16 528**	**15 169**	**11 138**	**8 027**	**8 373**	**9 730**
Salt	**kt**	**9 826**	**11 314**	**11 772**	**11 562**	**11 413** s	**11 159** s

a **Excludes production from petrochemical plants.** b **Includes ethane, methane and coal seam gas.** c **Uranium is included with energy.** d **Primary production, metal content.** e **Excludes iron oxide not intended for metal extraction.** g **Includes lead content of lead alloys from primary sources.** h **Products with a nickel content of 99 per cent or more. Includes electrolytic nickel, pellets, briquettes and powder.** i **Products with a nickel content of less than 99 per cent. Includes ferronickel, nickel oxides and oxide sinter.** j **Includes imported ore for further processing.** k **Energy Quest.** s **BREE estimate.** f **BREE forecast.**
Sources: **BREE; ABARES; Australian Bureau of Statistics; Consolidated Gold Fields; Coal Services Pty Limited; Energy Quest; International Nickel Study Group; Queensland Government, Department of Natural Resources and Mines.**

14 Volume of commodity exports

Australia

	unit	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Resources and energy							
Resources							
Metalliferous minerals and metals c							
Aluminium							
Bauxite	**kt**	**7 917**	**7 470**	**8 023**	**8 595**	**10 518**	**12 560**
Alumina	**kt**	**15 739**	**16 395**	**16 653**	**16 227**	**16 592**	**18 909**
Aluminium (ingot metal)	**kt**	**1 650**	**1 748**	**1 624**	**1 686**	**1 693**	**1 569**
Copper							
Ore and concentrate d	**kt**	**1 694**	**1 797**	**1 928**	**1 750**	**1 814**	**2 194**
Refined	**kt**	**296**	**361**	**271**	**375**	**395**	**360**
Gold e	**t**	**382**	**437**	**335**	**301**	**304**	**280**
Iron and steel							
Iron ore and pellets	**Mt**	**294**	**324**	**390**	**407**	**470**	**527**
Iron and steel g	**kt**	**2 131**	**1 741**	**1 549**	**1 785**	**1 186**	**993**
Lead							
Ores and concentrates	**kt**	**308**	**381**	**491**	**494**	**438**	**462**
Refined	**kt**	**193**	**261**	**186**	**213**	**217**	**221**
Bullion	**kt**	**169**	**147**	**151**	**93**	**159**	**133**
Manganese d	**kt**	**5 105**	**3 226**	**5 648**	**6 190**	**6 853**	**6 723**
Nickel es	**kt**	**211**	**194**	**221**	**210**	**240**	**253**
Titanium							
Ilmenite concentrate h	**kt**	**894**	**1 538**	**1 763**	**1 804**	**2 045**	**2 040**
Leucoxene concentrate	**kt**	**69**	**61**	**18**	**27**	**31**	**31**
Rutile concentrate	**kt**	**399**	**550**	**575**	**491**	**334**	**368**
Synthetic rutile s	**kt**	**513**	**512**	**513**	**517**	**536**	**485**
Titanium dioxide pigment	**kt**	**175**	**141**	**181**	**195**	**179**	**142**
Refined silver	**t**	**335**	**423**	**420**	**198**	**269**	**497**
Tin e	**t**	**3 079**	**4 159**	**6 031**	**5 426**	**4 895**	**6 322**
Zinc							
Ores and concentrates d	**kt**	**2 323**	**2 101**	**2 271**	**2 317**	**2 382**	**2 490**
Refined	**kt**	**411**	**451**	**425**	**410**	**456**	**432**
Zircon concentrate i	**kt**	**637**	**685**	**748**	**963**	**846**	**779**
Other minerals							
Diamonds	**'000 ct**	**16 528**	**16 279**	**10 355**	**9 900**	**11 526**	**12 160**
Salt	**kt**	**10 686**	**10 978**	**11 185**	**11 162**	**10 884**	**10 773**
Energy							
Crude oil a	**ML**	**15 975**	**16 588**	**18 064**	**19 638**	**19 212**	**18 750**
LPG	**ML**	**2 589**	**2 500**	**2 776**	**2 471**	**2 115**	**2 384**
LNG bs	**Mt**	**14**	**15**	**18**	**20**	**19**	**24**
Petroleum products	**ML**	**1 807**	**1 164**	**850**	**760**	**1 151**	**943**
Metallurgical coal	**Mt**	**137**	**125**	**157**	**140**	**142**	**154**
Thermal coal	**Mt**	**115**	**136**	**135**	**143**	**158**	**182**
Uranium (U_3O_8)	**t**	**10 139**	**10 114**	**7 555**	**6 950** s	**6 917** s	**8 675** s

a **Includes condensate and other refinery feedstock.** b **1 million tonnes of LNG equals aprroximately1.31 billion cubic metres of gas.** c **Uranium is included with energy.** d **Quantities refer to gross weight of all ores and concentrates.** e **Quantities refer to total metallic content of all ores, concentrates, intermediate products and refined metal.** g **Includes all steel items in ABS, *Australian Harmonized Export Commodity Classification*, ch. 72, 'Iron and steel', excluding ferrous waste and scrap and ferroalloys.** h **Excludes leucoxene and synthetic rutile.** i **Data from 1991–92 refer to standard grade zircon only.** s **BREE estimate.** f **BREE forecast.**

Sources: **BREE; ABARES; Australian Bureau of Statistics, *International Trade, Australia,* cat. no. 5465.0, Canberra; Australian Mining Industry Council; Department of Foreign Affairs and Trade; International Nickel Study Group.**

15 Value of commodity exports (fob)

Australia

	2007–08 $m	2008–09 $m	2009–10 $m	2010–11 $m	2011–12 $m	2012–13 $m
Resources						
Metalliferous minerals and metals						
Aluminium						
Bauxite s	**206**	**192**	**178**	**229**	**296**	**382**
Alumina	**5 809**	**6 015**	**4 969**	**5 218**	**5 146**	**5 339**
Aluminium (ingot metal)	**4 967**	**4 724**	**3 838**	**4 178**	**3 797**	**3 277**
Copper c						
Ore and concentrate	**4 151**	**3 618**	**4 526**	**5 130**	**5 386**	**5 362**
Refined	**2 579**	**2 245**	**1 980**	**3 292**	**3 115**	**2 716**
Gold c	**10 903**	**16 146**	**12 996**	**13 016**	**15 462**	**15 043**
Iron and steel						
Iron ore and pellets	**20 511**	**34 239**	**35 075**	**58 387**	**62 695**	**57 201**
Iron and steel	**1 562**	**1 363**	**1 120**	**1 303**	**983**	**820**
Lead c						
Ores and concentrates	**757**	**645**	**998**	**1 301**	**1 184**	**1 096**
Refined	**674**	**560**	**425**	**511**	**475**	**463**
Bullion	**595**	**432**	**409**	**248**	**541**	**397**
Manganese						
Ores and concentrate s	**1 532**	**1 406**	**1 395**	**1 407**	**1 229**	**1 349**
Titanium						
Ilmenite concentrate d	**104**	**171**	**197**	**198**	**225**	**224**
Leucoxene concentrate	**23**	**37**	**11**	**17**	**22**	**22**
Rutile concentrate	**277**	**335**	**382**	**390**	**252**	**261**
Synthetic rutile s	**305**	**258**	**269**	**315**	**294**	**264**
Titanium dioxide pigment	**375**	**396**	**448**	**527**	**571**	**385**
Nickel s	**5 412**	**2 717**	**3 875**	**4 096**	**4 056**	**3 589**
Refined silver	**187**	**245**	**254**	**164**	**268**	**535**
Tin c	**42**	**70**	**101**	**126**	**102**	**123**
Zinc c						
Ores and concentrates	**2 031**	**935**	**1 237**	**1 479**	**1 375**	**1 398**
Refined	**1 319**	**923**	**977**	**893**	**917**	**810**
Zircon concentrate e	**421**	**540**	**370**	**532**	**327**	**194**
Total metalliferous minerals and m	**64 745**	**78 212**	**76 031**	**102 955**	**108 719**	**101 249**
Other minerals						
Diamonds s	**625**	**676**	**471**	**366**	**386**	**409**
Salt	**232**	**237**	**247**	**251**	**245**	**242**
Other	**6 169**	**4 770**	**5 270**	**5 521**	**6 143**	**5 991**
Total other minerals	**7 026**	**5 683**	**5 988**	**6 139**	**6 774**	**6 642**
Total resources	**71 771**	**83 895**	**82 019**	**109 094**	**115 493**	**107 891**

Continued

15 Value of commodity exports (fob) *continued*

Australia

	2007–08 $m	2008–09 $m	2009–10 $m	2010–11 $m	2011–12 $m	2012–13 $m
Energy						
Crude oil a	**10 484**	**8 757**	**9 534**	**12 245**	**13 205**	**12 505**
LPG	**1 182**	**1 044**	**1 105**	**1 068**	**971**	**1 091**
LNG	**5 854**	**10 079**	**7 789**	**10 437**	**11 949**	**14 314**
Bunker fuel b	**1 457**	**1 537**	**1 315**	**1 508**	**1 589**	**1 607**
Other petroleum products	**1 323**	**788**	**566**	**526**	**890**	**692**
Metallurgical coal	**16 038**	**36 813**	**24 526**	**29 793**	**30 700**	**22 439**
Thermal coal	**8 365**	**17 885**	**11 886**	**13 956**	**17 118**	**16 162**
Uranium (U_3O_8)	**887**	**990**	**757**	**610** s	**607** s	**739** s
Total energy						
Derived as sum of above	**45 591**	**77 892**	**57 478**	**70 143**	**77 029**	**69 550**
On balance of payments basis (excl. bunker fuel)	**43 492**	**75 660**	**55 771**	**67 695**	**73 907**	**66 384**
Total resources and energy exports						
Derived as sum of above	**117 362**	**161 788**	**139 497**	**179 237**	**192 523**	**177 440**
On balance of payments g	**115 904**	**160 251**	**138 183**	**177 729**	**190 934**	**175 833**
Total agricultural exports						
At current prices	**31 340**	**35 905**	**32 079**	**36 079**	**38 095**	**37 387**
On balance of payments g	**29 971**	**33 917**	**30 473**	**34 366**	**37 370**	**38 835**
Total commodity exports h						
Derived as sum of above	**148 702**	**197 693**	**171 577**	**215 316**	**230 617**	**214 827**
On balance of payments g	**145 875**	**194 168**	**168 656**	**212 095**	**228 304**	**214 668**

a **Includes condensate and other refinery feedstock.** b **International ships and aircraft stores.** c **Value of metals contained in host mine and smelter products are not available separately and are included in the value of the mineral product or metal in which they are exported.** d **Excludes leucoxene and synthetic rutile; data from 1991–92 refer to bulk ilmenite only.** e **Data refer to standard grade zircon only.** g **As derived in table 1.** h **Sum of resources, energy and agricultural commodity exports.** s **BREE estimate.** f **BREE forecast.**

Sources: **BREE; ABARES; Australian Bureau of Statistics, *International Trade, Australia,* cat. no. 5465.0, Canberra.**

16 Value of selected commodity imports

Australia

	2008–09	2009–10	2010–11	2011–12	2012–13
	$m	**$m**	**$m**	**$m**	**$m**
Resources and energy					
Aluminium (ingot metal)	**10**	**27**	**18**	**37**	**86**
Diamonds	**417**	**442**	**397**	**407**	**414**
Ferroalloys	**181**	**118**	**127**	**106**	**85**
Gold (refined and unrefined)	**11 250**	**7 739**	**5 426**	**6 814**	**4 885**
Ingot steel	**3 191**	**1 889**	**2 121**	**2 113**	**1 755**
Iron ore	**269**	**259**	**417**	**223**	**117**
Petroleum					
Crude oil a	**14 727**	**15 031**	**20 183**	**21 125**	**20 395**
Natural gas	**2 166**	**1 219**	**1 929**	**2 151**	**2 421**
Petroleum products b	**13 129**	**11 296**	**11 445**	**16 720**	**17 973**
Phosphate rock	**193**	**10**	**57**	**55**	**64**
Phosphates	**549**	**347**	**628**	**503**	**410**
Silver	**223**	**107**	**490**	**950**	**435**
Other	**794**	**1 183**	**859**	**1 464**	**1 569**
Total resources and energy	**47 098**	**39 666**	**44 097**	**52 668**	**50 610**

a **Includes condensate and other refinery feedstock.** b **Includes LPG.**

Sources: **BREE; Australian Bureau of Statistics,** ***International Trade, Australia,*** **cat. no. 5465.0, Canberra.**

17 Quarterly commodity production

Australia

		quarter							
		2011–12				2012–13			
		Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun p
Aluminium									
Bauxite	kt	18 007	18 349	17 844	18 696	19 623	20 119	18 936	20 264
Alumina	kt	4 726	4 864	4 866	4 828	5 530	5 690	5 100	5 323
Aluminium (ingot metal)	kt	490	493	480	474	459	451	437	442
Coal									
Black, raw	Mt	125	123	109	123	133	136	123	135
Black, saleable	Mt	95	92	85	92	101	102	94	104
Brown as	Mt	na	na	na	na	na	na	na	na
Copper									
Mine production bs	kt	235	253	212	226	236	240	248	240
Blister c	kt	105	112	115	116	97	94	115	112
Refined s	kt	114	121	124	127	107	103	123	121
Diamonds	'000 ct	2 335	1 953	2 361	1 724	2 496	2 045	2 027	3 163
Gold									
Mine production bs	t	65	64	62	63	62	66	62	65
Refined	t	81	86	77	77	78	76	72	76
Iron									
Iron ore and concentrate	kt	124 952	130 226	118 726	129 848	132 896	138 223	133 466	149 703
Iron and steel s	kt	1 753	1 214	1 212	1 204	1 287	1 201	1 186	1 176
Lead									
Mine production bs	kt	157	160	145	171	159	147	146	148
Bullion c	kt	41	31	36	36	40	35	30	43
Refined	kt	42	45	39	48	28	45	40	46
Manganese s	kt	1 907	1 766	1 706	1 725	1 867	1 874	1 798	1 851
Nickel									
Mine production bs	kt	53	61	59	62	62	61	58	61
Intermediate	kt	9	20	19	21	13	13	18	17
Refined, class 1	kt	26	23	29	28	32	27	32	35
Refined, class 2	kt	4	4	4	4	3	2	2	2
Petroleum, field									
Crude oil and condensate e	ML	5 800	6 539	5 734	5 995	6 253	5 630	4 380	5 995
LPG (naturally occurring)	ML	1 032	955	908	918	1 025	824	795	884
Gas d	Mm^3	14 538	13 642	12 966	14 689	16 995	15 011	15 011	15 011
Petroleum, total refinery	ML	9 588	9 434	9 310	8 432	9 598	9 384	8 927	8 109
Salt s	kt	3 067	2 957	2 544	2 844	2 690	2 743	3 105	2 622
Silver									
Mine production bs	t	428	481	426	528	405	369	405	475
Refined	t	250	247	168	181	161	271	329	297
Tin									
Mine production bs	t	2 751	2 686	1 238	1 475	1 565	1 880	1 600	1 592
Titanium s									
Ilmenite concentrate	kt	326	329	354	322	333	335	336	331
Leucoxene concentrate	kt	57	57	57	57	57	57	57	57
Rutile concentrate	kt	127	114	98	115	113	113	116	123
Synthetic rutile	kt	118	123	105	135	120	120	120	124
Titanium dioxide pigment	kt	51	51	51	51	51	51	51	51
Uranium oxide (U_3O_8)	t	2 123	2 054	1 633	1 847	2 381	2 380	1 962	2 196
Zinc									
Mine production bs	kt	401	394	373	400	360	409	346	412
Refined	kt	126	133	117	128	124	129	115	128 s
Zircon concentrate s	kt	211	191	164	141	150	150	152	160

a **Quarterly data are not available.** b **Total metallic content of minerals produced.** c **Metallic content.** d **Includes methane, ethane and coal seam gas.** e **Energy Quest.** p **Preliminary.** s **BREE estimate.** na **Not available.**

Sources: **BREE; Australian Bureau of Statistics, Canberra; Coal Services Pty Limited; Energy Quest; Queensland Government, Department of Mines and Energy.**

18 Quarterly commodity exports, by volume

Australia

		quarter							
		2011–12				2012–13			
		Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun p
Aluminium									
Bauxite	kt	2 724	2 803	2 313	2 678	2 769	2 594	2 960	4 237
Alumina a	kt	4 054	4 103	4 327	4 108	4 660	5 176	4 401	4 672
Aluminium (ingot metal)	kt	429	439	422	403	399	425	359	385
Coal, black									
Metallurgical	Mt	35.33	36.86	34.35	35.86	34.38	39.99	37.56	42.25
Thermal	Mt	39.66	41.14	36.94	40.69	44.92	48.42	41.54	46.75
Copper bs	kt	219	255	210	242	223	271	228	256
Diamonds cs	'000 ct	2 684	2 961	2 840	3 040	3 040	3 040	3 040	3 040
Gold bs	t	78.07	80.71	61.93	82.97	69.39	67.77	67.74	75.58
Iron									
Iron ore and pellets	kt	117 314	121 273	108 433	123 022	125 286	134 870	124 919	141 900
Iron and steel s	kt	458	206	263	258	260	260	251	222
Lead bs	kt	168	193	155	187	165	181	137	195
Manganese ore and concentrate	kt	1 787	1 601	1 427	2 038	1 648	1 615	1 902	1 558
Nickel ds	kt	56	57	63	64	61	67	59	66
Petroleum									
Crude oil and other refinery feedstock	ML	4 565	4 856	4 732	5 060	5 665	5 376	3 665	4 044
LNG s	Mt	4.59	4.77	4.56	5.33	6.05	5.72	6.24	6.32
LPG	ML	602	465	516	532	694	540	535	615
Refinery products	ML	304	97	283	468	356	190	177	221
Salt s	kt	2 793	2 802	2 523	2 766	2 571	2 652	3 017	2 534
Tin b	t	1 234	1 240	922	1 499	1 519	1 766	1 462	1 575
Titanium									
Ilmenite concentrate	kt	518	527	492	508	512	511	507	510
Leucoxene concentrate	kt	8	8	8	8	8	8	8	8
Rutile concentrate	kt	85	82	81	86	86	89	94	99
Synthetic rutile s	kt	136	136	141	123	126	121	117	122
Titanium dioxide pigment	kt	51	41	51	37	27	33	38	43
Zinc b	kt	372	423	374	403	379	408	348	464
Zircon concentrate	kt	237	219	196	195	196	193	191	199

a **Includes aluminium hydroxide.** b **Metallic content of all ores, concentrates, intermediate products (where applicable) and refined metal.**
c **Unsorted and sorted.** d **Includes metal content of ores and concentrates, intermediate products and nickel metal.** p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

19 Quarterly commodity exports, by value (fob)

Australia

		quarter							
		2011–12				2012–13			
		Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun p
Aluminium									
Bauxite	$m	74	83	63	76	79	73	87	143
Alumina a	$m	1 366	1 306	1 243	1 231	1 254	1 424	1 288	1 373
Aluminium (ingot metal)	$m	1 043	983	908	862	792	897	777	810
Coal, black									
Metallurgical	$m	8 836	8 636	6 609	6 619	5 842	5 402	5 191	6 003
Thermal	$m	4 253	4 664	3 984	4 218	4 247	4 305	3 562	4 047
Copper e	$m	2 212	2 251	1 851	2 186	1 894	2 194	1 883	2 106
Diamonds cs	$m	94	106	93	93	107	97	100	104
Gems, other than diamonds	$m	10	8	16	13	12	9	10	23
Gold, refined	$m	3 898	4 210	3 143	4 211	3 785	4 089	3 614	3 556
Iron									
Iron ore and pellets	$m	17 992	16 126	13 045	15 532	12 903	12 968	14 693	16 638
Iron and steel s	$m	344	305	135	199	201	219	217	183
Lead e	$m	522	627	482	570	468	560	400	528
Manganese ore and concentrate	$m	322	310	228	369	316	291	374	368
Nickel es	$m	908	990	1 077	1 081	936	909	851	892
Petroleum									
Crude oil and other refinery feedstock	$m	3 111	3 319	3 311	3 464	3 738	3 600	2 486	2 682
LNG	$m	2 951	3 036	2 818	3 144	3 578	3 578	3 578	3 578
LPG	$m	265	195	268	244	285	280	257	270
Refinery products	$m	225	92	226	347	245	138	131	179
Salt s	$m	63	63	57	62	58	60	68	57
Silver, refined	$m	48	42	57	121	60	19	203	252
Tin e	$m	29	25	18	29	27	36	29	31
Titanium									
Ilmenite concentrate	$m	57	58	54	56	56	56	56	56
Leucoxene concentrate	$m	5	5	6	6	6	6	6	6
Rutile concentrate	$m	64	52	73	64	63	63	66	69
Synthetic rutile s	$m	78	73	76	67	69	65	64	66
Titanium dioxide pigment	$m	164	127	153	127	81	91	98	115
Zinc e	$m	567	625	520	578	518	562	507	621
Zircon concentrate	$m	117	87	60	63	59	57	33	45
Other mineral resources f	$m	1 878	2 070	860	1 280	1 758	1 178	1 160	1 833
Total resources and energy g	$m	51 649	50 630	41 590	47 065	43 635	43 422	41 951	46 825
Total merchandise	$m	70 569	69 814	58 467	66 259	62 263	62 059	58 687	66 129
Total goods and services	$m	83 173	82 659	71 297	78 815	74 686	75 102	71 695	79 160

a **Includes aluminium hydroxide.** b **Metallic content of all ores, concentrates, intermediate products (where applicable) and refined metal.** c **Unsorted and sorted.** d **Includes metal content of ores and concentrates, intermediate products and nickel metal.** e **Value of all ores, concentrates, intermediate products (where applicable) and refined metal.** f **Derived as the difference between total resources and energy exports, below, and the sum of the above items.** g **Total resources and energy exports on an BREE balance of payments basis.** p **Preliminary.** s **BREE estimate.**

***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

20 Quarterly resources and energy export unit returns
Australia

	quarter							
	2011–12				2012–13			
	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun p
Energy	**388.5**	**382.6**	**350.2**	**336.9**	**317.7**	**297.0**	**291.6**	**293.6**
Metals and other minerals	**321.3**	**296.3**	**273.4**	**282.5**	**250.0**	**244.5**	**269.1**	**262.7**
Total resources and energy	**348.0**	**329.8**	**303.2**	**304.1**	**276.4**	**265.2**	**278.7**	**275.3**

a **Base: 1994-95 = 100.** p **Preliminary.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

21 Quarterly commodity imports
Australia

		quarter							
		2011–12				2012–13			
		Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun p
Quantity									
Diamonds a	**'000 ct**	**259**	**151**	**107**	**122**	**160**	**73**	**102**	**72**
Iron ore	**kt**	**1 555**	**1 314**	**841**	**844**	**1 325**	**1 004**	**735**	**1 118**
Ingot steel	**kt**	**445**	**433**	**491**	**473**	**475**	**469**	**377**	**357**
Ferroalloys	**kt**	**15**	**14**	**23**	**14**	**15**	**22**	**9**	**10**
Petroleum									
Crude oil and other refinery feedstock	**ML**	**7 184**	**7 269**	**7 832**	**7 210**	**8 553**	**7 551**	**7 085**	**6 781**
Natural gas	**kt**	**1 226**	**1 089**	**1 144**	**814**	**1 108**	**1 221**	**1 206**	**1 256**
Refinery products	**ML**	**5 646**	**6 180**	**5 081**	**5 288**	**5 153**	**6 235**	**5 537**	**6 775**
Phosphate rock	**kt**	**80**	**169**	**10**	**61**	**177**	**53**	**66**	**127**
Value									
Diamonds a	**$m**	**101**	**107**	**101**	**98**	**108**	**110**	**98**	**99**
Gold b	**$m**	**1 822**	**2 043**	**1 507**	**1 442**	**1 564**	**1 223**	**979**	**1 119**
Iron ore	**$m**	**100**	**62**	**29**	**31**	**43**	**25**	**18**	**31**
Ingot steel	**$m**	**544**	**521**	**533**	**515**	**507**	**464**	**393**	**392**
Ferroalloys	**$m**	**28**	**27**	**26**	**26**	**29**	**23**	**16**	**17**
Nickel	**$m**	**54**	**39**	**48**	**18**	**18**	**13**	**12**	**42**
Petroleum									
Crude oil and other refinery feedstock	**$m**	**4 963**	**5 173**	**5 641**	**5 348**	**5 640**	**5 195**	**4 983**	**4 577**
Natural gas	**$m**	**594**	**561**	**595**	**401**	**580**	**604**	**638**	**600**
Refinery products	**$m**	**3 936**	**4 535**	**4 063**	**4 186**	**3 916**	**4 773**	**4 316**	**4 969**
Phosphate rock	**$m**	**15**	**29**	**1**	**10**	**29**	**9**	**7**	**19**
Silver	**$m**	**572**	**187**	**93**	**98**	**104**	**119**	**97**	**115**
Other	**$m**	**420**	**586**	**378**	**515**	**471**	**535**	**436**	**492**
Total	**$m**	**13 150**	**13 871**	**13 016**	**12 688**	**13 007**	**13 093**	**11 992**	**12 472**

a **Includes sorted and unsorted, gem and industrial diamonds, and diamond dust and powder.** b **Refined and unrefined bullion.** p **Preliminary.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

22 Quarterly private resources and energy exploration expenditure

Australia

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun
Energy									
Petroleum									
Onshore	$m	919.7	1 363.2	163.1	229.7	275.7	354.6	283.4	449.5
Offshore	$m	2 277.3	3 430.2	432.9	694.1	808.3	1 044.0	726.3	851.6
Total	$m	3 197.0	4 793.4	596.0	923.8	1 084.0	1 398.6	1 009.7	1 301.1
Coal	$m	834.3	544.0	177.5	211.7	170.6	149.2	104.5	119.7
Uranium	$m	153.6	69.5	29.3	24.7	23.5	20.8	12.4	12.8
Total energy	$m	4 184.9	5 406.9	802.8	1 160.2	1 278.1	1 568.6	1 126.6	1 433.6
Metals and other minerals									
Copper	$m	442.6	319.3	98.7	120.4	102.5	92.1	61.0	63.7
Diamonds	$m	na	6.3	1.1	na	1.4	1.6	1.6	1.7
Gold	$m	768.0	661.8	168.8	215.0	194.4	162.7	154.7	150.0
Iron ore	$m	1 150.6	1 011.3	267.9	336.2	280.5	278.4	248.2	204.2
Mineral sands	$m	na	37.8	9.3	na	10.9	11.0	7.2	8.7
Nickel, cobalt	$m	265.4	164.5	64.1	78.4	43.9	49.3	31.0	40.3
Silver, lead and zinc	$m	87.5	79.8	21.2	21.4	21.1	19.6	18.5	20.6
Other	$m	na	161.1	38.2	na	45.9	39.2	33.1	42.9
Total metals and other minerals	$m	2 965.1	2 441.9	669.3	824.7	700.6	653.9	555.3	532.1
Total expenditure	$m	7 150.0	7 848.8	1 472.1	1 984.9	1 978.7	2 222.5	1 681.9	1 965.7

p **Preliminary.** na **Not available.**

***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

23 Resources and energy prices

	Alumina avg export unit value	Aluminium (high grade) LME cash	Gold London AM fix	Iron ore [a] avg export unit value	Thermal coal avg export unit value	Metallurgical coal avg export unit value	Crude oil [b] West Texas Intermediate spot price	Brent spot price
	A$/t	US$/t	US$/oz	A$/t	A$/t	A$/t	US$/bbl	US$/bbl
2010–11	321.54	2 382.92	1 371.59	143.50	97.37	212.12	89.29	96.00
2011–12	310.12	2 165.74	1 671.32	133.38	108.04	215.60	94.27	110.71
2012–13	282.36	1 936.95	1 605.25	108.55	88.99	145.53	91.79	108.21
2012								
April	299.15	2 046.53	1 646.06	118.70	103.18	184.54	103.39	120.37
May	303.55	2 000.48	1 587.04	121.49	105.01	186.00	94.55	110.29
June	295.76	1 884.76	1 591.52	117.08	101.89	181.89	72.94	83.85
July	279.45	1 874.14	1 592.78	107.91	97.15	173.37	87.92	102.59
August	265.07	1 838.07	1 627.46	97.83	94.21	171.32	94.16	112.68
September	262.46	2 053.88	1 741.93	85.27	91.94	163.09	94.65	113.03
October	280.86	1 975.17	1 746.35	86.69	92.87	142.01	89.55	111.58
November	274.19	1 936.57	1 724.35	91.53	88.07	131.19	86.56	109.22
December	270.51	2 086.63	1 684.98	93.46	85.71	132.49	83.68	104.34
2013								
January	287.93	2 037.97	1 671.54	106.78	85.52	136.20	94.76	113.02
February	290.60	2 053.43	1 630.69	114.17	86.32	139.49	95.28	116.19
March	299.09	1 913.08	1 591.56	112.25	85.41	136.95	93.09	108.49
April	287.07	1 856.52	1 491.20	112.31	83.19	139.62	92.01	102.53
May	290.15	1 830.57	1 417.42	112.41	87.46	140.21	94.44	102.51
June	303.95	1 816.28	1 342.70	108.05	88.68	144.36	95.77	102.92

	Uranium [c] Industry spot price	Copper (high grade) LME cash	Lead LME cash	Zinc (high grade) LME cash	Silver [d] London fix	Nickel LME cash	Rutile [e] avg export unit value	Zircon [g] avg export unit value
	US$/lb	US$/t	US$/t	US$/t	USc/troy oz	US$/t	A$/t	A$/t
2010–11	57.13	8 670.65	2 396.49	2 240.91	2 880.20	23 962.89	793.37	551.92
2011–12	51.47	8 193.13	2 127.03	2 019.59	3 309.12	19 275.00	756.42	386.75
2012–13	43.36	7 674.65	2 131.94	1 929.21	2 894.13	16 390.31	707.78	248.88
2012								
April	51.63	8 259.63	2 063.05	1 996.74	3 152.57	17 897.37	2 764.31	2 201.14
May	51.63	7 919.93	1 998.91	1 929.91	2 875.48	17 024.32	2 947.67	2 495.04
June	50.75	7 420.11	1 855.42	1 855.79	2 798.38	16 572.11	2 977.77	2 450.77
July	49.50	7 589.39	1 876.39	1 851.18	2 743.18	16 159.09	2 842.20	2 432.78
August	48.25	7 492.45	1 895.75	1 813.80	2 876.96	15 657.73	2 745.31	2 355.54
September	46.50	8 068.38	2 169.28	2 002.10	3 365.50	17 215.50	2 795.69	2 319.38
October	41.75	8 069.52	2 153.30	1 911.78	3 318.74	17 245.43	2 922.80	1 945.65
November	42.25	7 694.20	2 179.48	1 904.30	3 277.32	16 297.50	2 066.21	1 543.72
December	43.38	7 962.58	2 275.50	2 037.58	3 179.43	17 406.58	2 194.41	1 572.39
2013								
January	43.88	8 049.27	2 340.27	2 033.16	3 106.17	17 464.77	1 788.45	1 242.12
February	42.00	8 070.48	2 376.20	2 129.28	3 032.90	17 733.75	1 873.13	1 225.69
March	42.25	7 662.90	2 183.48	1 935.90	2 879.10	16 727.75	1 587.91	1 168.10
April	40.50	7 203.36	2 030.26	1 852.90	2 535.50	15 635.00	1 534.76	1 110.51
May	40.45	7 229.17	2 028.29	1 829.02	2 303.83	14 950.95	1 549.62	1 156.49
June	39.60	7 004.05	2 103.83	1 839.23	2 110.90	14 270.50	1 411.85	1 285.58

a **Lump and fines.** b **US Department of Energy, Energy Information Administration.** c **Average of weekly restricted spot price published by The Ux Consulting Company.** d **London fix rate from May 2001; Handy and Harman, commercial bar, minimum 99.9 per cent prior to May 2001.** e **Bagged only after August 1999.** g **Bagged only after September 1999.** s **BREE estimate.** na **Not available.**

***Sources*: BREE; Australian Bureau of Statistics, Canberra; London Metal Exchange; London Bullion Market Association; The Ux Consulting Company; US Department of Energy.**

24 Aluminium

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Mine									
Bauxite									
Queensland	**kt**	**21 563**	**25 280**	**4 974**	**5 586**	**6 179**	**6 518**	**5 783**	**6 800**
Western Australia s	**kt**	**43 768**	**45 733**	**11 008**	**11 183**	**11 358**	**11 533**	**11 235**	**11 608**
Northern Territory	**kt**	**7 565**	**7 929**	**1 862**	**1 927**	**2 086**	**2 068**	**1 918**	**1 857**
Australia s	**kt**	**72 895**	**78 942**	**17 844**	**18 696**	**19 623**	**20 119**	**18 936**	**20 264**
Alumina content s	**kt**	**27 989**	**30 762**	**6 774**	**7 191**	**7 643**	**7 869**	**7 309**	**7 940**
Smelter and refinery									
Alumina	**kt**	**19 283**	**21 645**	**4 866**	**4 828**	**5 530**	**5 690**	**5 100**	**5 323**
Aluminium (ingot metal)	**kt**	**1 938**	**1 788**	**480**	**474**	**459**	**451**	**437**	**442**
Exports									
Quantity									
Bauxite	**kt**	**10 518**	**12 560**	**2 313**	**2 678**	**2 769**	**2 594**	**2 960**	**4 237**
Alumina ab	**kt**	**16 592**	**18 909**	**4 327**	**4 108**	**4 660**	**5 176**	**4 401**	**4 672**
Aluminium (ingot metal)									
Chinese Taipei	**kt**	**168**	**220**	**37**	**35**	**51**	**60**	**52**	**58**
Indonesia	**kt**	**137**	**119**	**36**	**37**	**28**	**30**	**27**	**34**
Japan	**kt**	**587**	**479**	**134**	**137**	**131**	**155**	**94**	**100**
Korea, Rep. of	**kt**	**264**	**327**	**61**	**62**	**63**	**84**	**93**	**88**
Malaysia	**kt**	**81**	**66**	**19**	**24**	**18**	**16**	**14**	**17**
Thailand	**kt**	**144**	**172**	**30**	**42**	**42**	**34**	**44**	**52**
Other	**kt**	**312**	**185**	**106**	**65**	**67**	**47**	**35**	**36**
Total	**kt**	**1 693**	**1 569**	**422**	**403**	**399**	**425**	**359**	**385**
Value									
Bauxite	**$m**	**296**	**382**	**63**	**76**	**79**	**73**	**87**	**143**
Alumina ab	**$m**	**5 146**	**5 339**	**1 243**	**1 231**	**1 254**	**1 424**	**1 288**	**1 373**
Aluminium (ingot metal)	**$m**	**3 797**	**3 277**	**908**	**862**	**792**	**897**	**777**	**810**
Imports									
Quantity									
Bauxite	**kt**	**7**	**4**	**2**	**2**	**1**	**1**	**1**	**1**
Alumina ab	**kt**	**10**	**11**	**2**	**2**	**2**	**3**	**3**	**3**
Aluminium (ingot metal)	**kt**	**15**	**38**	**3**	**4**	**7**	**8**	**11**	**12**
Value									
Bauxite	**$m**	**3**	**2**	**1**	**1**	**1**	**1**	**0**	**0**
Alumina a	**$m**	**12**	**11**	**4**	**2**	**3**	**3**	**3**	**3**
Aluminium (ingot metal)	**$m**	**37**	**86**	**7**	**9**	**16**	**19**	**24**	**27**
Prices									
Alumina c	**A$/t**	**310**	**282**	**287**	**300**	**269**	**275**	**293**	**294**
Aluminium									
LME cash d	**US$/t**	**2 166**	**1 937**	**2 175**	**1 981**	**1 914**	**1 996**	**2 003**	**1 835**
Australia c	**A$/t**	**2 242**	**2 089**	**2 151**	**2 141**	**1 984**	**2 109**	**2 167**	**2 102**

a **Includes aluminium hydroxide.** b **Country details confidential.** c **Average export unit value.** d **High grade.** p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra; London Metal Exchange.**

25 Coal

		2011–12	2012–13	quarter					
				2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Mine									
Black coal, raw									
Underground	**Mt**	**96.35**	**109.75**	**21.82**	**25.75**	**28.49**	**27.68**	**25.35** s	**28.22** s
Opencut	**Mt**	**383.82**	**416.89**	**86.90**	**97.62**	**104.59**	**107.95**	**97.19** s	**107.17** s
New South Wales	**Mt**	**221.00**	**245.83**	**53.07**	**57.06**	**62.36**	**62.41**	**58.00**	**63.06**
Queensland	**Mt**	**249.69**	**271.35**	**53.28**	**63.94**	**68.35**	**70.85**	**62.17** s	**69.96** s
Western Australia a	**Mt**	**5.00**	**5.00**	**1.25**	**1.25**	**1.25**	**1.25**	**1.25**	**1.25**
South Australia a	**Mt**	**3.84**	**3.84**	**0.96**	**0.96**	**0.96**	**0.96**	**0.96**	**0.96**
Tasmania a	**Mt**	**0.64**	**0.64**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**
Australia	**Mt**	**480.17**	**526.65**	**108.72**	**123.37**	**133.08**	**135.64**	**122.54** s	**135.39** s
Black coal, saleable									
Underground	**Mt**	**74.40**	**84.03**	**16.42**	**18.92**	**21.97**	**20.90**	**19.41** s	**21.76** s
Opencut	**Mt**	**289.47**	**317.36**	**68.38**	**72.83**	**78.55**	**81.37**	**74.95** s	**82.49** s
New South Wales	**Mt**	**167.17**	**185.55**	**39.88**	**42.43**	**47.22**	**46.81**	**43.13**	**48.39**
Queensland	**Mt**	**188.25**	**207.38**	**42.81**	**47.21**	**51.19**	**53.34**	**49.11** s	**53.74** s
Western Australia a	**Mt**	**4.00**	**4.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
South Australia a	**Mt**	**3.84**	**3.84**	**0.96**	**0.96**	**0.96**	**0.96**	**0.96**	**0.96**
Tasmania a	**Mt**	**0.62**	**0.62**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**
Australia	**Mt**	**363.87**	**401.39**	**84.81**	**91.75**	**100.52**	**102.27**	**94.36** s	**104.25** s
Brown coal b									
Victoria	**Mt**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Exports									
Quantity									
Metallurgical coal, high quality									
Brazil	**Mt**	**2.34**	**2.06**	**0.69**	**0.47**	**0.71**	**0.53**	**0.35**	**0.47**
China	**Mt**	**9.84**	**20.38**	**3.44**	**1.69**	**1.12**	**8.07**	**5.42**	**5.77**
Chinese Taipei	**Mt**	**4.51**	**4.38**	**1.08**	**1.31**	**0.86**	**0.99**	**1.17**	**1.37**
European Union 27	**Mt**	**15.93**	**14.66**	**3.23**	**3.82**	**3.94**	**3.39**	**3.05**	**4.28**
India	**Mt**	**23.28**	**23.60**	**5.17**	**6.27**	**6.02**	**5.53**	**5.16**	**6.88**
Japan	**Mt**	**22.11**	**20.94**	**4.58**	**5.57**	**6.13**	**4.46**	**5.25**	**5.10**
Korea, Rep. of	**Mt**	**8.86**	**7.37**	**2.10**	**1.71**	**1.84**	**1.65**	**2.04**	**1.84**
Other	**Mt**	**4.72**	**3.34**	**1.21**	**1.10**	**0.79**	**0.80**	**0.75**	**1.00**
Total	**Mt**	**91.59**	**96.74**	**21.49**	**21.95**	**21.42**	**25.40**	**23.20**	**26.71**
Metallurgical coal, other c									
European Union 27	**Mt**	**1.70**	**2.01**	**0.30**	**0.48**	**0.26**	**0.49**	**0.69**	**0.57**
India	**Mt**	**6.02**	**7.17**	**1.82**	**1.59**	**1.51**	**2.13**	**1.41**	**2.13**
Japan	**Mt**	**18.02**	**19.26**	**3.74**	**4.93**	**4.95**	**4.09**	**4.82**	**5.39**
Other	**Mt**	**25.04**	**29.01**	**7.01**	**6.86**	**6.23**	**7.87**	**7.45**	**7.45**
Total	**Mt**	**50.77**	**57.45**	**12.86**	**13.87**	**12.96**	**14.59**	**14.37**	**15.54**
Total metallurgical coal	**Mt**	**142.40**	**154.19**	**34.35**	**35.86**	**34.38**	**39.99**	**37.56**	**42.25**
Thermal coal									
Chinese Taipei	**Mt**	**17.52**	**17.88**	**3.92**	**3.46**	**4.56**	**4.48**	**4.39**	**4.44**
European Union 27	**Mt**	**0.04**	**0.04**	**0.00**	**0.04**	**0.00**	**0.00**	**0.00**	**0.04**
China	**Mt**	**28.46**	**38.06**	**3.44**	**1.69**	**1.12**	**8.07**	**5.42**	**5.77**
Japan	**Mt**	**69.80**	**77.66**	**18.41**	**17.10**	**20.45**	**19.28**	**17.62**	**20.31**
Korea, Rep. of	**Mt**	**28.85**	**33.36**	**6.67**	**6.43**	**8.29**	**8.67**	**8.30**	**8.11**
Other	**Mt**	**32.39**	**32.30**	**4.50**	**11.97**	**10.50**	**7.91**	**5.80**	**8.08**
Total	**Mt**	**158.44**	**181.62**	**36.94**	**40.69**	**44.92**	**48.42**	**41.54**	**46.75**

continued

25 Coal
continued

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Exports									
Quantity d									
Other coal	**Mt**	**0.63**	**0.45**	**0.20**	**0.02**	**0.00**	**0.27**	**0.17**	**0.00**
Value									
Metallurgical coal									
High quality	**$m**	**21 707**	**15 286**	**4 540**	**4 455**	**4 017**	**3 701**	**3 481**	**4 086**
Other quality	**$m**	**8 993**	**7 153**	**2 069**	**2 164**	**1 825**	**1 701**	**1 710**	**1 917**
Total metallurgical coal	**$m**	**30 700**	**22 439**	**6 609**	**6 619**	**5 842**	**5 402**	**5 191**	**6 003**
Thermal coal	**$m**	**17 118**	**16 162**	**3 984**	**4 218**	**4 247**	**4 305**	**3 562**	**4 047**
Other coal	**$m**	**94**	**37**	**27**	**4**	**0**	**16**	**20**	**0**
Total coal	**$m**	**47 912**	**38 638**	**10 620**	**10 840**	**10 089**	**9 724**	**8 774**	**10 051**
Coke	**$m**	**302**	**268**	**53**	**94**	**71**	**72**	**67**	**59**
Prices e									
Metallurgical coal									
High quality	**A$/t**	**237.00**	**158.01**	**211.23**	**202.95**	**187.51**	**145.69**	**150.08**	**152.97**
Other quality	**A$/t**	**177.13**	**124.50**	**160.91**	**156.02**	**140.83**	**116.64**	**119.00**	**123.36**
Thermal coal	**A$/t**	**108.04**	**88.99**	**107.86**	**103.64**	**94.55**	**88.92**	**85.76**	**86.57**

a **Quarterly data derived from annual BREE estimates.** b **Quarterly data not available.** c **Country details confidential for various time periods for Brazil, Chinese Taipei, Dem. Peoples Rep. of Korea, Italy, Pakistan and Republic of Korea–commencing from October 1996.** d **Quantity details for coke not available.** e **Average export unit value.** p **Preliminary.** s **BREE estimate.** na **Not available.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra; Coal Services Pty Limited; Queensland Government, Department of Mines and Energy.**

26 Copper

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Mine s									
Copper ore and concentrate	**kt**	**3 405**	**3 715**	**775**	**823**	**880**	**892**	**993**	**950**
Copper content of all minerals produced									
New South Wales a	**kt**	**172**	**174**	**39**	**41**	**42**	**41**	**43**	**47**
Queensland a	**kt**	**272**	**279**	**53**	**59**	**64**	**71**	**75**	**68**
Western Australia a	**kt**	**147**	**215**	**36**	**40**	**56**	**59**	**50**	**49**
South Australia	**kt**	**310**	**268**	**78**	**79**	**67**	**61**	**72**	**69**
Tasmania	**kt**	**25**	**29**	**6**	**7**	**7**	**8**	**7**	**6**
Australia a	**kt**	**926**	**963**	**212**	**226**	**236**	**240**	**248**	**240**
Smelter and refinery									
Blister copper (primary) b	**kt**	**449**	**417**	**115**	**116**	**97**	**94**	**115**	**112**
Refined copper (primary) s	**kt**	**486**	**454**	**124**	**127**	**107**	**103**	**123**	**121**
Exports									
Quantity									
Copper concentrate									
China c	**kt**	**577**	**928**	**161**	**98**	**162**	**226**	**264**	**276**
India	**kt**	**584**	**509**	**117**	**173**	**134**	**161**	**139**	**76**
Japan	**kt**	**386**	**501**	**55**	**117**	**118**	**148**	**84**	**150**
Korea, Rep. of	**kt**	**191**	**121**	**29**	**49**	**50**	**10**	**22**	**39**
Philippines	**kt**	**9**	**76**	**0**	**0**	**4**	**68**	**5**	**0**
Other	**kt**	**67**	**59**	**19**	**31**	**6**	**24**	**1**	**27**
Total	**kt**	**1 814**	**2 194**	**380**	**467**	**473**	**637**	**515**	**569**
Refined copper									
China c	**kt**	**146**	**166**	**37**	**23**	**26**	**30**	**43**	**67**
Chinese Taipei	**kt**	**51**	**31**	**11**	**12**	**13**	**9**	**5**	**3**
Germany	**kt**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**
Indonesia	**kt**	**31**	**18**	**7**	**10**	**8**	**7**	**2**	**2**
Japan	**kt**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Korea, Rep. of	**kt**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
Malaysia	**kt**	**89**	**90**	**23**	**27**	**22**	**18**	**31**	**19**
Singapore	**kt**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
Thailand	**kt**	**44**	**34**	**12**	**22**	**13**	**12**	**5**	**4**
Vietnam	**kt**	**21**	**15**	**6**	**8**	**4**	**5**	**3**	**2**
Other	**kt**	**8**	**5**	**1**	**2**	**1**	**1**	**1**	**1**
Total	**kt**	**395**	**360**	**97**	**104**	**87**	**82**	**91**	**100**
Copper content of all primary materials exported ds	**kt**	**926**	**979**	**210**	**242**	**223**	**271**	**228**	**256**
Value									
Copper concentrate	**$m**	**5 386**	**5 362**	**1 080**	**1 376**	**1 239**	**1 560**	**1 191**	**1 371**
Refined copper	**$m**	**3 115**	**2 716**	**772**	**810**	**655**	**634**	**692**	**735**
Total	**$m**	**8 501**	**8 077**	**1 851**	**2 186**	**1 894**	**2 194**	**1 883**	**2 106**
Prices e									
LME cash	**US$/t**	**8 193**	**7 675**	**8 300**	**7 867**	**7 717**	**7 909**	**7 928**	**7 200**
Australia	**A$/t**	**7 929**	**7 472**	**7 868**	**7 784**	**7 425**	**7 611**	**7 635**	**7 217**

a **Includes copper cathode and copper precipitate.** b **Copper content.** c **Excludes Hong Kong.** d **Copper content of all ores and concentrates, slags, residues, intermediate products, refined copper, copper powder and flakes.** e **Based on LME cash, midday, high grade, 25 tonne warrants.** p **Preliminary.** s **BREE estimate.**

Sources: **BREE; Australian Bureau of Statistics, Canberra; London Metal Exchange.**

27 Diamonds and other gemstones

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Diamonds									
Northern Territory	'000 ct	0	0	0	0	0	0	0	0
Western Australia	'000 ct	8 373	9 730	2 361	1 724	2 496	2 045	2 027	3 163
Australia	'000 ct	8 373	9 730	2 361	1 724	2 496	2 045	2 027	3 163
Exports									
Quantity									
Diamonds									
Unsorted s	'000 ct	11 455	12 087	2 829	3 020	3 021	3 025	3 019	3 022
Sorted									
Gem	'000 ct	71	72	11	20	19	15	21	17
Industrial a	'000 ct	0	1	0	0	0	0	0	1
Total s	'000 ct	11 526	12 160	2 840	3 040	3 040	3 040	3 040	3 040
Value									
Diamonds									
Unsorted s	$m	256	269	65	64	70	66	65	68
Sorted									
Gem	$m	130	140	29	29	38	31	35	36
Industrial a	$m	0	0	0	0	0	0	0	0
Total s	$m	386	409	93	93	107	97	100	104
Opals									
Rough	$m	4	6	0	0	1	1	1	3
Cut and polished	$m	36	31	13	10	6	5	7	13
Total	$m	40	37	14	10	8	6	8	16
Sapphires									
Rough	$m	1	6	0	0	1	1	1	3
Total	$m	1	6	0	0	1	1	1	3
Other gemstones b	$m	6	11	2	2	3	2	2	4
Total gemstones	$m	47	55	16	13	12	9	10	23
Imports									
Quantity									
Diamonds									
Unsorted	'000 ct	1	0	0	0	0	0	0	0
Sorted									
Gem	'000 ct	261	246	66	59	66	69	58	53
Industrial a	'000 ct	60	0	4	0	0	0	0	0
Dust and powder	'000 ct	316	161	36	63	93	4	44	19
Value									
Diamonds									
Unsorted	$m	0	0	0	0	0	0	0	0
Sorted									
Gem	$m	404	414	101	97	108	110	98	99
Industrial a	$m	2	0	0	1	0	0	0	0
Dust and powder	$m	1	1	0	0	0	0	0	0
Total	$m	407	414	101	98	108	110	98	99

a **Excludes dust, powder and unsorted diamonds.** b **Includes cut and polished sapphires from 1 July 2000.** p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

28 Gold

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Mine s									
Gold content of all minerals produced									
New South Wales	t	28	29	6	7	7	7	8	8
Victoria	t	4	5	1	0	0	2	2	1
Queensland	t	16	16	4	4	4	4	4	4
Western Australia	t	179	180	44	46	44	48	43	45
South Australia	t	14	12	4	3	3	3	3	3
Tasmania	t	4	2	1	1	1	1	1	1
Northern Territory	t	9	9	3	2	3	2	2	2
Australia	t	255	254	62	63	62	66	62	65
Refinery									
Primary									
Australian origin	t	204	204	51	51	49	53	50	53
Overseas origin	t	62	62	14	15	16	15	15	17
Secondary									
Australian origin	t	5	4	1	1	1	1	1	1
Overseas origin	t	51	31	11	9	13	7	6	5
Total	t	321	302	77	77	78	76	72	76
Exports									
Quantity									
Refined and unrefined bullion									
Hong Kong, China	t	3	2	1	1	1	1	1	1
India	t	58	43	20	7	7	12	8	16
Middle East	t	0	0	0	0	0	0	0	0
United Arab Emirates	t	0	0	0	0	0	0	0	0
Singapore	t	22	19	4	5	12	5	2	1
Switzerland	t	1	1	0	0	0	0	0	1
Thailand	t	32	25	5	4	3	5	17	0
United Kingdom	t	90	50	14	16	18	24	3	5
Other	t	15	18	1	1	6	3	1	9
Total	t	304	280	62	83	69	68	68	76
Value									
Refined	$m	15 462	15 043	3 143	4 211	3 785	4 089	3 614	3 556
Imports									
Value									
Refined and unrefined bullion	$m	6 814	4 885	1 507	1 442	1 564	1 223	979	1 119
Prices									
London AM fix	US$/oz	1 671	1 605	1 690	1 608	1 654	1 719	1 631	1 417
Australia	A$/oz	1 621	1 561	1 602	1 592	1 593	1 655	1 571	1 427

p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra; London Bullion Market Association.**

29 Iron

		2011–12	2012–13	quarter 2011–12 Mar	2011–12 Jun	2012–13 Sep	2012–13 Dec	2012–13 Mar	2012–13 Jun p
Production									
Iron ore and concentrate a									
Western Australia	kt	488 679	539 149	114 779	126 207	129 302	134 625	129 095	146 127
South Australia	kt	10 780	10 788	2 959	2 525	2 661	2 575	3 144	2 408 s
Tasmania s	kt	2 293	1 850	539	616	433	523	477	418
Northern Territory	kt	2 000	2 500	450	500	500	500	750	750 s
Australia s	kt	503 751	554 288	118 726	129 848	132 896	138 223	133 466	149 703
Iron content s	kt	304 770	335 344	71 829	78 558	80 402	83 625	80 747	90 570
Iron and steel bs	kt	5 383	4 850	1 212	1 204	1 287	1 201	1 186	1 176
Exports									
Quantity									
Iron ore and pellets									
Pellets, sinters and briquettes	kt	2 227	2 094	871	500	624	547	435	488
Fines	kt	354 960	399 803	81 317	92 880	95 229	101 724	94 780	108 069
Lump and run of mine	kt	112 856	125 078	26 246	29 643	29 432	32 598	29 703	33 344
China c	kt	333 885	393 470	78 138	86 095	91 766	100 866	92 912	107 926
Chinese Taipei	kt	12 389	12 958	2 830	3 423	2 891	3 109	3 069	3 890
European Union 27	kt	791	483	156	161	327	156	0	0
Japan	kt	76 572	75 872	16 323	21 079	18 546	19 097	18 121	20 107
Korea, Rep. of	kt	46 303	43 721	10 936	12 265	11 386	11 562	10 817	9 957
Other	kt	104	470	50	0	370	80	0	20
Total iron ore and pellets	kt	470 043	526 974	108 433	123 022	125 286	134 870	124 919	141 900
Iron content	kt	291 374	326 583	67 246	76 259	77 639	83 607	77 415	87 922
Steel									
Iron and steel s	kt	1 186	993	263	258	260	260	251	222
Scrap	kt	2 148	2 072	558	606	434	595	386	657
Value									
Iron ore and pellets									
Pellets, sinters and briquettes	$m	368	258	131	78	72	63	60	63
Fines	$m	45 897	42 187	9 466	11 444	9 529	9 499	10 931	12 228
Lump and run of mine	$m	16 431	14 756	3 448	4 010	3 302	3 406	3 702	4 346
Total	$m	62 695	57 201	13 045	15 532	12 903	12 968	14 693	16 638
Steel									
Iron and steel s	$m	983	820	135	199	201	219	217	183
Scrap	$m	1 016	848	247	290	193	232	157	266
Total	$m	2 000	1 668	382	489	394	451	374	449
Imports									
Quantity									
Iron ore d	kt	4 555	4 181	841	844	1 325	1 004	735	1 118
Iron and steel	kt	1 841	1 677	491	473	475	469	377	357
Ferroalloys	kt	65	56	23	14	15	22	9	10
Value									
Iron ore d	$m	223	117	29	31	43	25	18	31
Iron and steel	$m	2 113	1 755	533	515	507	464	393	392
Ferroalloys	$m	106	85	26	26	29	23	16	17
Total	$m	2 443	1 957	588	572	579	512	427	440
Prices									
Japanese negotiated e	USc/dmtu	183.81	186.47	202.41	200.16	156.21	168.50	213.52	176.66

a **For use in iron and steel making; includes pellets for Tasmania.** b **Includes recovery from scrap.** c **Excludes Hong Kong.** d **Includes limonite ore used in the production of refined nickel products.** e **Indicative price: Australian hematite fines to Japan (fob), per dry metric tonne unit, for Japanese fiscal year commencing 1 April.** p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

30 Lead

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Mine s									
Lead ore and concentrates	**kt**	**896**	**844**	**205**	**249**	**227**	**205**	**205**	**206**
Lead content of all minerals produced									
New South Wales	**kt**	**79**	**91**	**20**	**21**	**27**	**22**	**23**	**18**
Queensland	**kt**	**455**	**419**	**104**	**125**	**107**	**104**	**102**	**105**
Western Australia	**kt**	**10**	**10**	**2**	**2**	**4**	**0**	**0**	**6**
South Australia	**kt**	**9**	**11**	**2**	**3**	**4**	**3**	**2**	**2**
Tasmania	**kt**	**39**	**25**	**8**	**10**	**5**	**7**	**6**	**7**
Northern Territory	**kt**	**42**	**44**	**10**	**10**	**11**	**11**	**12**	**9**
Australia	**kt**	**634**	**628**	**145**	**171**	**159**	**147**	**146**	**148**
Smelter and refinery									
Refined lead (primary) a	**kt**	**174**	**159**	**39**	**48**	**28**	**45**	**40**	**46**
Domestic despatches									
Refined lead	**kt**	**20**	**19**	**3**	**6**	**5**	**4**	**5**	**6**
Exports									
Quantity									
Lead concentrate									
China	**kt**	**153**	**173**	**24**	**42**	**40**	**59**	**28**	**45**
European Union 27	**kt**	**53**	**58**	**21**	**15**	**0**	**27**	**11**	**21**
Japan	**kt**	**71**	**59**	**11**	**21**	**16**	**21**	**11**	**11**
Korea, Rep. of	**kt**	**134**	**121**	**32**	**37**	**32**	**21**	**20**	**48**
Other	**kt**	**27**	**51**	**0**	**16**	**27**	**0**	**11**	**13**
Total	**kt**	**438**	**462**	**88**	**132**	**115**	**129**	**81**	**137**
Lead bullion b									
United Kingdom	**kt**	**159**	**133**	**46**	**46**	**22**	**45**	**25**	**41**
Total	**kt**	**159**	**133**	**46**	**46**	**22**	**45**	**25**	**41**
Refined lead									
China	**kt**	**1**	**2**	**0**	**0**	**0**	**1**	**0**	**0**
Chinese Taipei	**kt**	**8**	**13**	**2**	**2**	**3**	**4**	**2**	**3**
India	**kt**	**32**	**41**	**8**	**8**	**14**	**9**	**9**	**10**
Indonesia	**kt**	**4**	**11**	**0**	**2**	**4**	**1**	**3**	**4**
Korea, Rep. of	**kt**	**38**	**44**	**8**	**9**	**12**	**10**	**11**	**12**
Malaysia	**kt**	**77**	**21**	**11**	**9**	**14**	**2**	**2**	**3**
South Africa	**kt**	**9**	**13**	**3**	**3**	**3**	**3**	**5**	**3**
Thailand	**kt**	**12**	**21**	**2**	**3**	**4**	**4**	**6**	**7**
Vietnam	**kt**	**17**	**38**	**4**	**7**	**7**	**11**	**10**	**11**
Other	**kt**	**18**	**17**	**3**	**4**	**3**	**5**	**5**	**4**
Total	**kt**	**217**	**221**	**42**	**47**	**63**	**49**	**53**	**57**
Lead content of all primary materials exported cs	**kt**	**703**	**678**	**155**	**187**	**165**	**181**	**137**	**195**
Value									
Lead concentrate	**$m**	**1 184**	**1 096**	**238**	**341**	**289**	**325**	**204**	**278**
Lead bullion	**$m**	**541**	**397**	**161**	**134**	**59**	**133**	**77**	**128**
Refined lead	**$m**	**475**	**463**	**83**	**95**	**120**	**101**	**119**	**123**
Total	**$m**	**2 200**	**1 956**	**482**	**570**	**468**	**560**	**400**	**528**
Prices									
LME cash d	**US$/t**	**2 127**	**2 132**	**2 092**	**1 974**	**1 975**	**2 199**	**2 301**	**2 053**
Australia e	**A$/t**	**2 241**	**2 172**	**2 175**	**1 958**	**2 070**	**2 230**	**2 362**	**2 090**

a **Includes lead content of lead alloys from primary sources.** b **Includes a substantial precious metal content, mainly silver.** c **Lead content of all ores, concentrates, slags, residues, bullion, and refined lead.** d **Based on LME cash, midday, standard grade, minimum 25 tonne warrants.** e **Nyrstar, 99.97–99.99 per cent, fob/for Port Pirie.** p **Preliminary.** s **BREE estimate.** na **Not available.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra; London Metal Exchange.**

31 Manganese

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Manganese ore and concentrate									
Western Australia s	**kt**	**1 930**	**1 635**	**360**	**458**	**432**	**413**	**453**	**336**
Northern Territory	**kt**	**5 174**	**5 755**	**1 346**	**1 267**	**1 435**	**1 461**	**1 345**	**1 515**
Australia s	**kt**	**7 104**	**7 390**	**1 706**	**1 725**	**1 867**	**1 874**	**1 798**	**1 851**
Manganese content s	**kt**	**2 893**	**2 972**	**684**	**701**	**753**	**753**	**728**	**737**
Exports									
Quantity									
Manganese ore and concentrate	**kt**	**6 853**	**6 723**	**1 427**	**2 038**	**1 648**	**1 615**	**1 902**	**1 558**
Value									
Manganese ore and concentrate	**$m**	**1 229**	**1 349**	**228**	**369**	**316**	**291**	**374**	**368**
Prices									
Japanese negotiated a	**US$/t**	**544.08**	**499.08**	**463.00**	**463.00**	**513.33**	**510.00**	**510.00**	**510.00**
	A$/t	**527.46**	**485.97**	**438.66**	**458.59**	**494.31**	**491.02**	**491.00**	**514.05**

a **Indicative price: high grade ore (48 – 50 per cent Mn) to Japan for Japanese fiscal year commencing 1 April.** p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

32 Nickel

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production as									
Mine									
Nickel content									
Western Australia	**kt**	**235**	**242**	**59**	**62**	**62**	**61**	**58**	**61**
Tasmania	**kt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Australia	**kt**	**235**	**242**	**59**	**62**	**62**	**61**	**58**	**61**
Smelter and refinery									
Intermediate nickel	**kt**	**70**	**61**	**19**	**21**	**13**	**13**	**18**	**17**
Refined nickel, class 1 b	**kt**	**107**	**125**	**29**	**28**	**32**	**27**	**32**	**35**
Refined nickel, class 2 c	**kt**	**16**	**9**	**4**	**4**	**3**	**2**	**2**	**2**
Exports									
Quantity									
Nickel d	**kt**	**240**	**253**	**63**	**64**	**61**	**67**	**59**	**66**
Value									
Ores and concentrates	**$m**	**1 126**	**1 111**	**275**	**376**	**292**	**321**	**259**	**239**
Intermediate products e	**$m**	**724**	**579**	**212**	**198**	**166**	**125**	**134**	**154**
Refined nickel, class 1 b	**$m**	**2 007**	**1 784**	**538**	**463**	**444**	**439**	**426**	**475**
Refined nickel, class 2 c	**$m**	**198**	**115**	**53**	**44**	**34**	**24**	**32**	**25**
Total	**$m**	**4 056**	**3 589**	**1 077**	**1 081**	**936**	**909**	**851**	**892**
Imports									
Value									
Primary nickel products f	**$m**	**281**	**186**	**68**	**41**	**51**	**38**	**30**	**68**
Prices									
LME cash g	**US$/t**	**19 275**	**16 390**	**19 590**	**17 158**	**16 317**	**16 967**	**17 314**	**14 963**
	A$/t	**18 696**	**15 953**	**18 588**	**16 972**	**15 727**	**16 315**	**16 667**	**15 084**

a **Details of production of nickel metal, matte, oxide, sinter and nickel–cobalt sulphide are not available.** b **Products with a nickel content of 99 per cent or more. Includes electrolytic nickel, pellets, briquettes and powder.** c **Products with a nickel content of less than 99.8 per cent. Includes ferronickel, nickel oxides and oxide sinter.** d **Includes metal content of ores and concentrates, intermediate products and nickel metal.** e **Includes matte and speiss for further refining.** f **Includes matte, sinter and intermediate products; ferronickel, unwrought nickel metal and alloys and scrap. Also includes value of limonite ore used in the production of refined nickel products.** g **Average cash settlement price for melting grade refined nickel.** p **Preliminary.** s **BREE estimate.**

33 Petroleum

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Field									
Crude oil d	ML	16 584	14 768	3 895	4 266	4 168	3 698	2 636	4 266
Condensate d	ML	7 484	7 489	1 839	1 729	2 084	1 932	1 744	1 729
Total d	ML	24 068	22 257	5 734	5 995	6 253	5 630	4 380	5 995
Production rate d	'000 bbl/day	389	339	359	389	409	368	284	294
LPG	ML	3 813	3 529	908	918	1 025	824	795	884
Methane	Mm^3	47 728	54 390	10 912	12 578	15 080	13 103	13 103	13 103
Ethane	Mm^3	475	434	100	127	114	107	107	107
Coal seam gas	Mm^3	7 631	7 203	1 955	1 984	1 801	1 801	1 801	1 801
Refinery									
Refinery input	ML	38 973	37 907	9 968	9 582	9 708	9 974	9 519	8 706
Refinery output									
LPG	ML	1 228	1 094	338	272	340	297	248	209
Automotive gasoline	ML	15 661	14 924	3 832	3 761	4 011	3 804	3 679	3 429
Aviation gasoline	ML	91	93	25	15	33	17	22	21
Aviation turbine fuel	ML	5 488	5 563	1 436	1 254	1 489	1 423	1 461	1 191
Kerosene	ML	0	3	0	0	1	1	0	1
Heating oil	ML	12	9	2	1	4	3	3	0
Automotive diesel oil	ML	8 798	12 735	2 058	2 725	3 335	3 323	3 156	2 922
Industrial and marine diesel fuel	ML	3 938	190	1 238	0	56	55	34	45
Fuel oil (excl. refinery fuel)	ML	966	905	249	258	208	274	242	182
Lubricating oil basestock	ML	– 5	0	0	0	0	0	0	0
Bitumen	ML	427	234	100	85	74	82	49	30
Other products	ML	158	267	32	59	47	105	34	81
Total	ML	36 081	35 163	9 310	8 432	9 598	9 384	8 927	8 109
Sales									
LPG									
Automotive use b	ML	1 908	1 825	468	451	461	466	445	453
Total	ML	3 663	3 646	866	918	984	904	846	911
Automotive gasoline									
Premium unleaded	ML	2 449	2 490	630	602	622	644	620	603
Regular unleaded	ML	11 313	11 089	2 837	2 776	2 816	2 880	2 718	2 675
Other unleaded	ML	5 000	5 079	1 244	1 230	1 275	1 301	1 259	1 244
Total	ML	18 762	18 659	4 711	4 608	4 714	4 825	4 597	4 522
Aviation gasoline	ML	84	81	20	22	21	20	18	21
Aviation turbine fuel	ML	7 336	7 773	1 812	1 827	1 928	1 979	1 916	1 950
Kerosene	ML	13	26	3	3	2	6	16	2
Heating oil	ML	4	6	2	1	1	2	2	1
Automotive diesel oil	ML	21 642	22 617	5 180	5 554	5 572	5 872	5 362	5 810
Industrial and marine diesel fuel	ML	0	0	0	0	0	0	0	0
Fuel oil	ML	942	717	276	198	147	181	203	186
Lubricating oil and greases	ML	348	341	84	89	87	85	83	86
Bitumen	ML	730	735	194	184	152	224	176	183
Other products	ML	283	265	79	72	62	62	76	65
Total	ML	53 809	54 866	13 226	13 476	13 671	14 160	13 297	13 739

continued

33 Petroleum
continued

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Exports									
Quantity									
Crude oil and other refinery feedstock									
China	ML	4 397	2 795	949	1 084	609	838	371	976
Chinese Taipei	ML	410	684	266	113	311	202	106	65
Japan	ML	1 817	1 731	533	501	418	491	442	380
Korea, Rep. of	ML	1 807	2 391	511	298	741	614	514	522
New Zealand	ML	126	271	3	121	102	130	15	25
Singapore	ML	3 702	4 041	629	1 130	1 681	1 020	539	801
United States	ML	451	266	0	86	96	170	0	0
Other	ML	6 502	6 572	1 840	1 727	1 705	1 912	1 679	1 276
Total	ML	19 212	18 750	4 732	5 060	5 665	5 376	3 665	4 044
LNG s	Mt	19.25	24.33	4.56	5.33	6.05	5.72	6.24	6.32
LPG	ML	2 115	2 384	516	532	694	540	535	615
Refinery products									
Automotive gasoline	ML	175	100	21	37	44	10	16	31
Aviation turbine fuel	ML	7	24	4	1	3	4	15	3
Diesel fuel c	ML	130	91	73	8	40	16	27	9
Fuel oil	ML	485	220	90	295	154	23	13	30
Aviation gasoline	ML	30	33	6	7	7	10	4	12
Lubricants	ML	304	440	88	106	98	120	99	123
Other products	ML	21	35	1	13	12	7	3	13
Total	ML	1 151	943	283	468	356	190	177	221
Ships' and aircraft stores									
Aviation turbine fuel	ML	1 985	1 985	496	496	496	496	496	496
Fuel oil	ML	269	267	68	72	67	69	65	65
Other products	ML	34	38	4	6	6	6	4	21
Total	ML	2 288	2 289	568	574	570	571	565	583
Value									
Crude oil and other refinery feedstock	$m	13 205	12 505	3 311	3 464	3 738	3 600	2 486	2 682
LNG	$m	11 949	14 314	2 818	3 144	3 557	3 367	3 670	3 720
LPG	$m	971	1 091	268	244	285	280	257	270
Refinery products									
Automotive gasoline	$m	127	76	15	27	34	7	11	24
Aviation turbine fuel	$m	6	15	3	2	1	2	10	1
Diesel fuel c	$m	115	75	62	7	30	13	19	14
Fuel oil	$m	314	114	58	196	80	11	6	17
Aviation gasoline	$m	30	28	6	7	6	8	2	12
Lubricants	$m	261	333	75	91	79	87	73	93
Other products	$m	36	52	6	18	16	11	8	17
Total	$m	890	692	226	347	245	138	131	179
Total	$m	25 752	26 509	6 047	6 510	7 752	6 912	5 737	6 108
Ships' and aircraft stores									
Aviation turbine fuel	$m	1 368	1 376	344	346	342	342	346	346
Fuel oil	$m	187	185	48	54	47	47	45	45
Other products	$m	34	47	3	4	8	8	5	27
Total	$m	1 589	1 607	395	403	397	397	395	417

continued

33 Petroleum
continued

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Imports									
Quantity									
Crude oil and other refinery feedstock									
Indonesia	ML	3 310	3 577	736	952	1 174	886	739	778
Malaysia	ML	4 942	5 434	1 602	1 138	1 572	1 322	1 263	1 277
Middle East									
Saudi Arabia	ML	216	53	216	0	0	0	53	0
United Arab Emirates	ML	4 599	4 352	863	910	1 138	809	1 191	1 215
Other	ML	0	0	0	0	0	0	0	0
Total Middle East	ML	4 879	4 405	1 079	973	1 138	809	1 243	1 215
New Zealand	ML	2 195	1 943	572	547	543	479	446	475
Papua New Guinea	ML	1 475	984	408	364	273	513	99	99
Singapore	ML	554	443	171	182	191	164	87	0
Vietnam	ML	1 788	2 359	262	339	731	705	361	562
Other	ML	10 352	10 825	3 003	2 714	2 931	2 673	2 846	2 376
Total	ML	29 495	29 970	7 832	7 210	8 553	7 551	7 085	6 781
Natural gas	kt	4 273	4 792	1 144	814	1 108	1 221	1 206	1 256
Refined products									
LPG	ML	1 023	920	158	285	196	261	85	378
Automotive gasoline	ML	3 672	3 709	886	834	642	976	1 109	982
Aviation turbine fuel	ML	2 252	3 202	468	496	684	830	725	963
Diesel fuel c	ML	11 225	12 541	2 702	2 898	2 871	3 231	2 834	3 604
Fuel oil	ML	1 623	1 678	455	355	382	526	349	420
Lubricants	ML	528	526	128	126	147	119	132	127
Other products	ML	1 872	1 124	283	293	230	292	302	301
Total	ML	22 194	23 699	5 081	5 288	5 153	6 235	5 537	6 775
Value									
Crude oil and other refinery feedstock	$m	21 125	20 395	5 641	5 348	5 640	5 195	4 983	4 577
Natural gas	$m	2 151	2 421	595	401	580	604	638	600
Refined products									
LPG	$m	452	412	78	142	83	132	40	157
Automotive gasoline	$m	2 915	2 874	717	694	494	753	877	750
Aviation turbine fuel	$m	1 742	2 443	368	388	516	646	568	713
Diesel fuel c	$m	8 830	9 657	2 168	2 302	2 198	2 536	2 226	2 696
Fuel oil	$m	1 061	1 029	312	235	235	321	216	258
Lubricants	$m	826	741	191	195	214	172	174	181
Other products	$m	3 045	3 237	824	630	756	816	852	813
Total	$m	16 720	17 973	4 063	4 186	3 916	4 773	4 316	4 969
Total	$m	39 997	40 789	10 300	9 935	10 135	10 572	9 936	10 146
Prices									
Dubai	US$/bbl	109.17	105.71	116.37	104.36	106.00	107.35	107.91	100.79
West Texas Intermediate	US$/bbl	94.27	91.79	102.90	90.29	92.20	86.64	94.37	94.03
Brent	US$/bbl	110.71	108.21	118.29	104.85	109.37	108.44	112.52	102.64

a **Commercial sales plus field and plant usage.** b **This is a minimum level and includes only direct sales by the oil industry. The data do not include volumes sold to distributors etc. that are subsequently used or sold for automotive use.** c **Includes automotive diesel oil and industrial and marine diesel fuel.** d **Energy Quest.** p **Preliminary.** s **BREE estimate.**
Sources: **BREE; Australian Bureau of Statistics, Canberra; Energy Quest; US Department of Energy, Energy Information Administration.**

34 Sales of petroleum products, by state marketing area

	NSW [a]	Vic.	Qld	WA	SA	Tas.	NT	Aust.
	ML	ML	ML	ML	ML	ML	ML	ML
June quarter 2013 [p]								
LPG [b]								
Automotive use [c]	125	197	42	33	51	3	2	453
Total	245	341	142	69	89	16	8	911
Automotive gasoline								
Premium unleaded	288	107	109	61	21	12	5	603
Regular unleaded	394	901	652	369	263	74	22	2 675
Other unleaded [d]	778	162	210	54	34	5	0	1 244
Total	1 461	1 170	971	485	319	90	27	4 522
of which sales to retailers	1 293	997	789	435	248	46	17	3 826
Aviation gasoline	3	3	6	4	2	0	3	21
Aviation turbine fuel	834	325	397	254	78	5	58	1 950
Kerosine	0	0	1	0	0	0	0	2
Heating oil	0	0	1	0	0	0	0	1
Automotive diesel oil	1 169	884	1 738	1 408	414	88	110	5 810
of which sales to retailers	494	395	384	260	116	11	15	1 675
Industrial and marine diesel fuel	0	0	0	0	0	0	0	0
Fuel oil [e]	86	33	42	24	0	0	0	186
Lubricating oil and greases	19	15	26	17	7	1	1	86
Bitumen	36	31	88	13	11	3	0	183
Other products [f]	51	6	3	2	2	0	0	65
Total	3 906	2 808	3 414	2 277	923	203	208	13 739

35 Phosphate

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Imports									
Quantity									
Phosphate rock									
China	**kt**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Morocco	**kt**	**183**	**183**	**0**	**31**	**64**	**53**	**0**	**66**
Nauru	**kt**	**72**	**60**	**0**	**30**	**30**	**0**	**0**	**30**
Togo	**kt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Other	**kt**	**63**	**180**	**10**	**0**	**83**	**0**	**66**	**31**
Total	**kt**	**319**	**423**	**10**	**61**	**177**	**53**	**66**	**127**
Phosphates									
Diammonium a	**kt**	**142**	**214**	**68**	**58**	**0**	**50**	**105**	**59**
Monammonium b	**kt**	**704**	**544**	**365**	**205**	**3**	**76**	**319**	**146**
High analysis c	**kt**	**91**	**134**	**41**	**18**	**0**	**31**	**59**	**43**
Value									
Phosphate rock	**$m**	**55**	**64**	**1**	**10**	**29**	**9**	**7**	**19**
Phosphates									
Diammonium a	**$m**	**75**	**105**	**35**	**29**	**0**	**25**	**50**	**29**
Monammonium b	**$m**	**393**	**270**	**203**	**103**	**3**	**42**	**153**	**71**
High analysis c	**$m**	**34**	**36**	**14**	**7**	**0**	**11**	**16**	**9**
Prices									
Australia d	**A$/t**	**161.20**	**147.76**	**121.38**	**163.97**	**162.61**	**176.84**	**104.30**	**147.27**

a **P_2O_5 equivalent: 46 per cent.** b **P_2O_5 equivalent: 50 per cent.** c **P_2O_5 equivalent: 48 per cent.** d **Average import unit value.**
p **Preliminary.** na **Not available.**
***Sources*: Australian Bureau of Statistics, Canberra; Queensland Government, Department of Mines and Energy; Government of South Australia, Primary Industries and Resources South Australia.**

36 Salt

		2011–12	2012–13	quarter					
				2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production s									
Australia a	**kt**	**11 413**	**11 159**	**2 544**	**2 844**	**2 690**	**2 743**	**3 105**	**2 622**
Exports s									
Quantity									
Bulk, bagged and table	**kt**	**10 884**	**10 773**	**2 523**	**2 766**	**2 571**	**2 652**	**3 017**	**2 534**
Value									
Bulk, bagged and table	**$m**	**245**	**242**	**57**	**62**	**58**	**60**	**68**	**57**
Prices s									
Australia b	**A$/t**	**22.48**	**22.48**	**22.49**	**22.44**	**22.48**	**22.48**	**22.47**	**22.47**

a **Excludes Victoria.** b **Average export unit value.** p **Preliminary.** s **BREE estimate.**
***Source*: BREE.**

37 Silver

		2011–12	2012–13	quarter					
				2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Mine s									
Silver content of all minerals produced									
New South Wales	**t**	**81**	**91**	**23**	**23**	**19**	**27**	**21**	**24**
Queensland	**t**	**1 471**	**1 366**	**338**	**428**	**338**	**290**	**341**	**397**
Western Australia	**t**	**65**	**37**	**13**	**16**	**17**	**8**	**3**	**9**
South Australia	**t**	**21**	**23**	**6**	**1**	**1**	**8**	**7**	**7**
Tasmania	**t**	**171**	**76**	**34**	**46**	**16**	**20**	**17**	**23**
Northern Territory	**t**	**53**	**61**	**13**	**13**	**14**	**16**	**15**	**15**
Australia	**t**	**1 862**	**1 602**	**426**	**528**	**405**	**369**	**405**	**475**
Refinery									
Refined silver	**t**	**847**	**1 057**	**168**	**181**	**161**	**271**	**329**	**297**
Exports									
Quantity									
Refined silver bullion	**t**	**269**	**497**	**56**	**127**	**65**	**11**	**141**	**279**
Value									
Refined silver a	**$m**	**268**	**535**	**57**	**121**	**60**	**19**	**203**	**252**
Imports									
Value									
Refined silver bullion	**$m**	**950**	**435**	**93**	**98**	**104**	**119**	**97**	**115**
Prices									
World b	**USc/oz**	**3 309**	**2 894**	**3 213**	**2 940**	**2 982**	**3 261**	**3 009**	**2 323**
Australia c	**A$/kg**	**1 012**	**899**	**1 039**	**910**	**960**	**991**	**925**	**721**

a **Includes refined bullion, powder, unwrought silver and semi-manufactured forms.** b **London Bullion Market Association, fixed rate.**
c **Nyrstar, fob/fot Port Pirie.** p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra; London Bullion Market Association.**

38 Tin

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Mine									
Tin content of all minerals produced									
Western Australia s	**t**	**3 150**	**320**	**70**	**80**	**80**	**80**	**80**	**80**
Tasmania	**t**	**5 000**	**6 317**	**1 168**	**1 395**	**1 485**	**1 800**	**1 520**	**1 512**
Australia s	**t**	**8 150**	**6 637**	**1 238**	**1 475**	**1 565**	**1 880**	**1 600**	**1 592**
Exports									
Quantity									
Tin concentrate	**t**	**12 285**	**13 044**	**1 859**	**4 410**	**3 033**	**4 097**	**2 853**	**3 061**
Refined tin	**t**	**0**	**11**	**0**	**0**	**5**	**3**	**0**	**3**
Tin content of primary materials exported as	**t**	**4 895**	**6 322**	**922**	**1 499**	**1 519**	**1 766**	**1 462**	**1 575**
Value									
Tin concentrate	**$m**	**102**	**123**	**18**	**29**	**27**	**35**	**29**	**31**
Refined tin	**$m**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total	**$m**	**102**	**123**	**18**	**29**	**27**	**36**	**29**	**31**
Imports									
Quantity									
Refined tin	**t**	**593**	**483**	**190**	**89**	**115**	**112**	**151**	**105**
Value									
Refined tin	**$m**	**13**	**10**	**4**	**2**	**2**	**2**	**3**	**2**
Prices									
LME b	**US$/t**	**20 011**	**21 466**	**22 880**	**20 571**	**19 275**	**21 560**	**24 125**	**20 905**

a **Tin content of tin ores and concentrates and refined tin.** b **LME official close.** p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra; London Metal Exchange.**

39 Titanium minerals

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production s									
Ilmenite concentrate									
New South Wales	**kt**	**90**	**90**	**23**	**23**	**23**	**23**	**23**	**23**
Queensland	**kt**	**186**	**186**	**47**	**47**	**47**	**47**	**47**	**47**
Victoria	**kt**	**100**	**98**	**37**	**16**	**25**	**25**	**26**	**23**
South Australia	**kt**	**156**	**145**	**46**	**21**	**39**	**37**	**36**	**33**
Western Australia	**kt**	**799**	**815**	**203**	**216**	**200**	**204**	**206**	**206**
Northern Territory	**kt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Australia	**kt**	**1 331**	**1 335**	**354**	**322**	**333**	**335**	**336**	**331**
Leucoxene concentrate									
New South Wales	**kt**	**162**	**162**	**41**	**41**	**41**	**41**	**41**	**41**
Victoria	**kt**	**10**	**10**	**3**	**3**	**3**	**3**	**3**	**3**
South Australia	**kt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Western Australia	**kt**	**56**	**56**	**14**	**14**	**14**	**14**	**14**	**14**
Northern Territory	**kt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Australia	**kt**	**228**	**228**	**57**	**57**	**57**	**57**	**57**	**57**
Rutile concentrate									
New South Wales	**kt**	**80**	**80**	**20**	**20**	**20**	**20**	**20**	**20**
Victoria	**kt**	**194**	**169**	**34**	**51**	**46**	**42**	**40**	**42**
Queensland	**kt**	**74**	**72**	**18**	**18**	**18**	**18**	**18**	**18**
South Australia	**kt**	**68**	**64**	**17**	**17**	**16**	**16**	**16**	**16**
Western Australia	**kt**	**38**	**80**	**10**	**10**	**13**	**18**	**23**	**28**
Australia	**kt**	**454**	**465**	**98**	**115**	**113**	**113**	**116**	**123**
Synthetic rutile	**kt**	**480**	**484**	**105**	**135**	**120**	**120**	**120**	**124**
Titanium dioxide pigment	**kt**	**204**	**204**	**51**	**51**	**51**	**51**	**51**	**51**
Exports									
Quantity									
Ilmenite concentrate a	**kt**	**2 045**	**2 040**	**492**	**508**	**512**	**511**	**507**	**510**
Leucoxene concentrate	**kt**	**31**	**31**	**8**	**8**	**8**	**8**	**8**	**8**
Rutile concentrate s	**kt**	**334**	**368**	**81**	**86**	**86**	**89**	**94**	**99**
Synthetic rutile s	**kt**	**536**	**485**	**141**	**123**	**126**	**121**	**117**	**122**
Titanium dioxide pigment	**kt**	**179**	**142**	**51**	**37**	**27**	**33**	**38**	**43**
Value									
Ilmenite concentrate a	**$m**	**225**	**224**	**54**	**56**	**56**	**56**	**56**	**56**
Leucoxene concentrate	**$m**	**22**	**22**	**6**	**6**	**6**	**6**	**6**	**6**
Rutile concentrate s	**$m**	**252**	**261**	**73**	**64**	**63**	**63**	**66**	**69**
Synthetic rutile s	**$m**	**294**	**264**	**76**	**67**	**69**	**65**	**64**	**66**
Titanium dioxide pigment	**$m**	**571**	**385**	**153**	**127**	**81**	**91**	**98**	**115**
Prices b									
Ilmenite concentrate									
Bulk s	**A$/t**	**110**	**110**	**110**	**110**	**110**	**110**	**110**	**110**
Rutile concentrate									
Bagged	**A$/t**	**2**	**2**	**643**	**648**	**653**	**646**	**647**	**648**
Titanium dioxide pigment	**A$/t**	**3 191**	**2 721**	**3 032**	**3 437**	**3 020**	**2 757**	**2 543**	**2 664**

a **From January 1992, bulk only.** b **Average export unit value.** p **Preliminary.** s **BREE estimate.** na **Not available.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

40 Uranium

	unit	2011	2012	2013 f	2014 z	2015 z	2016 z	2017 z	2018 z
World									
Production	**kt**	**63.3**	**67.0**	**68.1**	**70.7**	**75.3**	**81.0**	**86.4**	**90.3**
Africa b	**kt**	**10.4**	**11.9**	**11.7**	**12.5**	**13.1**	**14.3**	**16.1**	**19.3**
Canada	**kt**	**10.8**	**10.2**	**10.2**	**11.3**	**13.6**	**16.1**	**17.5**	**17.1**
Kazakhstan	**kt**	**22.9**	**24.8**	**25.7**	**26.5**	**27.8**	**28.4**	**29.6**	**29.9**
Russian Federation	**kt**	**3.5**	**3.0**	**3.3**	**3.6**	**3.6**	**3.7**	**4.4**	**4.4**
Consumption	**kt**	**73.8**	**75.1**	**73.6**	**81.2**	**84.8**	**89.8**	**92.7**	**97.5**
China	**kt**	**4.8**	**7.7**	**7.1**	**9.5**	**13.4**	**12.4**	**13.1**	**14.2**
European Union c	**kt**	**23.4**	**22.6**	**22.6**	**22.8**	**22.8**	**25.0**	**22.8**	**24.4**
Japan	**kt**	**3.3**	**0.4**	**0.4**	**0.7**	**2.0**	**3.9**	**5.2**	**6.5**
Russian Federation	**kt**	**5.8**	**6.5**	**6.0**	**6.8**	**5.0**	**6.7**	**5.9**	**5.2**
United States	**kt**	**21.7**	**23.3**	**22.4**	**24.9**	**25.7**	**25.3**	**27.4**	**26.4**
Spot price	**US$/lb**	**56.8**	**48.4**	**38.3**	**44.8**	**54.8**	**63.5**	**59.0**	**68.0**
– real d	**US$/lb**	**58.5**	**49.3**	**38.3**	**44.4**	**53.7**	**61.6**	**56.4**	**64.2**

		2010	2011	2012	2013	2014	2015	2016	2017
		–11	–12	–13	–14 z	–15 z	–16 z	–17 z	–18 z
Australia									
Production	**t**	**7 069**	**7 657**	**8 919**	**7 270**	**6 690**	**7 190**	**7 940**	**9 590**
Export volume	**t**	**6 950**	**6 917**	**8 675**	**7 508**	**6 690**	**7 190**	**7 940**	**9 590**
– nominal value	**A$m**	**610**	**607**	**739**	**692**	**695**	**783**	**904**	**1 094**
– real value e	**A$m**	**647**	**635**	**757**	**692**	**679**	**748**	**845**	**1 001**
Average price	**A$/kg**	**87.7**	**87.8**	**85.2**	**92.2**	**103.9**	**108.9**	**113.8**	**114.1**
– real e	**A$/kg**	**93.1**	**91.7**	**87.3**	**92.2**	**101.5**	**104.0**	**106.4**	**104.3**

b **Includes Niger, Namibia, South Africa, Malawi and Zambia.** c **Regarded as 27 countries for all years.** d **In 2013 US dollars.** e **In 2013–14 Australian dollars.** f **BREE forecast.** z **BREE projection.**

Sources: **BREE; ABARES; Australian Bureau of Statistics, Canberra; Department of Industry, Canberra; Ux Consulting.**

41 Zircon

		2011–12	2012–13	quarter 2011–12 Mar	2011–12 Jun	2012–13 Sep	2012–13 Dec	2012–13 Mar	2012–13 Jun p
Production s									
Zircon concentrate									
New South Wales	**kt**	**86**	**90**	**22**	**22**	**22**	**22**	**22**	**22**
Victoria	**kt**	**188**	**135**	**35**	**37**	**34**	**34**	**34**	**34**
Queensland	**kt**	**60**	**60**	**15**	**15**	**15**	**15**	**15**	**15**
South Australia	**kt**	**273**	**0**	**67**	**43**	**0**	**0**	**0**	**0**
Western Australia	**kt**	**99**	**328**	**24**	**24**	**79**	**79**	**81**	**89**
Northern Territory	**kt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Australia	**kt**	**706**	**613**	**164**	**141**	**150**	**150**	**152**	**160**
Exports s									
Quantity									
Zircon concentrate	**kt**	**846**	**779**	**196**	**195**	**196**	**193**	**191**	**199**
Value									
Zircon concentrate	**$m**	**327**	**194**	**60**	**63**	**59**	**57**	**33**	**45**
Prices a									
Zircon concentrate									
All grades – bagged	**A$/t**	**2 325**	**1 508**	**2 272**	**2 420**	**2 392**	**1 603**	**1 218**	**1 190**

a **Average export unit value.** p **Preliminary.** s **BREE estimate.**
***Sources*: BREE; Australian Bureau of Statistics, Canberra.**

42 Zinc

				quarter					
		2011–12	2012–13	2011–12		2012–13			
				Mar	Jun	Sep	Dec	Mar	Jun p
Production									
Mine s									
Zinc ore and concentrates	**kt**	**3 360**	**3 267**	**788**	**846**	**796**	**854**	**746**	**872**
Zinc content of all minerals produced									
New South Wales	**kt**	**121**	**157**	**28**	**31**	**46**	**37**	**36**	**38**
Queensland	**kt**	**1 031**	**991**	**253**	**261**	**212**	**281**	**219**	**279**
Western Australia	**kt**	**89**	**68**	**15**	**21**	**31**	**10**	**11**	**16**
South Australia	**kt**	**22**	**24**	**6**	**7**	**7**	**7**	**4**	**6**
Tasmania	**kt**	**107**	**78**	**23**	**29**	**16**	**20**	**20**	**22**
Northern Territory	**kt**	**199**	**209**	**48**	**50**	**48**	**53**	**56**	**51**
Australia	**kt**	**1 567**	**1 527**	**373**	**400**	**360**	**409**	**346**	**412**
Smelter and refinery									
Refined zinc (primary)	**kt**	**505**	**496**	**117**	**128**	**124**	**129**	**115**	**128** s
Domestic despatches									
Refined zinc	**kt**	**60**	**63**	**14**	**14**	**17**	**15**	**15**	**15**
Exports									
Quantity									
Zinc concentrates									
Belgium–Luxembourg	**kt**	**48**	**132**	**13**	**11**	**13**	**11**	**71**	**37**
China	**kt**	**938**	**838**	**145**	**165**	**180**	**244**	**156**	**259**
Germany	**kt**	**115**	**70**	**36**	**49**	**0**	**30**	**10**	**30**
India	**kt**	**51**	**46**	**11**	**22**	**25**	**10**	**0**	**11**
Japan	**kt**	**276**	**307**	**57**	**59**	**70**	**100**	**49**	**87**
Korea, Rep. of	**kt**	**445**	**496**	**117**	**128**	**98**	**103**	**108**	**186**
Netherlands	**kt**	**273**	**279**	**98**	**71**	**75**	**98**	**36**	**71**
Spain	**kt**	**197**	**155**	**56**	**84**	**57**	**34**	**44**	**20**
Thailand	**kt**	**40**	**57**	**10**	**9**	**18**	**11**	**7**	**21**
Other	**kt**	**0**	**111**	**0**	**0**	**35**	**0**	**36**	**40**
Total	**kt**	**2 382**	**2 490**	**542**	**598**	**572**	**641**	**516**	**762**
Refined zinc									
China	**kt**	**123**	**163**	**26**	**28**	**49**	**37**	**40**	**36**
Chinese Taipei	**kt**	**70**	**46**	**16**	**16**	**12**	**9**	**9**	**15**
Hong Kong, China	**kt**	**46**	**57**	**6**	**7**	**16**	**11**	**12**	**18**
India	**kt**	**5**	**7**	**1**	**2**	**1**	**2**	**2**	**2**
Indonesia	**kt**	**13**	**26**	**3**	**3**	**4**	**4**	**7**	**11**
Korea, Rep. of	**kt**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**0**
Malaysia	**kt**	**27**	**16**	**7**	**7**	**4**	**3**	**3**	**5**
New Zealand	**kt**	**9**	**7**	**2**	**2**	**3**	**2**	**2**	**1**
Saudi Arabia	**kt**	**6**	**7**	**1**	**3**	**3**	**1**	**2**	**1**
United States	**kt**	**133**	**67**	**48**	**45**	**20**	**23**	**24**	**0**
Other	**kt**	**24**	**36**	**5**	**8**	**8**	**7**	**7**	**14**
Total	**kt**	**456**	**432**	**115**	**119**	**121**	**100**	**108**	**103**
Zinc content of all primary materials exported as	**kt**	**1 572**	**1 599**	**374**	**403**	**379**	**408**	**348**	**464**
Value									
Zinc concentrates	**$m**	**1 375**	**1 398**	**302**	**342**	**301**	**378**	**294**	**426**
Refined zinc	**$m**	**917**	**810**	**218**	**236**	**217**	**184**	**213**	**195**
Total	**$m**	**2 292**	**2 208**	**520**	**578**	**518**	**562**	**507**	**621**
Prices									
LME cash b	**US$/t**	**2 020**	**1 929**	**2 022**	**1 931**	**1 885**	**1 949**	**2 033**	**1 840**
Australia c	**A$/t**	**2 088**	**1 946**	**2 085**	**1 916**	**1 914**	**1 966**	**2 102**	**1 853**

a **Zinc content of all ores, concentrates, slags, residues, intermediate products, refined zinc, zinc powders, flakes and dust.** b **LME cash, midday, registered brands, minimum 98 per cent, 25 tonne warrants.** c **Nyrstar SH Grade, 98.5 per cent.** p **Preliminary.** s **BREE estimate.** na **Not available.**
Sources: **BREE; Australian Bureau of Statistics, Canberra; London Metal Exchange.**

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