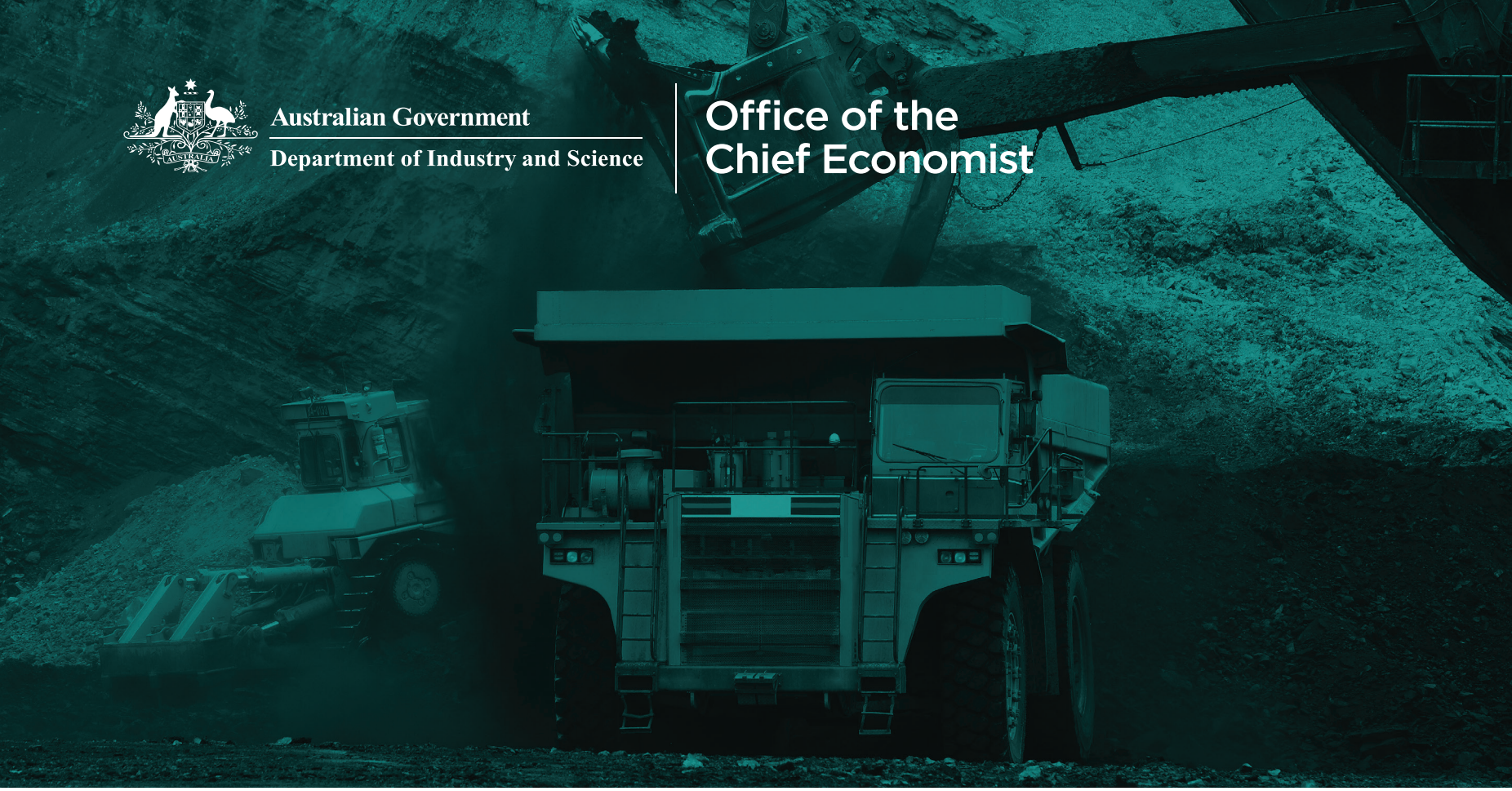

Australian Government
Department of Industry and Science

Office of the Chief Economist

Resources and Energy Quarterly

MARCH QUARTER 2015

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Further Information

For more information on data or government initiatives please access the report from the Department's website at:
www.industry.gov.au.

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Individual commodity notes have identified authors.

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Foreword

The Resources and Energy Quarterly provides data on the performance of Australia's resources and energy sectors and analysis of key commodity markets. This release of the Resources and Energy Quarterly contains an update to the Office of the Chief Economist's medium-term commodity forecasts over the period to 2020.

The combination of relatively weak consumption growth and strong supply growth put considerable pressure on commodity prices over the course of 2014. Between January and December 2014, Brent oil prices declined by 48 per cent, iron ore prices (FOB) by 47 per cent, and Newcastle thermal coal by 25 per cent.

Despite the widespread downturn in commodity prices in 2014, the prospects for Australia's resources and energy sector remain broadly positive. Growth in commodity demand over the outlook period is projected to be driven by economic growth in emerging economies, predominantly in Asia. As a major consumer of most commodities, the prospects for economic growth in China will be particularly important. If growth is lower than projected, this may have flow-on effects for commodity demand and prices.

Global supply has grown considerably over the past few years in response to higher prices. There are indications that there remains the prospect for further supply increases over the outlook period. In the short term, this growth in supply is expected to put further downward pressure on commodity prices. Lower prices have encouraged the closure of capacity and stalled the development of some projects. As a result, the surplus supply in most commodity markets is expected to be absorbed towards the end of the projection period as the economic conditions of key trading partners improve. Until this time, producers will need to focus on managing costs and improving competiveness to remain viable.

In Australia, the sector is transitioning from a period of high investment to a period of strong increases in production, which will support a projected increase in export volumes.

By 2020, Australia is projected to become the world's largest exporter of LNG, iron ore and coal. Australia's earnings from resources and energy commodities are projected to increase at an average annual rate of 6 per cent a year from 2014-15 to total $240 billion (in 2014-15 dollar terms) in 2019-20.

Mark Cully

Chief Economist

Department of Industry and Science

Contents

Macroeconomic outlook

The global economy

The global economy is forecast to grow by 3.4 per cent in 2015, driven by strong growth in the US and emerging economies, particularly India and South East Asia. Emerging economies are forecast to grow by 4.8 per cent and the OECD by 2.4 per cent (table 1.1). Global growth will be positively supported by lower oil prices, particularly in major importing countries; but is likely to be offset by lower growth in key areas including China, the European Union and Japan.

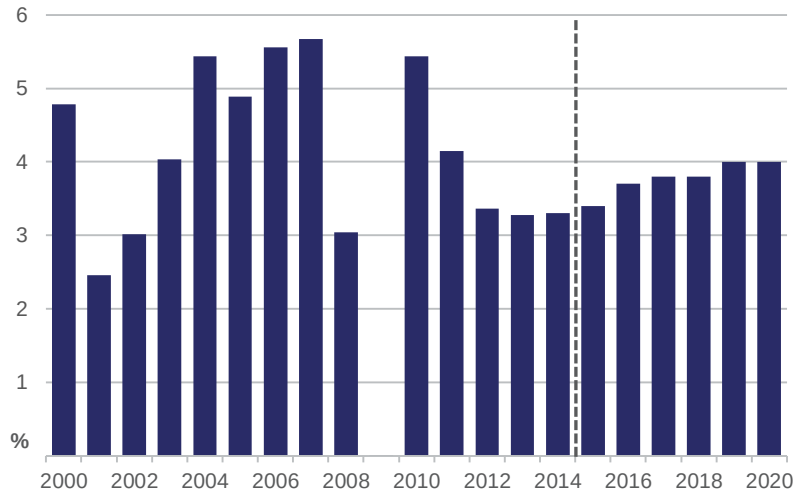
China will continue to be a major contributor to world economic growth, but at a slower pace than in the past as the Chinese Government proceeds with reforms to achieve more sustainable growth.

Over the medium term, world economic growth is assumed to increase to 4.0 per cent in 2020, with growth in emerging and OECD economies increasing to 5.5 per cent and 2.6 per cent, respectively. Growth in emerging economies is projected to be driven by China, India and South East Asia. In the OECD, growth will be supported by improved economic performance in the US as well as a recovery in the European Union.

Although the outlook is generally positive, there are several risks to global economic prospects over the short to medium term. This includes China's transition to a pattern of lower growth. The successful implementation of China's reform agenda will remain a key risk to China's economic prospects over the medium term. It will also have flow-on effects to its major trading partners, which include both OECD and emerging economies.

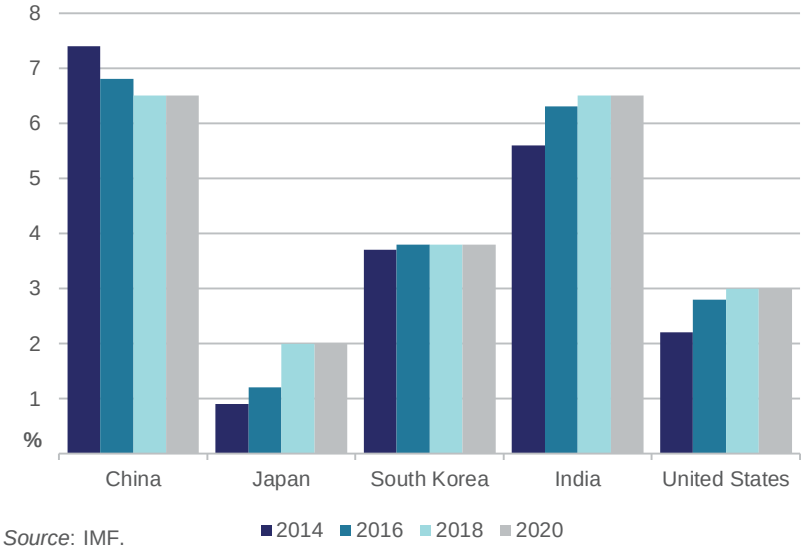
A more detailed discussion on the economic outlook for key economies follows.

Figure 1.1 World economic growth



Source: IMF.

Figure 1.2 Economic growth in selected countries



Source: IMF.

Table 1.1: Key world macroeconomic assumptions

%	2014	2015 a	2016 a	2017 a	2018 a	2019 a	2020 a
Economic growth b							
OECD	1.8	2.4	2.5	2.6	2.6	2.6	2.6
United States	2.2	2.5	2.8	3.0	3.0	3.0	3.0
Japan	0.9	0.9	1.2	1.5	2.0	2.0	2.0
European Union 28	1.4	1.3	1.5	1.7	2.0	2.0	2.0
Germany	1.4	1.9	2.0	2.0	2.0	2.0	2.0
France	0.4	1.0	1.5	1.5	2.0	2.0	2.0
United Kingdom	3.2	2.7	2.5	2.5	2.5	2.5	2.5
South Korea	3.7	3.5	3.8	3.8	3.8	3.8	3.8
New Zealand	3.6	3.0	2.8	2.5	2.5	2.5	2.5
Emerging economies	4.4	4.8	5.0	5.0	5.3	5.3	5.5
Non-OECD Asia	6.5	6.5	6.4	6.4	6.4	6.4	6.4
South East Asia d	4.7	5.3	5.5	5.5	5.5	5.5	5.5
China e	7.4	6.8	6.8	6.5	6.5	6.5	6.5
Chinese Taipei	3.5	3.5	3.8	4.0	4.0	4.0	4.0
India	5.6	6.0	6.3	6.5	6.5	6.5	6.5
Latin America	1.3	2.0	2.5	2.5	3.0	3.0	3.5
Middle East	2.7	3.4	3.5	4.0	4.0	4.0	4.0
World c	3.3	3.4	3.7	3.8	3.8	4.0	4.0
Inflation rate b							
United States	2.2	2.3	2.3	2.3	2.3	2.3	2.3

a 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.
Sources: ABS; IMF; OECD.

The outlook for key economies

The United States

The US economy performed above expectations in 2014, growing 2.2 per cent. Consumer spending stayed strong towards the end of the year, spurred by lower oil prices, low interest rates and increasing employment. The third round of quantitative easing concluded toward the end of the year and the economy progressed at a moderate pace. Employment indicators have been positive; 2014 job growth was 30 per cent higher than 2013, and unemployment remained relatively steady at 5.7 per cent in January 2015.

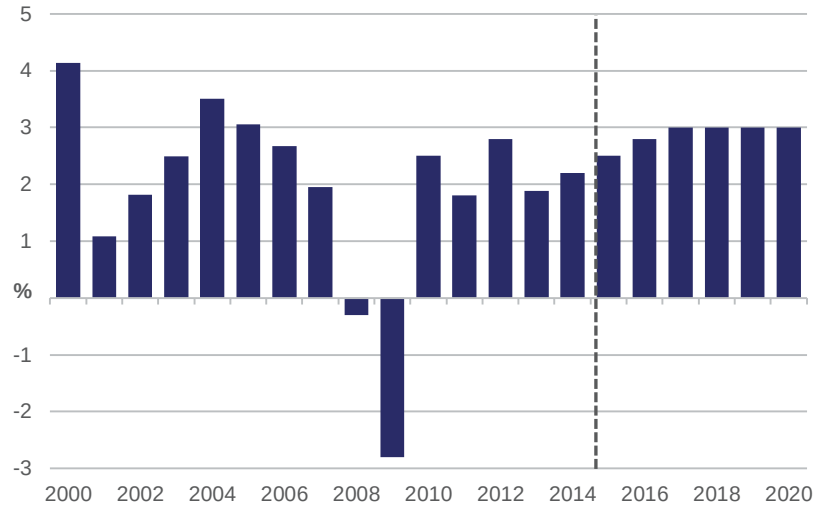
In 2015 the US economy is forecast to grow 2.5 per cent, driven by positive consumer confidence in an environment of low energy prices. Inflation is forecast to be kept in check by a strong US dollar. Although severe winter weather reduced activity in early 2015, economic indicators show positive growth, with the Manufacturing PMI 4 per cent higher than in December 2014 and consumer credit increasing 1.3 per cent in January.

However, there are a number of downside risks to navigate including an increasing current account deficit as the US dollar appreciates; rising government debt; and the negative effect of low energy prices on energy company revenues, which creates the potential for job losses in the sector.

The pace of economic growth during the first half of 2015 will influence the Federal Reserve's decision on whether to increase interest rates. It is expected a rate change will be announced mid-year, and with clear communication and expectation management, market shocks should be minimised. The timing and rate of increase will depend on the progress towards inflation and maximum employment targets.

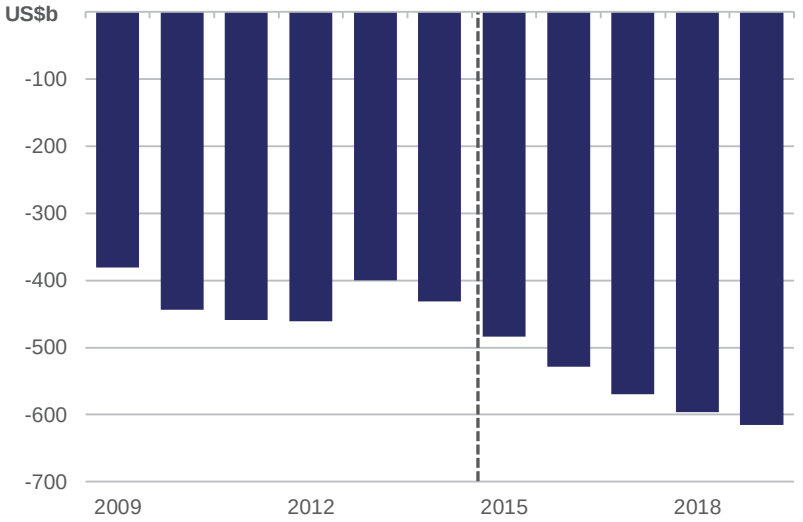
Over the medium term, US economic growth is projected to remain around 3 per cent a year as the economy stabilises. However, growth may be hampered if interest rates rise too quickly and deter consumer spending and investment.

Figure 1.3: US GDP growth



Source: IMF.

Figure 1.4: US current account deficit



Source: IMF.

China

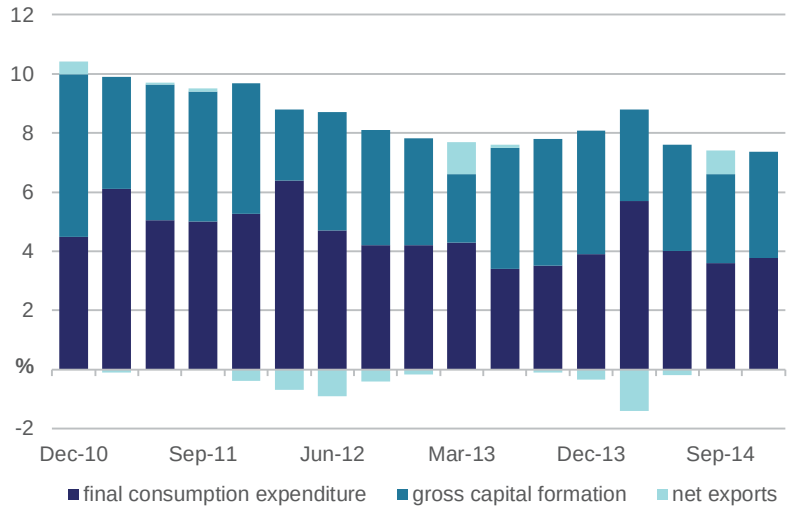
The Chinese economy grew by 7.4 per cent in 2014, the slowest annual increase in 24 years. The downturn in the property sector was the biggest drag on growth, as tighter credit conditions, surplus supply and reduced buying interest affected house sales and new builds. The effects of a weaker property sector expanded to other parts of the economy such as construction, investment, industrial production and electricity generation, where growth also slowed. Data releases for January 2015 indicate growth in China's economy is slowing, with weaker manufacturing activity, inflation and trade. In order to maintain stable growth, the People's Bank of China cut benchmark lending and deposit rates in late February.

The downturn in the Chinese property sector is expected to persist in the near term. It is reported that the government is preparing measures to assist the sector, including reducing down payment requirements for second home purchases; reducing the minimum holding period for homeowners to avoid sales tax on property from five to two years; and easing mortgage rules. While growth in the sector is forecast to gradually improve as the housing stock is drawn down and these measures take effect, it is unlikely to return to previous rates. From 2016, growth in the property sector is expected to be supported by the development of central and western China.

While the property sector has been weak, investment in infrastructure is expected to be a key driver of growth over the medium term. China's hard infrastructure, such as rail, power grids and airports, is still underdeveloped relative to advanced economies. The China Development Bank has indicated that at least RMB 590 billion (US$94 billion) in loans will be available for infrastructure projects in 2015. RMB 400 billion (US$64 billion) has been set aside for housing renovation, RMB 100 billion (US$16 billion) for the railway sector and RMB 90 billion (US$14 billion) for water infrastructure.

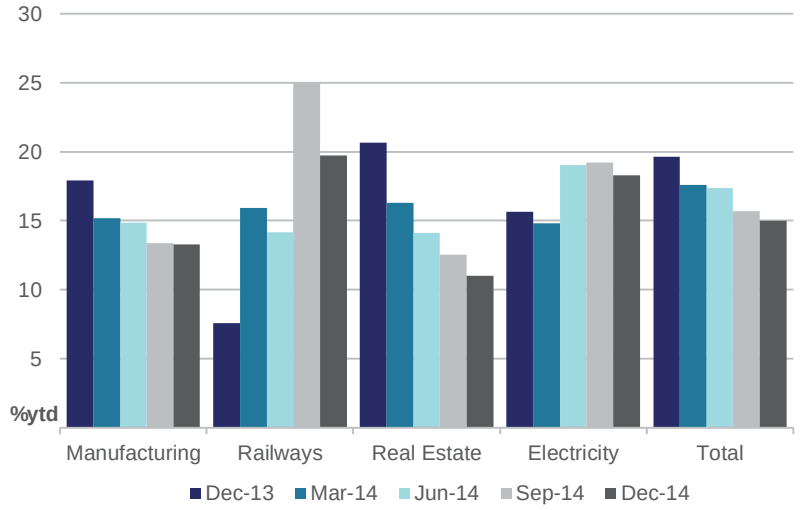
The National People's Congress (NPC) was held in early March to discuss targets, plans for reform and strategies for implementation. Some of the targets for 2015 included economic growth of 7 per cent, growth in fixed asset investment of 15 per cent, the creation of 10 million jobs and reducing energy intensity by 3.1 per cent.

Figure 1.5: China's quarterly contribution to GDP



Source: CEIC.

Figure 1.6: Growth in China's fixed asset investment



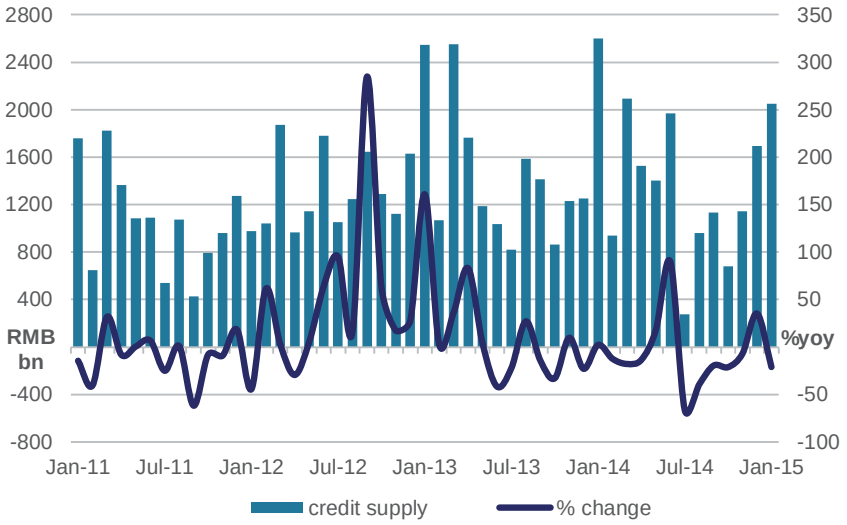
Source: CEIC.

Premier Li Keqiang noted that 2015 will be crucial for restructuring the economy towards greater domestic consumption to support sustained economic growth over the longer term. To this effect, the Chinese Government intends to push ahead with reforms directed at state-owned enterprises, liberalising the banking sector, developing financial markets, pricing, and taxation.

Since 2015 is the last year of the twelfth Five-Year Plan (FYP), the NPC also discussed its success and began to canvass goals for the thirteenth FYP to be published in early 2016 at the Fourth Plenum. The release of the thirteenth FYP will provide greater insight into the Government's reform priorities over the medium term.

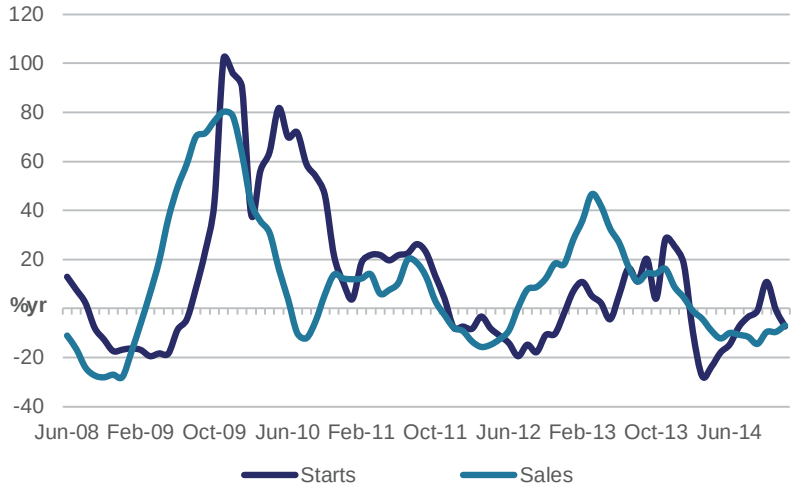
In 2015, real GDP is forecast to moderate to 6.8 per cent though government measures to support growth and maintain employment may result in growth above 7 per cent. Over the medium term, China's GDP is assumed to moderate to average around 6.5 per cent by 2020. While the rate of growth is slowing, it will still support large year-on-year increases in commodity demand.

Figure 1.7: China's new credit supply



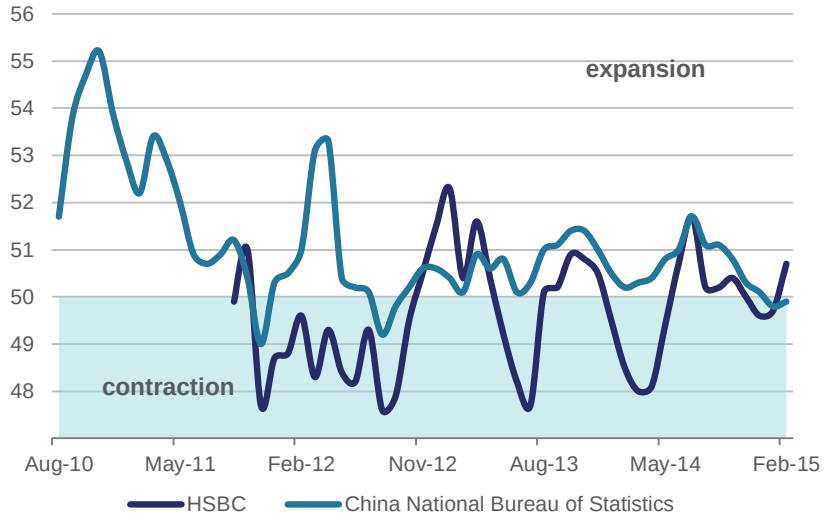
Source: CEIC.

Figure 1.8: China's residential sales and starts



Data is three month moving average of monthly growth rate.
Source: CEIC.

Figure 1.9: China's manufacturing PMI



Sources: CEIC; Bloomberg.

India

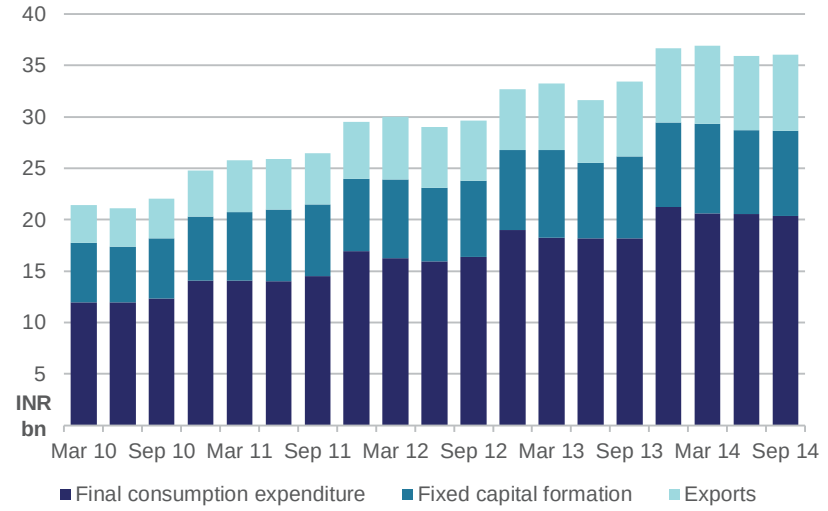
The Indian economy rebounded from a lacklustre 2013 to grow by an estimated 5.6 per cent in 2014. The election of the pro-business Modi government and economic reforms provided strong impetus for growth. Some of the reforms implemented in 2014 include: relaxing foreign investment rules; beginning an overhaul of the tax system; a commitment to reduce government ownership in the coal industry; and alleviating obstructions for small businesses. The Indian economy also benefited from lower oil prices, which helped ease inflation, reduced the cost of the government's fuel subsidisation scheme and cut the 2014 current account deficit by an estimated US$50 billion. Oil is India's largest import, costing an estimated US$100 billion a year (around one-fifth of annual imports).

Over the medium term, India's economic growth is expected to be supported by continued economic reform and investment in infrastructure as the population becomes more urbanised. Around 90 million people (almost four times Australia's population) migrated to cities in India between 2001 and 2011. This increased the percentage of people living in urban areas from 28 per cent to 32 per cent. The higher rate of urbanisation has been putting considerable pressure on India's transport, water and electrical infrastructure. A review of India's infrastructure needs by the High Powered Expert Committee found that US$800 billion in infrastructure investment, particularly transport and electrical capacity, will be required over the next 20 years.

In line with this recommendation the government unveiled plans to increase rail investment by US$137 billion in the February budget. The funds will be used to modernise tracks, expand the network and introduce faster trains. The government also intends to ensure all Indian villages have 24 hour access to electricity.

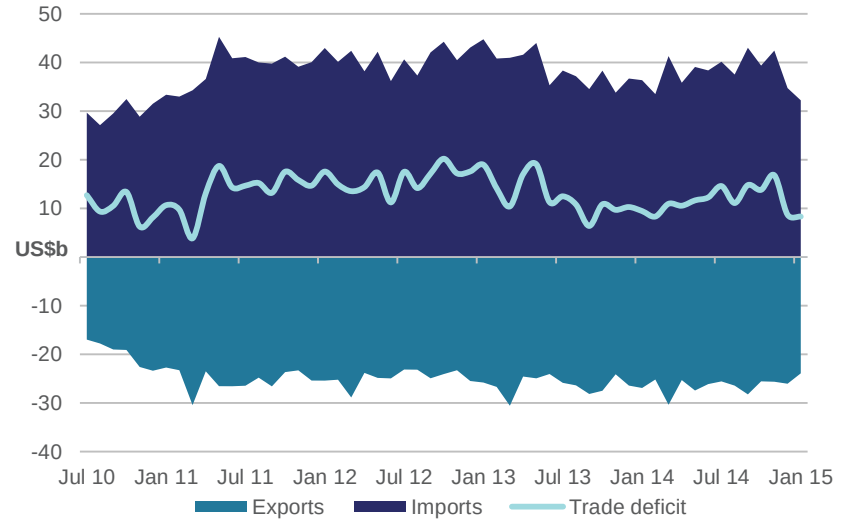
Over the medium term India's GDP growth is projected to increase to 6.5 per cent in 2020, supported by economic reform, strong infrastructure investment and increased exports of manufactured goods. However, there are considerable challenges in achieving this growth. Effort will need to be directed towards improving electricity availability, improving business conditions and modernising taxation and labour legislation.

Figure 1.10: Quarterly contributions to GDP



Source: CEIC.

Figure 1.11: Indian current account, monthly



Source: CEIC.

Japan

Japan's economy expanded at an annualised 2.2 per cent in the 2014 December quarter following two quarters of negative growth. Growth in the December quarter was supported by lower oil prices and a depreciation of the Yen which reduced Japan's trade deficit.

Data for early 2015 painted a mixed picture for the performance of the Japanese economy. Manufacturing output increased by 4 per cent in January in response to a weaker Yen and growing exports to Asia and the United States. However, consumer spending did not accelerate as much as expected following the decision to delay the consumption tax increase, as wage increases have been insufficient to offset the effect of the first consumption tax increase in April 2014. Household spending declined by 5 per cent and retail sales were down 2 per cent. In 2015, Japan's economy is forecast to grow by 0.9 per cent.

Japan's longer term growth strategy hinges around raising investment, employment and productivity. However, growth is likely to remain constrained by an ageing population and the need for fiscal consolidation. Over the medium term, Japan's economic growth is projected to strengthen to 2.0 per cent by 2020.

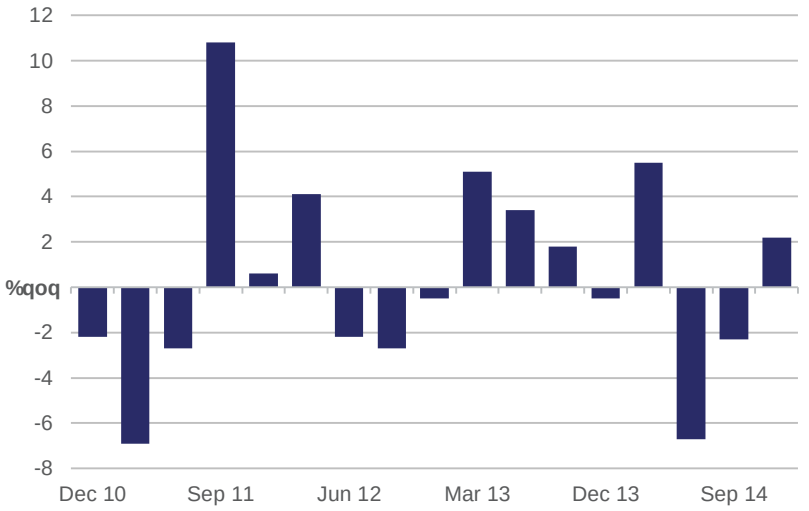
South Korea

South Korea's economy grew by 0.4 per cent in the December quarter compared with the September quarter, reflecting reduced government spending and weak export demand.

Data for early 2015 indicates continued weakness in the economy—production declined by 1.7 per cent in January, the largest drop since March 2013; retail sales declined 3 per cent and exports, which account for about half of Korea's economic growth, declined by 10 per cent. In 2015, South Korea's economic growth is forecast to slow to 3.5 per cent.

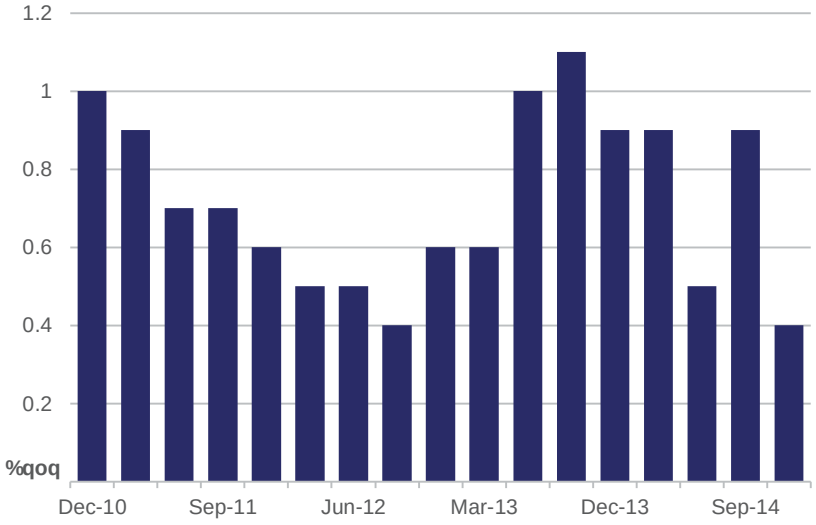
Exports and a US$40 billion stimulus package, announced in July, designed to encourage domestic demand are expected to drive growth over the medium term. However, weaker economic performance in key export markets in the short term, including China, Japan and Europe, pose a risk to export-led growth.

Figure 1.12: Japan's quarterly GDP, annualised



Source: Bloomberg.

Figure 1.13: South Korea's quarterly GDP



Source: Bloomberg.

Europe

Economic growth in the EU remained weak in 2014, as it continues to recover from the global financial crisis. While consumption was strong, investment and exports were subdued.

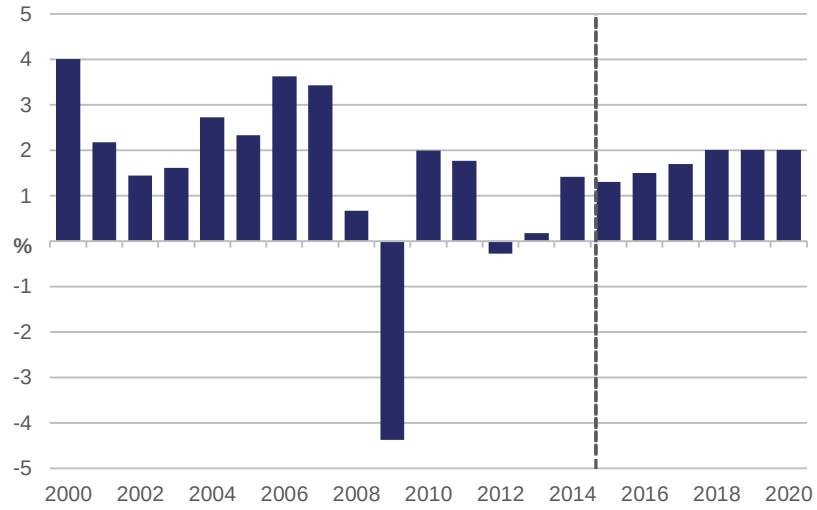
There are several factors which will improve the EU's short term economic prospects including lower oil prices, monetary easing measures introduced by the European Central Bank (ECB), more neutral fiscal policy and a depreciation of the Euro. Despite this, high unemployment, structural weakness and continued geopolitical concerns will continue to act as a drag on growth. In 2015, the EU is forecast to grow by 1.3 per cent.

Greek sovereign debt continues to be a major risk to the outlook for the EU as it has insufficient income to repay its debt of around €315 billion (US$341 billion). Around 80 per cent of this debt is owed to public lenders such as the International Monetary Fund, the ECB and multiple European Governments who have imposed strict conditions on the loans. In late February the Greek Government accepted a four month extension to the existing bailout programme. They have until April 2015 to detail reform plans to complete the bailout before they receive further aid.

Investment in the EU has been adversely affected by the pressure to reduce debt in the corporate sector, fiscal constraints and economic uncertainty. However, investment should begin to increase over the medium term as export demand strengthens and credit conditions improve. The EU Investment Plan announced during 2014 should also support stronger investment growth although the effect of this plan is unlikely to be realised until towards the end of the outlook period.

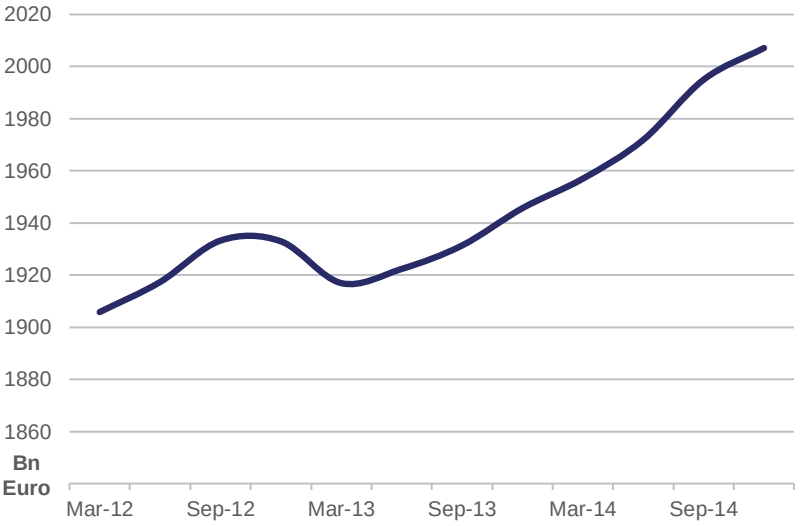
Over the medium term, economic growth in European economies is projected to return to historical rates (around 2 per cent) by 2020. While monetary easing will support a gradual recovery in the region, the implementation of fiscal and structural reforms is important for improving economic prospects over the medium to longer term.

Figure 1.14: EU GDP growth



Source: IMF.

Figure 1.15: Europe's household consumption



Source: Eurostat.

Economic outlook for Australia

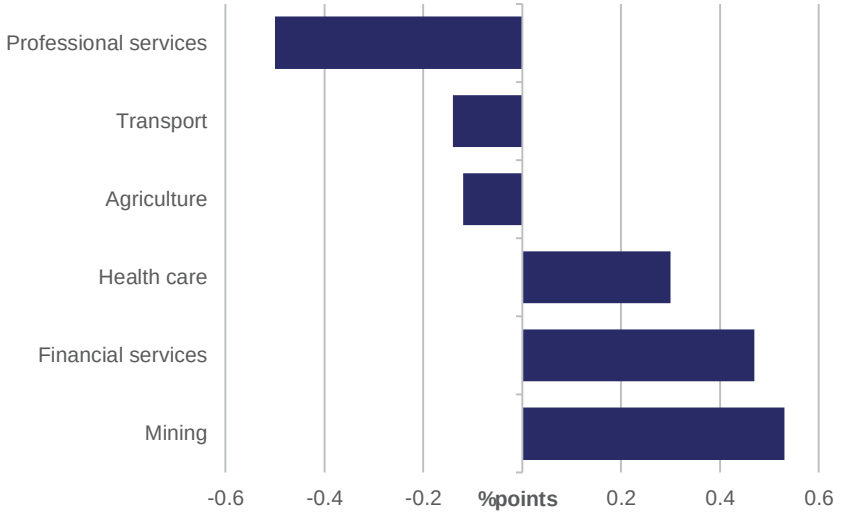
Australia's GDP increased 0.5 per cent in the December quarter 2014 (in seasonally adjusted terms), supported by growth in exports and household spending. The construction and health care sectors recorded the strongest growth during the quarter. Despite sharp declines in the price of some commodities during the December quarter, growth in the mining sector was steady compared with the previous quarter. When compared with the December quarter 2013, mining, financial services and health care were the major contributors to growth.

The mining sector has been a key contributor to the Australian economy, underpinned by large export earnings and capital investments. Although commodity prices and investment in the sector have declined, production of key mineral commodities have increased considerably over the past twelve months. Increased production volumes have been reflected in strong growth in exports. In 2014, exports of iron ore and thermal coal increased by 24 per cent and 7 per cent, respectively.

The drawdown in capital expenditure as large-scale resources projects are completed will be a key challenge to maintaining growth over the short term. While housing construction expenditure has increased recently, it has not been large enough to offset the decline in mining investment. The effect of the decline in investment is expected to be moderated by lower interest rates, a depreciating Australian dollar and lower energy prices. In 2014-15, Australia's GDP growth is forecast to moderate to 2.5 per cent.

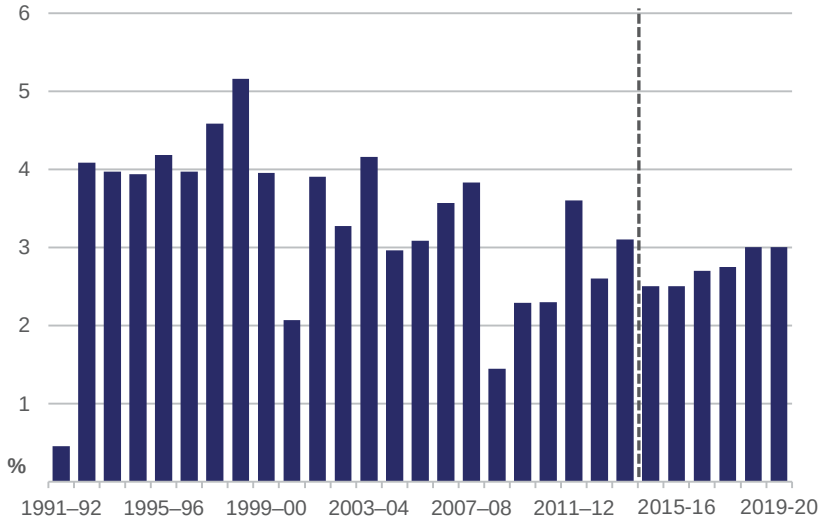
Over the remainder of the outlook period to 2019-20, Australia's GDP is assumed to recover to around 3.0 per cent. As mining investment declines and Australia transitions to a period of higher commodity production, exports of resources and energy commodities and non-mining investment will be the key drivers of GDP growth over the medium term. Growth in exports is expected to be supported by an assumed depreciation in the Australian dollar and projected strong commodity demand in emerging economies. Sustained weak commodity prices and uncertainty about the scale of non-mining investment present key risks to the outlook.

Figure 1.16: Contribution to growth Dec-13 to Dec-14



Source: ABS.

Figure 1.17: Australia's economic growth



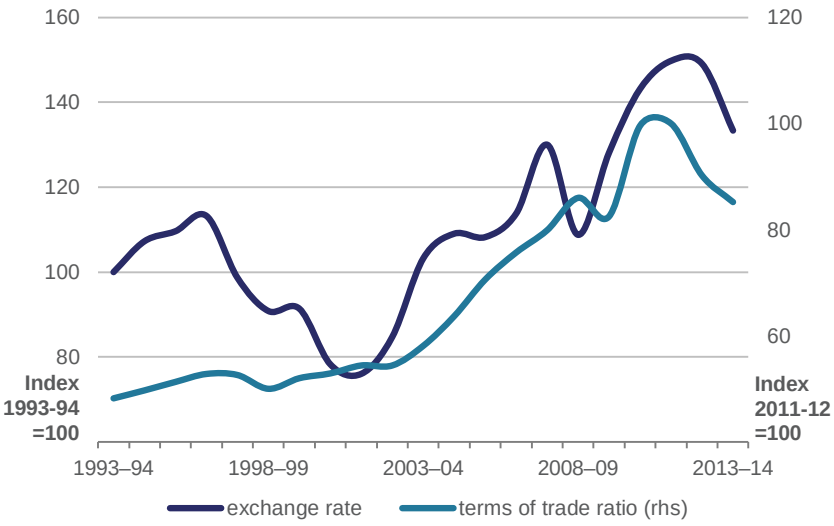
Source: ABS.

The Australian dollar has been historically high over the past few years, reflecting strong terms of trade and the relative strength of the Australian economy. Despite declining commodity prices during much of 2014, and a subsequent deterioration in the terms of trade, the Australian dollar remained relatively high by historical standards for most of the second half of 2014. This was supported by the relative strength of the Australian economy and monetary policies of key central banks which supported demand for the Australian dollar.

However, the Australian dollar-US dollar exchange rate began to decline in late 2014 in response to a continued deterioration in Australia's terms of trade and expectations of further interest rate increases in the US as its economy strengthens. The Australian-dollar-US dollar exchange rate is forecast to average 0.84 US dollars in 2014-15.

Over the medium term, the Australian dollar is assumed to depreciate and average 0.76 US dollars in 2019-20 as a result of continued softness in commodity prices and an expected normalisation of interest rates in key economies.

Figure 1.18: Australia's exchange rate and terms of trade



Sources: ABS; Bloomberg.

Table 1.2: Key macroeconomic assumptions for Australia

	unit	2013–14	2014–15 a	2015–16 a	2016–17 a	2017–18 a	2018–19 a	2019–20 a
Economic growth bc	%	3.1	2.5	2.5	2.7	2.8	3.0	3.0
Inflation rate b	%	3.0	2.7	2.5	2.2	2.2	2.2	2.2
Interest rate d	%	2.5	2.5	2.3	2.5	3.0	4.0	4.0
Exchange rate e	US$/A$	0.92	0.84	0.78	0.77	0.76	0.76	0.76

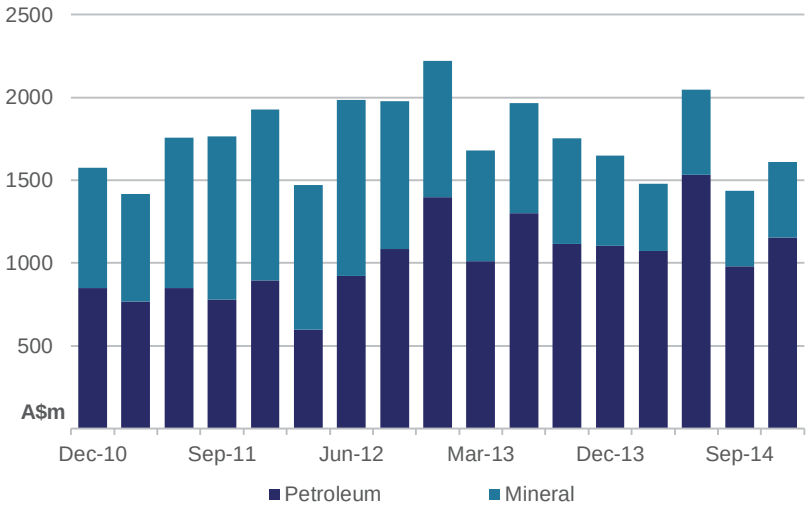
a assumption. **b** Change from previous period. **c** Seasonally adjusted chain volume measures. **d** Median RBA cash rate.
e Average of daily rates.
Sources: ABS; RBA.

Exploration

Exploration expenditure for mineral and petroleum resources increased by 12 per cent from the September quarter, but were down 2.3 per cent year on year as lower commodity prices and cost-cutting programs have affected exploration activity over the past year. While minerals exploration declined year-on-year, exploration for petroleum resources increased. However, the rapid decline in oil prices towards the end of 2014 may affect petroleum expenditure over the remainder of 2014-15. With generally lower commodity prices forecast for 2014-15, a large rebound in exploration expenditure appears unlikely in the short term.

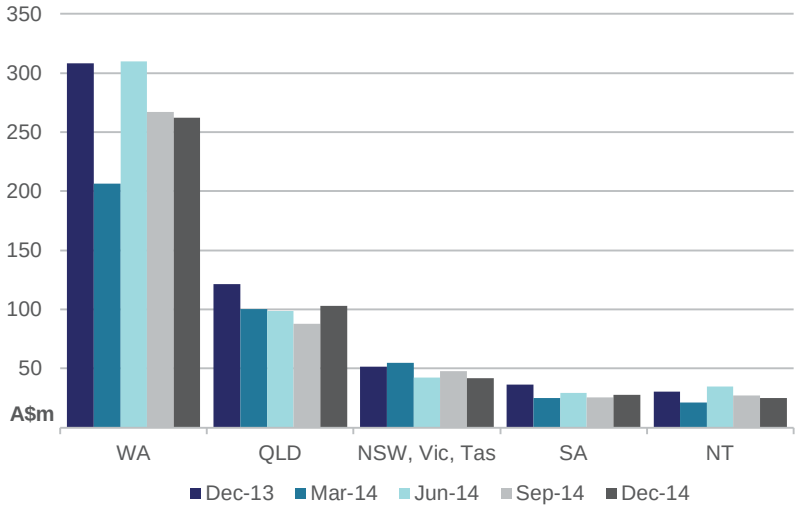
Exploration at existing deposits declined by 6 per cent compared with the September quarter, while exploration at new deposits increased by 17 per cent. In the December quarter, exploration expenditure in Western Australia declined by 2 per cent relative to the September quarter to $262 million. Exploration in Queensland increased by 17 per cent to $103 million, while exploration in South Australia increased by 9 per cent to $28 million.

Figure 1.19: Australia's exploration expenditure



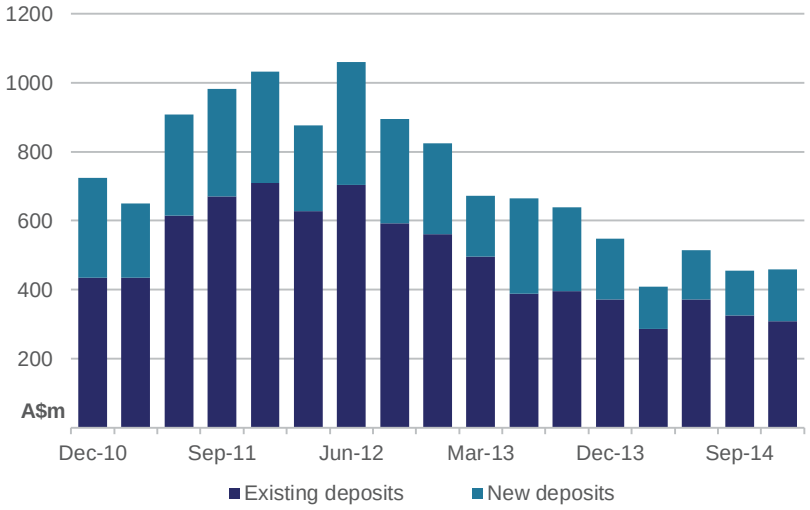
Source: ABS.

Figure 1.20: State exploration expenditure



Source: ABS.

Figure 1.21: Exploration expenditure, by deposit type



Source: ABS.

Capital expenditure

The rapid increase in resources and energy project investment over the past decade was fuelled by rapidly increasing consumption in emerging economies, particularly China, and substantially higher commodity prices. However, this investment is not sustainable in the current market of lower prices. Despite initiatives to streamline approval processes and award major project facilitation status, there are fewer projects entering the investment pipeline. To remain profitable, companies are cutting their capital expenditure. Despite this, in the December quarter, mining industry capital expenditure was $21.1 billion, up 1.4 per cent on the September quarter but down 15 per cent on the December quarter 2013.

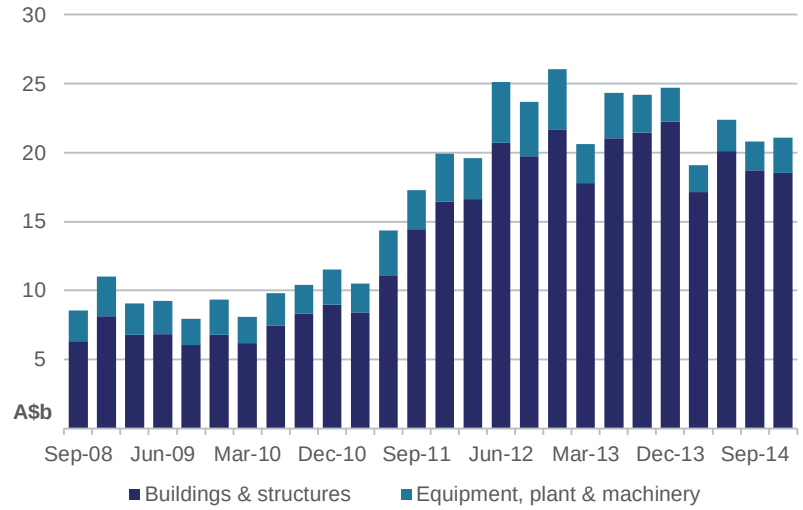
Given the projected softness in commodity prices over the medium term, the outlook for further investment in the mining sector is subdued. As high-value LNG projects are completed over the next few years, the stock of capital investment will be substantially drawn-down. The downturn in investment has come from a very high point, and while activity is slowing there are still a considerable number of resources and energy projects being developed. Over the medium term, Australia will need to compete with other resource-rich countries to secure investment and ensure it remains a leading destination for attracting capital.

Mining sector employment

Mining sector employment was 228 900 people in the December quarter 2014, down 6 per cent compared with the September quarter, and 16 per cent lower than the December quarter 2013. As part of cost cutting and productivity enhancing initiatives, many producers have sought to reduce staff numbers through job cuts or insourcing some functions that were previously undertaken by contractors.

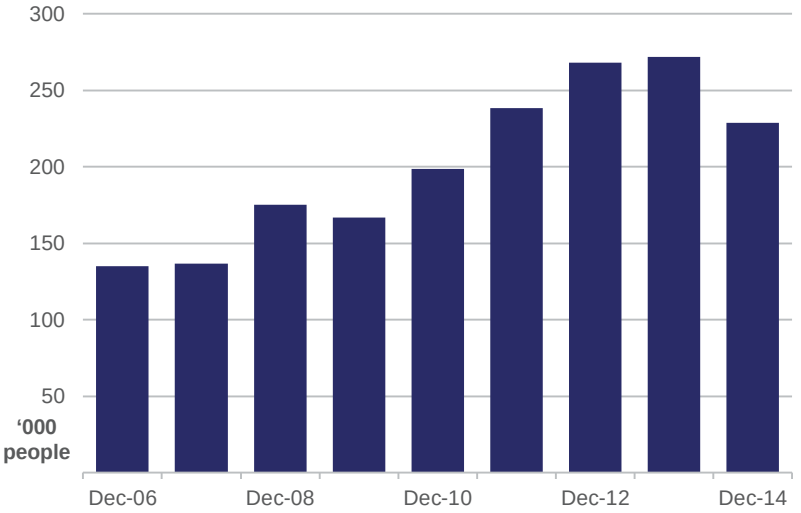
The projected increase in commodity production over the medium term will provide some employment opportunities. However, this will be more than offset by the draw down in demand for construction labour as major projects are completed and lower mining investment reduces the number of projects being developed.

Figure 1.22: Mining industry capital expenditure



Source: ABS.

Figure 1.23: Total mining employment



Source: ABS.

Australia's resources and energy commodity production and exports

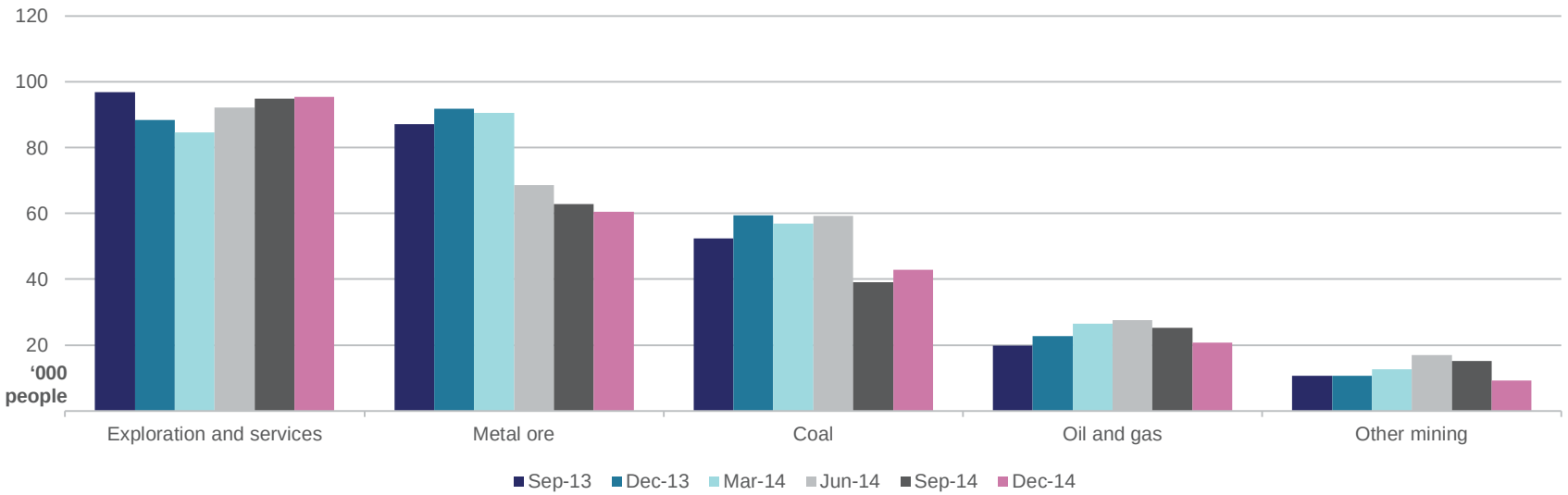
Commodity prices declined steadily in 2014, largely in response to substantial increases in supply rather than lower demand. The decline in commodity prices, in conjunction with relatively high costs, created a more challenging operating environment for Australian producers. In response, the industry has embarked on cost cutting and productivity enhancing initiatives to remain viable. Producers that remain high-cost are slowly being forced to exit the market. Despite the challenges, the substantial investment in new capacity over the last few years is beginning to translate into higher production.

The supply surplus that has emerged in most commodity markets is expected to persist over the short term and contribute to sustained softness in commodity prices. As global investment slows and unprofitable production is closed, the growth in supply is projected to slow. Towards the end of the projection period, projected growth in consumption will begin to absorb the surplus supply and support higher prices over the medium term. However, cost cutting exercises undertaken by companies has reduced the price required to remain viable and will limit the growth in prices in some commodities.

In 2014-15, Australia's earnings from mineral and energy commodities are forecast to decline by 8 per cent to $179 billion as higher export volumes for most commodities and the positive effect on earnings of a depreciating Australian dollar are more than offset by forecast lower prices.

LNG export earnings will begin to increase following the commissioning of new facilities on the east coast, although the full effect of the new capacity will become more apparent from 2015-16. Iron ore export volumes are forecast to increase by 17 per cent in 2014-15, supported by a full year of production from recently started mines. However, export earnings are forecast to decline by 23 per cent because of forecast lower prices.

Figure 1.24: Mining sector employment



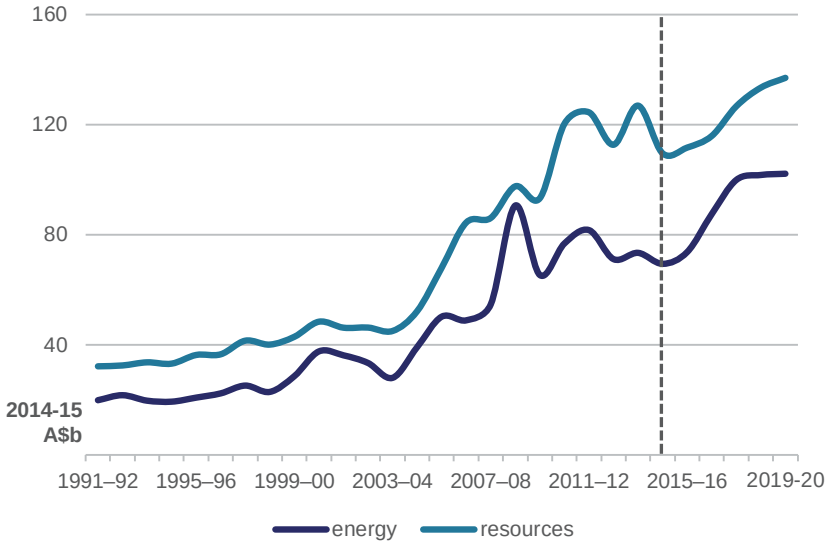
Source: ABS.

Despite the forecast decline in export earnings in 2014-15, the outlook for the Australian minerals and energy exports remains positive. The prices of several commodities, notably iron ore and coal, are projected to increase towards the end of the outlook period. In addition, production and export volumes are projected to increase substantially as the high volume of investment over the past decade translates into new production capacity.

The strongest growth in export earnings is projected for LNG, where the development of new projects is projected to contribute to a near-tripling of Australia's LNG exports. Towards the end of the outlook period, Australia will have the largest installed capacity in the world.

Australia's earnings from resources and energy exports are projected to reach $240 billion (in 2014-15 dollar terms) in 2019-20. Resources and energy export earnings are projected to total $137 billion and $102 billion (in 2014-15 dollar terms) in 2019-20, respectively.

Figure 1.25: Australia's resources and energy export earnings



Source: ABS.

Table 1.3: Medium term outlook for Australia's resources and energy commodities

	unit	2013–14	2014–15 f	2015–16 f	2016–17 z	2017–18 z	2018–19 z	2019–20 z
Value of exports								
Resources and energy	A$m	195 005	178 927	189 953	212 996	242 506	257 238	267 380
– real b	A$m	200 270	178 927	185 320	203 328	226 515	235 103	239 112
Energy	A$m	71 462	69 396	75 525	91 633	106 928	111 261	114 215
– real b	A$m	73 392	69 396	73 683	87 474	99 877	101 687	102 140
Resources	A$m	123 543	109 531	114 428	121 362	135 578	145 977	153 165
– real b	A$m	126 878	109 531	111 637	115 854	126 638	133 416	136 972
Mine production								
Gross value	A$m	187 205	171 770	182 354	204 476	232 806	246 949	256 685
– real b	A$m	192 260	171 770	177 907	195 194	217 454	225 699	229 547

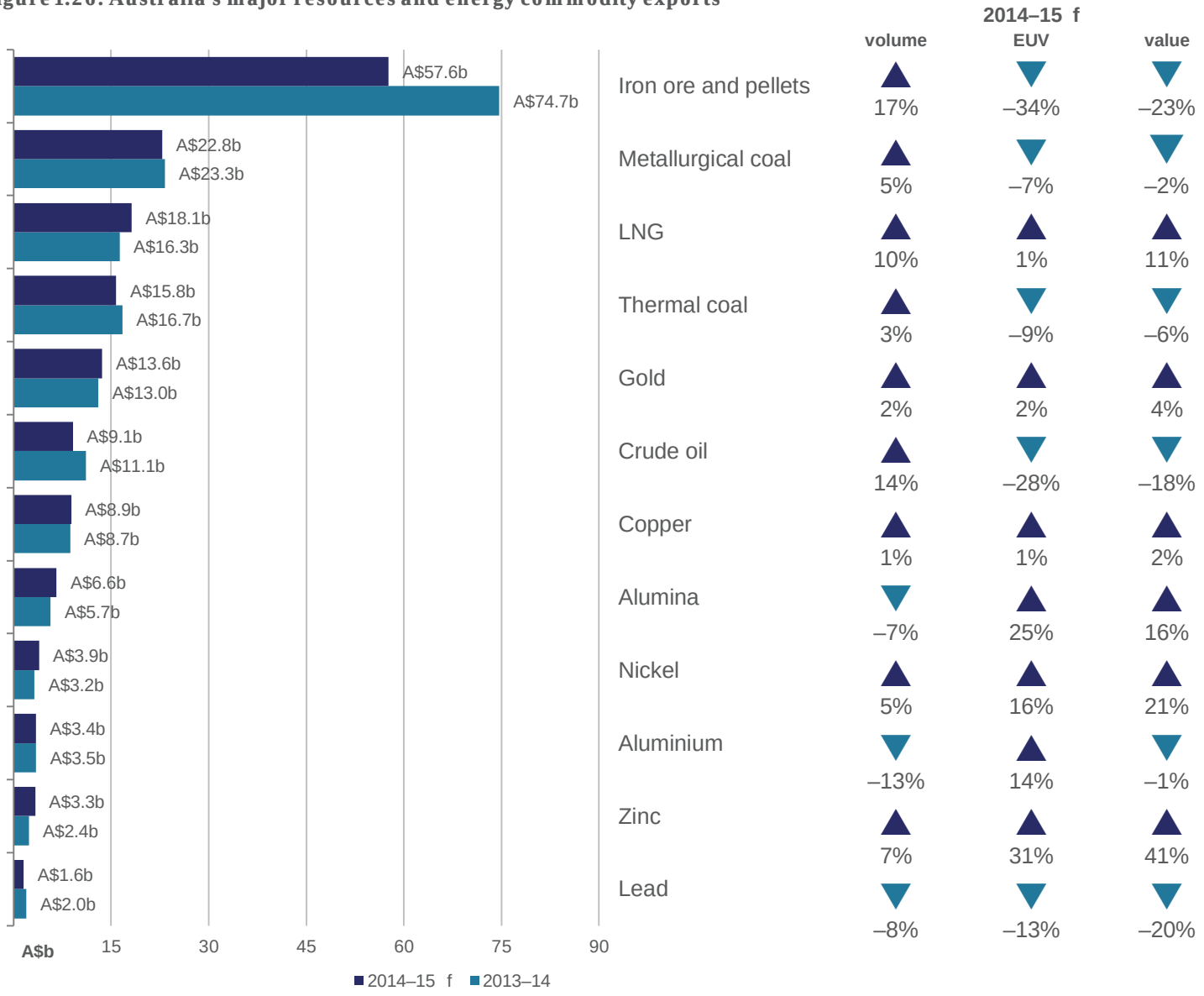
b In current financial year Australian dollars. **f** forecast. **z** projection.
Source: ABS.

Table 1.4: Australia's resources and energy commodity exports, by selected commodities

	Volume				Value			
	unit	2013–14	2019–20 z	CAGR	unit	2013–14	2019–20 z	CAGR
Alumina	kt	18 614	16 909	–1.6	A$m	5 711	7 753	5.2
Aluminium	kt	1 576	1 307	–3.1	A$m	3 479	3 768	1.3
Copper	kt	1 035	1 240	3.1	A$m	8 707	11 437	4.7
Gold	t	279	300	1.2	A$m	13 010	17 696	5.3
Iron ore	Mt	651	935	6.2	A$m	74 671	90 299	3.2
Nickel	kt	241	273	2.1	A$m	3 216	5 015	7.7
Zinc	kt	1 532	1 794	2.7	A$m	2 366	4 420	11.0
LNG	Mt	23	77	22.0	A$m	16 305	52 171	21.4
Metallurgical coal	Mt	180	204	2.1	A$m	23 254	29 163	3.8
Thermal coal	Mt	195	234	3.1	A$m	16 705	18 038	1.3
Oil	kbd	255	295	2.4	A$m	11 115	10 241	–1.4
Uranium	t	6 701	9 200	5.4	A$m	622	1 344	13.7

f forecast. CAGR is compound annual growth rate, in percentage terms.
Source: ABS.

Figure 1.26: Australia's major resources and energy commodity exports



f forecast
EUV is export unit value

Steel

Ben Witteveen

Despite indications of a lack of growth in China's steel consumption in 2014, associated with a downturn in residential construction, fixed asset investment in emerging economies is projected to support growth in world steel consumption and production over the medium term.

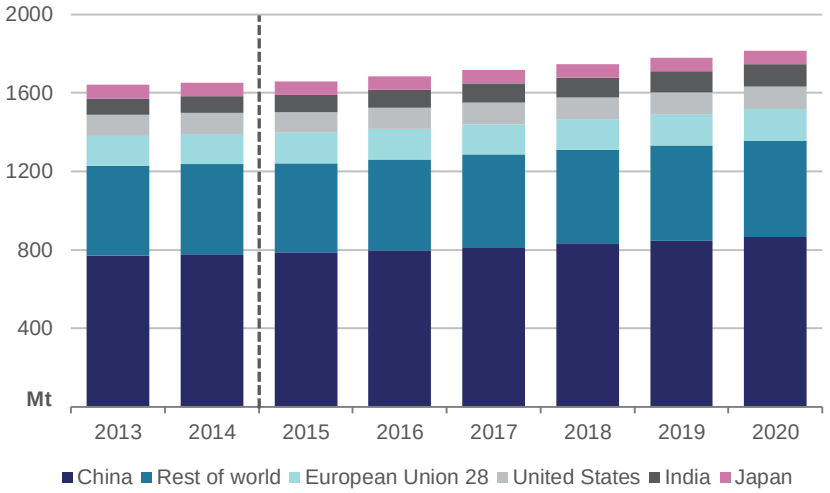
World steel overview

World steel consumption growth is estimated to have slowed to 0.6 per cent in 2014 (year-on-year) to 1.65 billion tonnes, down from 6 per cent in 2013 and 4 per cent in 2012. India and Brazil recorded strong consumption growth; however, this was offset by a fall in China's growth rate because of reduced residential construction activity.

In 2014 world steel production is estimated to have grown 1.1 per cent to 1.66 million tonnes, supported primarily by a 1 per cent expansion in China's output. With lower consumption growth in China, the extra production was exported. In 2014, China's steel exports increased by 50 per cent to 94 million tonnes. If growth in China's steel consumption remains subdued and world markets cannot continue to absorb the growth in China's steel exports, then it is likely that China's steel production will decline. Should this occur world steel production may be lower than forecast in 2015.

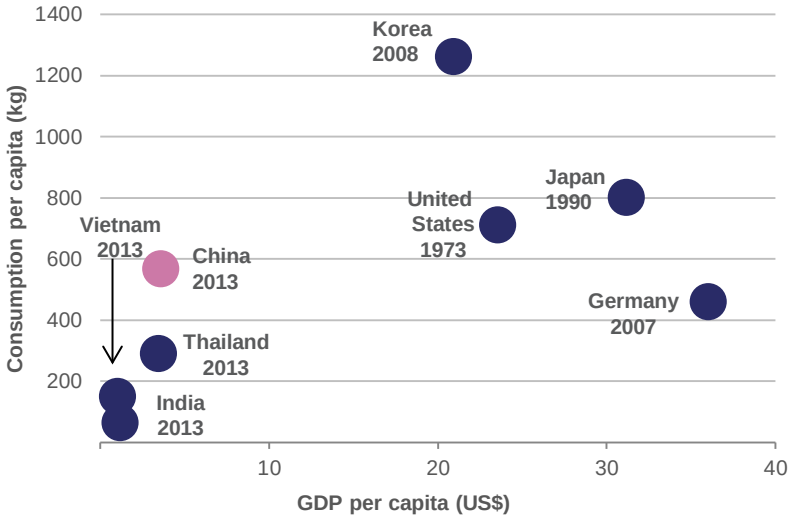
Over the medium term steel consumption growth is projected to average 1.6 per cent and total 1.8 billion tonnes in 2020. Emerging economies have been the growth engine of world steel consumption over the past decade and while their rate of growth is projected to slow they are still anticipated to drive steel consumption over the outlook period. These countries have considerably lower per capita steel consumption rates compared with developed economies at their peak and will require further investment in housing, infrastructure and manufacturing to further close the gap in living standards.

Figure 2.1: World steel consumption



Source: World Steel Association.

Figure 2.2: Peak steel intensity since 1970



Sources: World Bank; World Steel Association.

Steel consumption in OECD economies was mixed in 2014. Steel consumption in the US and South Korea is estimated to have increased (by 0.5 per cent and 1.5 per cent respectively), while consumption in the European Union and Japan is estimated to have decreased (by 0.5 per cent and 2 per cent respectively). Over the outlook period steel consumption across OECD economies is projected to grow, albeit moderately, as economic growth returns to long-run average levels. Their steel intensity of GDP is likely to decline though, as their economies continue to become more dependent on services as a source of growth.

World steel production over the outlook period is projected to average 1.5 per cent annual growth and total 1.8 billion tonnes in 2020.

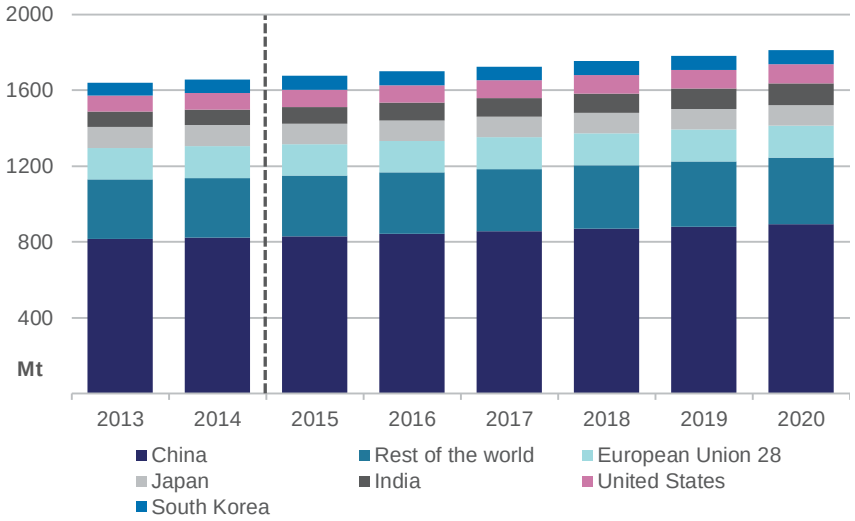
China

China's steel prices fell throughout most of 2014 as an increase in supply entered a market with weak growth. The price of rebar finished the year down 17 per cent to RMB2848, while the benchmark price for hot-rolled sheet declined 13 per cent to RMB3025. The downward trend in steel prices is forecast to continue through 2015 as spare capacity and low consumption growth remain key features of China's steel market.

After a decade of growth driven primarily by fixed asset investment the Chinese Government is planning to rebalance the economy, through market reforms, to increase domestic consumption. The government initiated reforms include freeing credit markets, increasing competition and allowing market forces to have a greater role in allocating resources. Over the medium term, it is expected that final consumption expenditure will account for an increasing share of GDP.

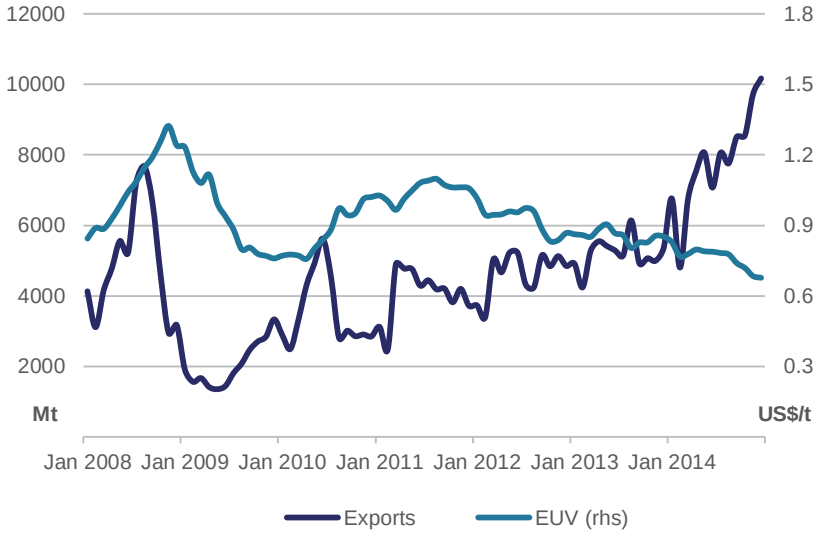
The successful implementation of these reforms will alter the allocation of resources through the economy, boosting the more productive sectors like manufacturing and force cuts in sectors that are over producing, such as steel. Another anticipated outcome of the rebalance is a fall in the share of fixed asset investment in GDP.

Figure 2.3: World steel production



Source: World Steel Association.

Figure 2.4: China steel exports and export unit value



Source: CEIC.

Table 2.1: World steel consumption (Mt)

	2013	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
European Union 28	154	153	154	154	155	157	160	163
United States	106	107	107	108	110	111	112	113
Brazil	29	30	31	31	32	32	33	33
Russian Federation	50	49	48	49	49	50	50	51
China	772	779	787	799	815	831	848	865
Japan	71	69	69	69	69	69	69	69
South Korea	54	55	56	56	57	58	58	59
India	81	83	88	92	97	101	108	114
World steel consumption	**1641**	**1652**	**1660**	**1686**	**1716**	**1747**	**1780**	**1814**

Table 2.2: Crude steel production (Mt)

	2013	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
European Union 28	165	167	166	166	167	167	168	169
United States	87	88	91	93	95	97	99	101
Russian Federation	69	71	71	72	73	74	75	77
China	815	823	831	843	856	869	882	895
Japan	111	111	111	110	108	107	106	105
South Korea	66	71	72	72	72	73	73	74
India	81	83	88	93	98	104	110	117
World steel production	**1640**	**1658**	**1676**	**1700**	**1725**	**1753**	**1782**	**1812**

f forecast. **z** projection.
Source: World Steel Association.

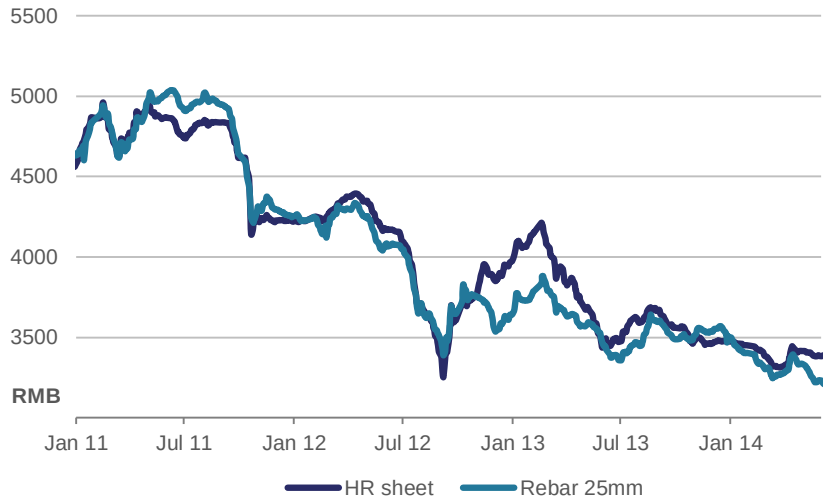
In 1978, less than 20 per cent of China's population lived in urban areas; in 2014 this share was 54 per cent. China's population is anticipated to continue urbanising over the outlook period to around 60 per cent in 2020, as around 100 million people move to the cities. To accommodate this migration China's investment in housing and transport infrastructure, particularly rail, is expected to continue growing over the outlook period. The length of rail track in China is still one-third that of the US and one-sixth of the EU, with both a larger land mass and population. As raised by Wilkins and Zurawski[1], transport infrastructure in China's cities is underdeveloped relative to highly populated cities in OECD economies. For example, Beijing's population is serviced by 26 kilometres of rail per million people, in comparison to 192 kilometres in London, 69 kilometres in Tokyo and 71 kilometres in New York.

In 2014 China's domestic steel consumption growth rate is estimated to have fallen significantly, driven primarily by a 6 per cent contraction in residential construction in the second half of 2014 (year-on-year). Residential construction is a key driver of China's steel consumption as it is ordered in the early stages of construction and accounts for around 48 per cent of China's steel end use. The sharp fall in residential construction was the result of excess stock (floor space awaiting sale rose 25 per cent), falling sales volumes (sales fell 7.6 per cent) and an associated fall in prices. In response the government outlined a series of measures designed to support the housing sector, including lowering interest rates and deposit ratios and expanding credit. These measures are designed to increase housing construction and combined with ongoing urbanisation are anticipated to support a rebound in the housing sector in the short to medium term.

However, the overall effect of the economic rebalance is projected to reduce China's fixed asset investment growth rate and lead to an easing in China's annual steel consumption growth rate.

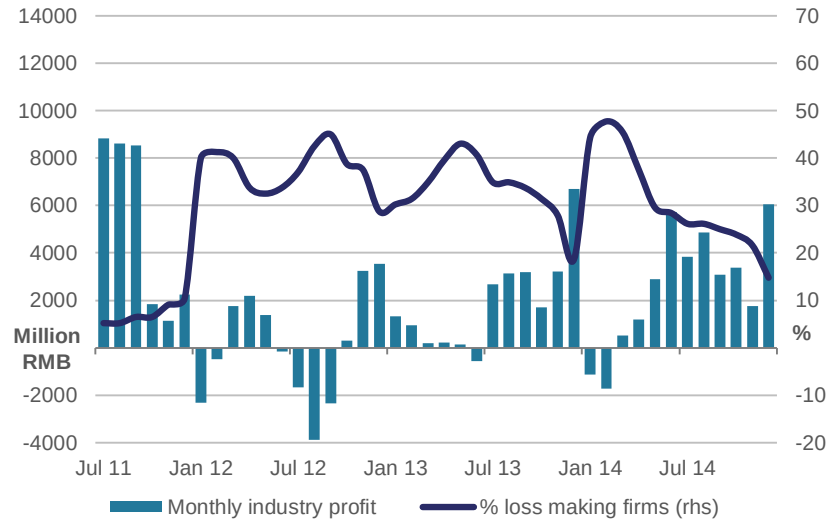
1. Wilkins, K., and Zurawski, A., 2014. *Infrastructure Investment In China*. RBA Bulletin June Quarter 2014.

Figure 2.5: China benchmark steel prices



Source: Bloomberg.

Figure 2.6: China steel industry profitability



Source: CEIC.

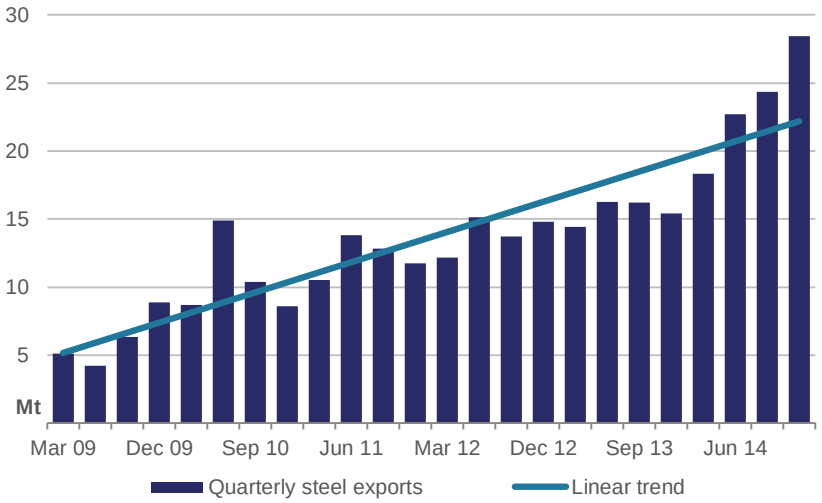
As a result, China's annual steel consumption growth rate is projected to fall from the 13 per cent average recorded over the past decade to around 2 per cent for the next five years with steel consumption projected to total 865 million tonnes in 2020.

Over the past decade China's steel production capacity increased 193 per cent as large scale integrated steel mills were built across China. This growth turned the corner in 2014 as market reforms began to impact marginal producers. However, China's steel production is still estimated to have reached a new record high of 823 million tonnes in 2014, 0.9 per cent higher than 2013. This below trend growth in 2014 followed a very high growth rate of 15 per cent in 2013.

China's steel production is centred in the central and coastal regions of China, particularly Hebei, Jiangsu and Shandong. Together these three provinces account for around 60 per cent of China's steel production. It is in these regions that market reforms and increased environmental regulation are having the greatest impact. In an effort to cut overcapacity in China's steel market, currently estimated at around 200 million tonnes, the government announced that 80 million tonnes of steel capacity will be removed from the market by 2017 and specified that no new capacity will be approved until that time. In addition, the Environmental Protection Law that came into effect in January 2015 increased the penalty for non-compliance to encourage older, higher polluting steel mills to exit the market.

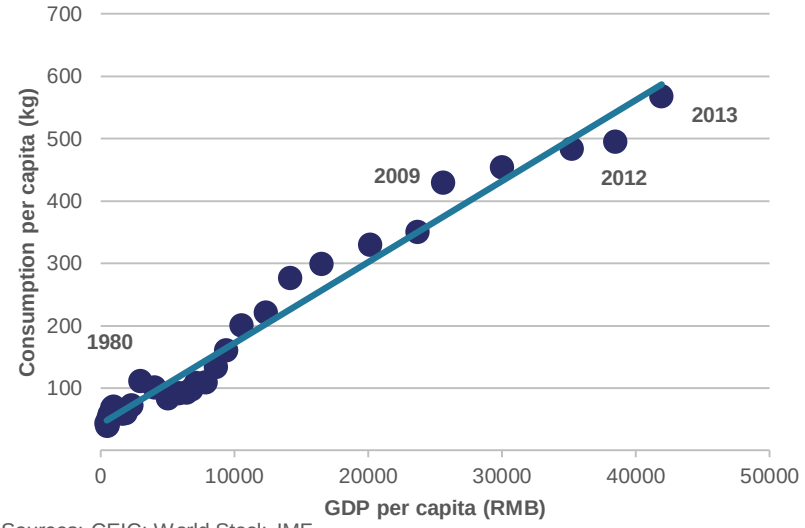
China's steel inventories declined through 2014 and finished the year at 11 million tonnes, 14 per cent below the end of 2013. China's steel inventories began falling in February 2014 as difficult operating conditions led mills to liquidate their stock. With the local market already oversupplied, mills increased their sales to international buyers. This contributed to China's steel exports increasing by 50 per cent in 2014 to 94 million tonnes. Coinciding with this rise the export unit value fell 21 per cent (year-on-year). The increase in exports was also supported by an export tax rebate for steel products containing boron and covered around 40 per cent of China's steel exports (the export tax rebate was cut in January 2015).

Figure 2.7: China steel exports



Source: CEIC.

Figure 2.8: China steel intensity

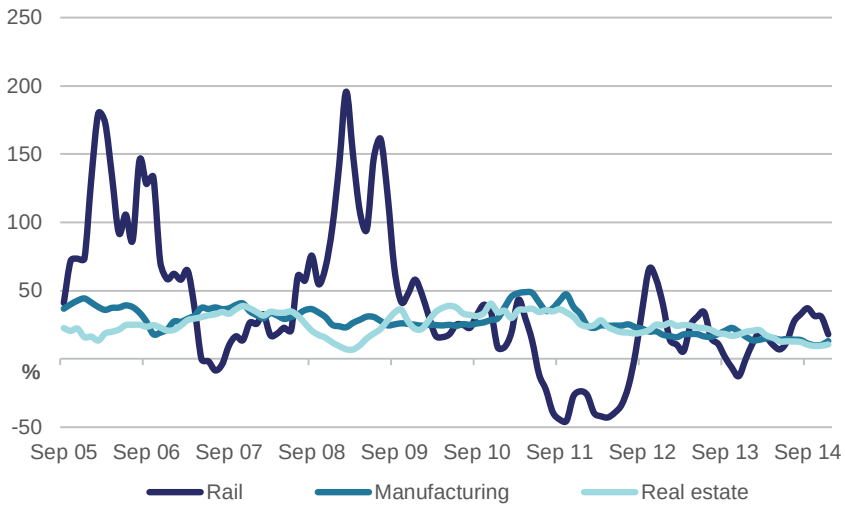


Sources: CEIC; World Steel; IMF.

At prevailing high levels, China's steel exports are unlikely to remain sustainable over the outlook period. World steel consumption growth will need to accelerate to absorb any future growth in China's steel output which appears unlikely. A number of countries are now starting to resist further growth in steel imports from China and protect their domestic steel industries by establishing trade barriers. China's steel exports are also likely to be effected by a cut in the government's export tax rebate.

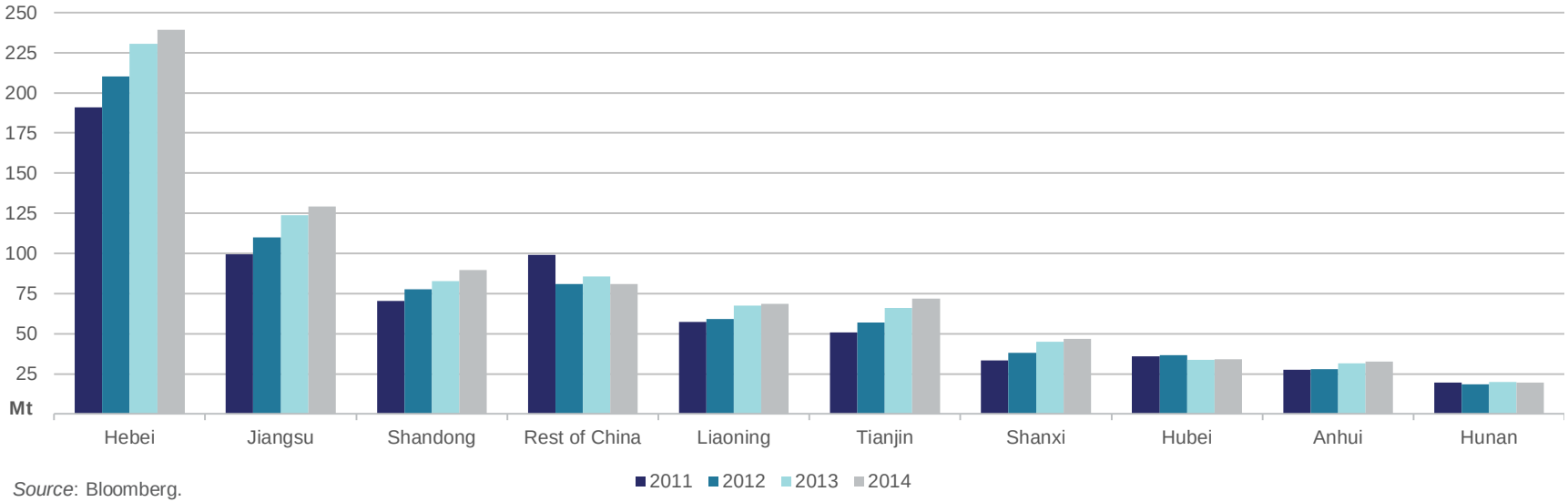
Steel exports provided an important source of revenue for mills in 2014 as the proportion of loss making steel mills decreased substantially, from 44 per cent in January to 15 per cent in December. In addition, steel mills were aided with a 47 per cent fall in the price of iron ore and a 22 per cent fall in the price of metallurgical coal.

Figure 2.9: China fixed asset investment (3mma)



Source: CEIC.

Figure 2.10: China crude steel production by region



Source: Bloomberg.

China's steel production is projected to continue growing over the medium term, averaging 1.4 per cent annual growth to total 895 million tonnes in 2020 supported by increasing consumption demand. However, steel exports pose a significant risk to China's steel production over the outlook period. A substantial cut in exports without an associated increase in domestic consumption would lead to the closure of marginal producers and the possibility of a fall in China's steel production.

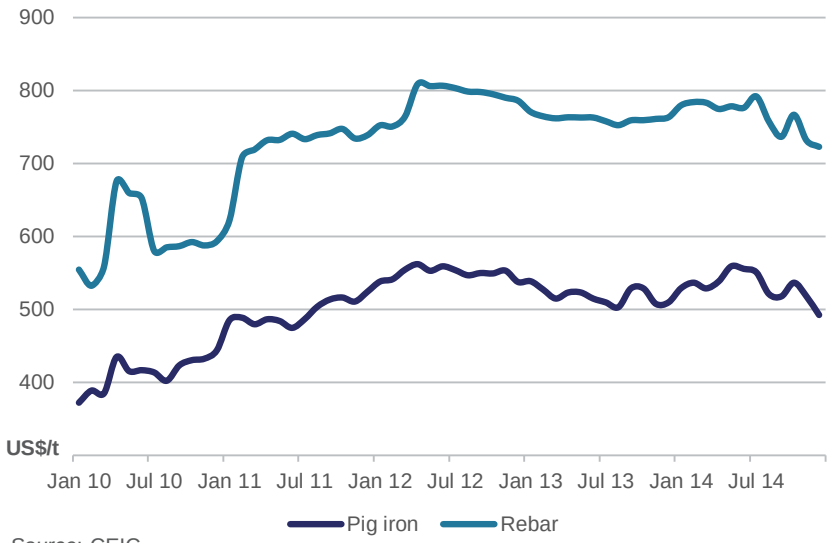
India

Steel prices in India fell through 2014 as cheap imports from China increased the supply of steel. In 2014, the price of pig iron and rebar fell 7 per cent to finish the year at US$493 and US$723, respectively. While the falls were not to the same extent as those recorded in China, it is affecting profitability and displacing domestically produced steel. As a result, India's steel mills have been lobbying the government to raise import duties and strictly implement steel quality standards on imports.

Unlike China, India's steel industry is primed for a period of expansion. The Indian Ministry of Steel is planning to increase steel production to 300 million tonnes by 2025, about 300 per cent higher than current production. Investment in new capacity is underway, but at slow rates that puts achieving such targets at risk. In an attempt to reach this target the government plans to cut regulatory hurdles and speed up approvals (particularly with land access); improve access to raw materials, including iron ore and coking coal; and improve access to foreign direct investment.

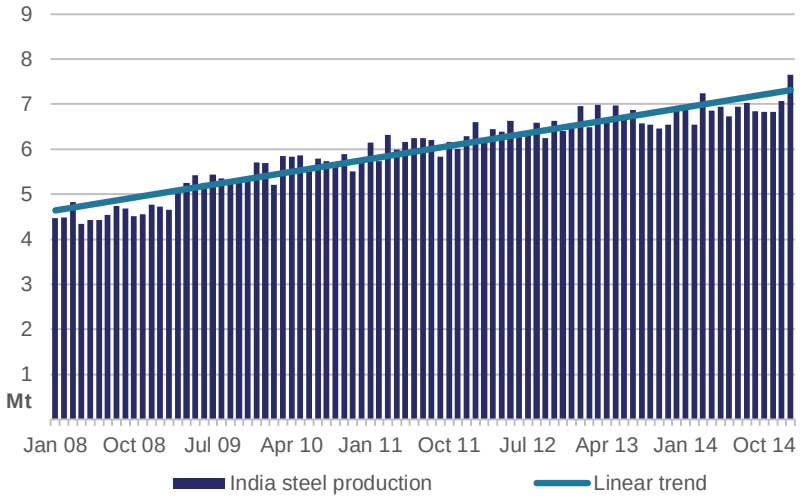
Initial results indicate that these initiatives are having an impact with several large integrated steel mills receiving state and federal development approval with a further US$97 billion in investment earmarked. If these projects proceed, they could add up to 130 million tonnes in annual steel production capacity by 2025. In addition, India's Purchasing Managers Index (PMI) increased to 52.9 in January which was the ninth straight month of expansion and signifies that market sentiment is optimistic and demand for steel is likely to continue expanding in the medium term.

Figure 2.11: India benchmark steel prices



Source: CEIC.

Figure 2.12: India steel production



Source: CEIC.

However, there is a significant risk that Indian steel production will not reach this target by the deadline. Currently there are only two large integrated steel mills under construction (a third is a mini-mill) with one in the feasibility stage and another seeking regulatory approval.

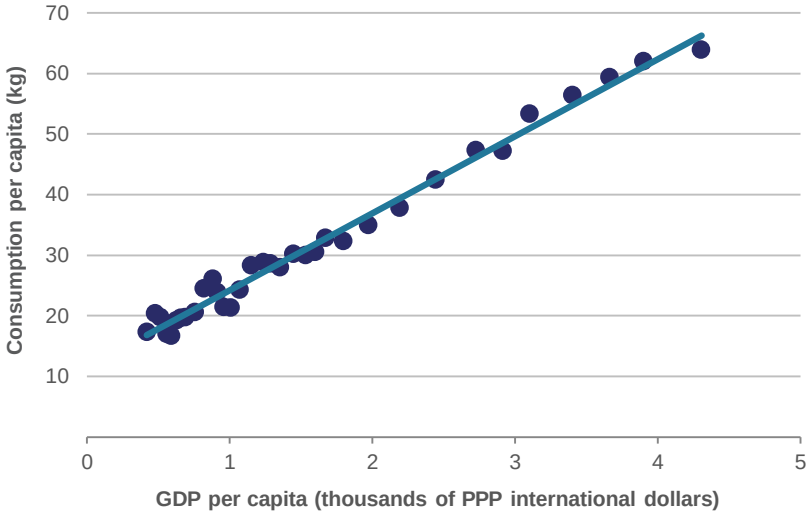
Access to sufficient raw materials to support higher steel production, like iron ore, will be another challenge for Indian steel producers. The Indian Supreme Court imposed closure of iron ore mines in 2010 has only recently been lifted and production has been slow to restart. As a result, Indian steel mills began importing substantial volumes of iron ore in 2014, although transporting the ore from the port has proven to be time consuming and expensive.

Over the outlook period India's steel production is projected to increase 5.8 per cent a year to total 117 million tonnes in 2020 supported by additional capacity. Should India commission mills at a faster than expected rate, steel production will be higher than projected.

India's steel consumption is estimated to have increased 2.5 per cent in 2014 to 83 million tonnes. Steel consumption in India has been erratic as investment in fixed assets like road and rail is regularly stifled by regulation. The government has committed to removing these impediments and is also planning to lift infrastructure investment, including expenditure on rail, roads and public housing. The government's plans are expected to support a projected 5.3 per cent average annual growth rate over the outlook period, to 114 million tonnes in 2020.

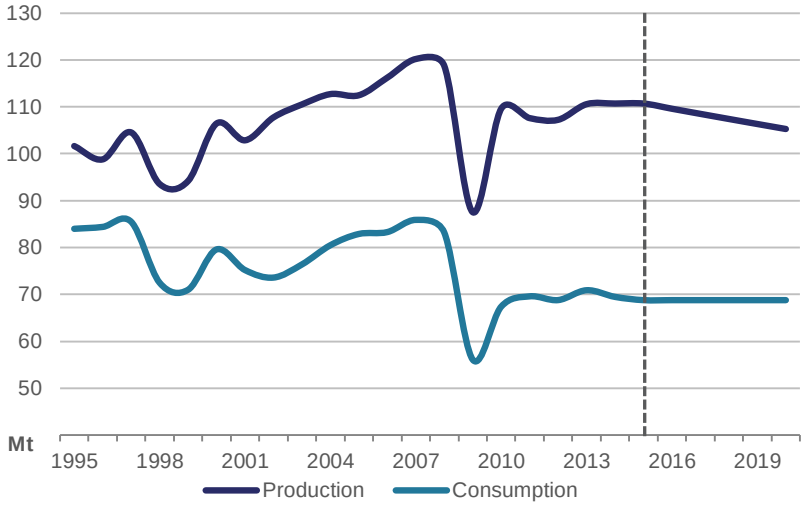
Increasing urbanisation in India could potentially increase India's steel consumption. In 2013 approximately 31 per cent of India's population lived in an urban area, considerably lower than the average for Asia which is 42 per cent. India is urbanising at an annual average rate of 2.5 per cent a year. An increase in the annual rate of urbanisation will drive up the residential and infrastructure construction growth rate, which accounts for approximately 66 per cent of India's steel consumption.

Figure 2.13: India steel intensity



Sources: CEIC; World Steel; IMF.

Figure 2.14: Japan steel production and consumption



Source: World Steel Association.

Japan

Japan's steel consumption is estimated to have contracted 2 per cent in 2014 to 69 million tonnes as a short recession affected domestic consumption. Steel exports, which struggled against competition from China and South Korea, fell 3 per cent to 42 million tonnes. Over the outlook period Japan's steel consumption is projected to remain unchanged at around 69 million tonnes a year, supported by stable domestic consumption.

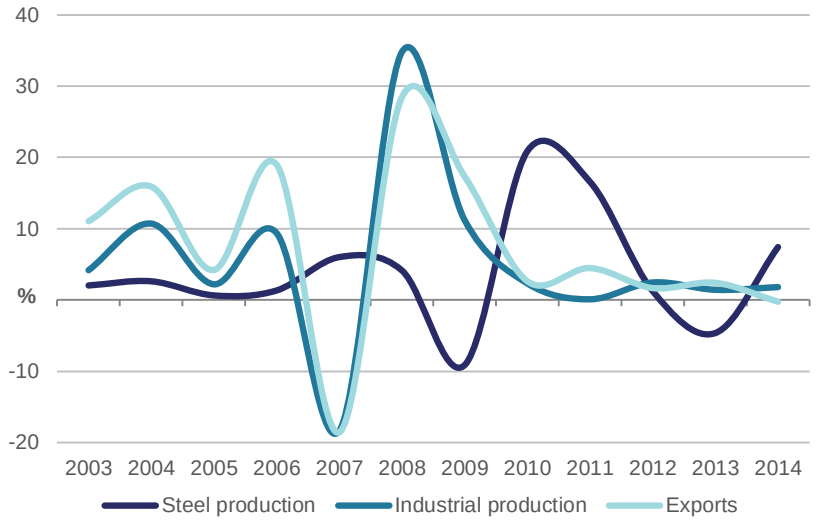
In 2014 Japan's steel production is estimated to have grown by less than 1 per cent to 111 million tonnes. In 2015 Japan's steel production is forecast to remain at around 111 million tonnes before starting to contract by 1 per cent a year to 105 million tonnes in 2020. Production is projected to decrease as manufacturers relocate overseas and competition from China and South Korea increases.

A prolonged period of deprecation in the Yen and a proposed US$8.5 billion regional development plan may benefit Japan's steel production. A prolonged period of currency deprecation may encourage Japanese companies to relocate manufacturing plants back into the country, or at least slow the rate they are moving offshore, and result in higher than forecast domestic steel production. While an extension to the government's current fiscal stimulus may increase fixed asset investment and demand for steel.

South Korea

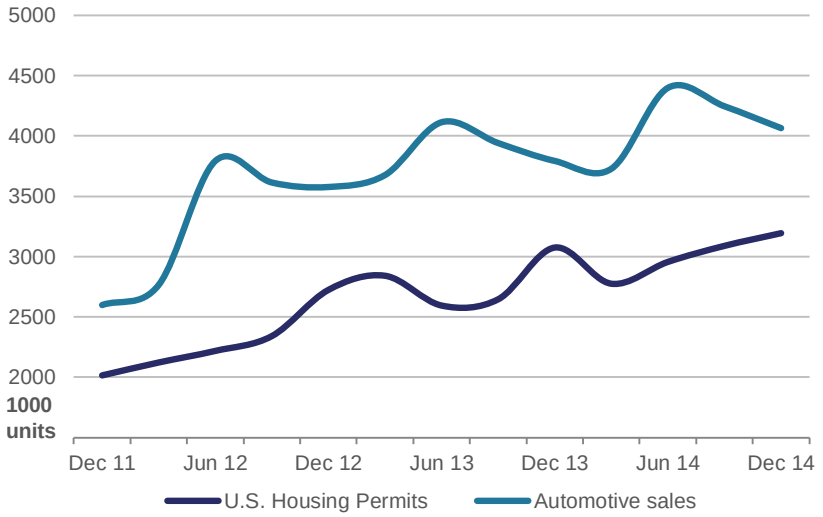
In 2014 South Korea is estimated to have increased steel consumption by 1.5 per cent to 55 million tonnes. Over the outlook period South Korea's steel consumption is projected to average 1.2 per cent annual growth to reach 59 million tonnes in 2020. Steel intensive manufacturing, like cars and ships, and the construction sector are projected to support growth over the outlook period. The government's Construction Economy Research Institute of Korea expects expansion in the sector over the outlook period.

Figure 2.15: South Korea's change in steel use



Sources: Bloomberg; World Steel Association.

Figure 2.16: US steel end-use growth



Source: Bloomberg.

South Korea's steel production is estimated to have increased 7.4 per cent in 2014 to 71 million tonnes. This increase was a considerable achievement given China's steel exports to South Korea grew 35 per cent (year-on-year) to 13.4 million tonnes. China's steel surplus and export tax rebate combined with South Korea's liberal import tax policy combined to drive the increase in imports.

The cut in China's export tax rebate and low inventories is anticipated to provide some relief to South Korean producers. However, any relief is likely to be short-lived as steel surpluses in China are projected to feature over the medium term and a sustained period of high steel imports from China presents a risk to South Korea's production.

Over the outlook period South Korea's steel production is projected to average 0.6 per cent annual growth to 74 million tonnes in 2020, supported by steel intensive exports.

United States

US steel consumption in 2014 is estimated to have grown 0.5 per cent to 107 million tonnes. Growth was supported by an increase in residential construction and automotive manufacturing, which account for around 40 per cent and 25 per cent of end steel use respectively. Over the outlook period steel consumption is projected to grow by around 0.9 per cent a year to 113 million tonnes in 2020, supported by ongoing growth in construction and manufacturing.

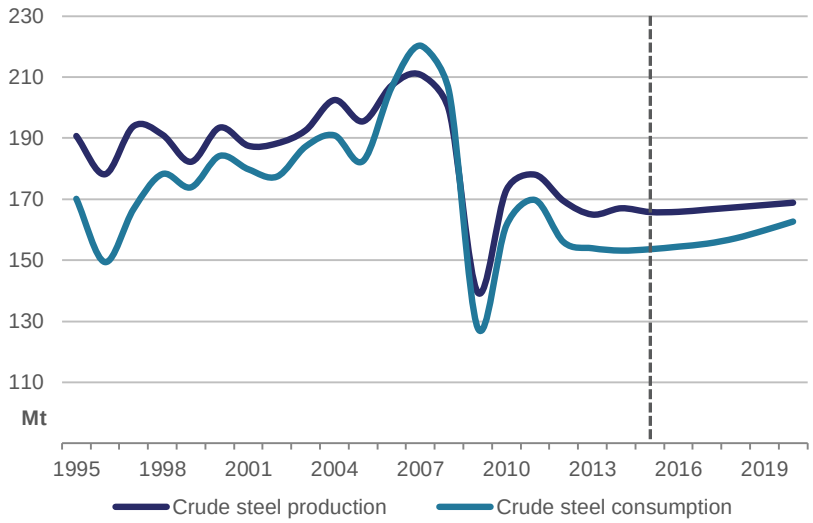
Growth in steel products used in these sectors is anticipated to offset a decline in US pipeline consumption. The shale oil revolution supported 10 per cent annual growth in use for pipe construction for a number of years; however, the fall in the price of oil in 2014 led to widespread destocking of pipe inventory as shale oil projects were delayed or cancelled. With no recovery in sight for the shale oil sector, US pipe consumption is anticipated to weigh down overall steel consumption through the outlook period.

In 2014 US steel production is estimated to have grown 1.5 per cent to 88 million tonnes as cheap energy helped lower the cost of domestic production.

Over the outlook period US steel production is projected to average 2 per cent growth to 101 million tonnes, supported by increased domestic consumption and low cost energy. US steel mills have been switching to gas as a power source, helping them to lower the cost of production and cut their reliance on imports.

Cheap steel imports from Asia have been a challenge for the US steel industry. The US Government has introduced trade tariffs to protect local steel producers from perceived dumping from South East Asia. However, the WTO has ruled that some US import tariffs are inconsistent with free trade principles. The outcome of this trade dispute could have an impact on US steel production over the outlook period as a substantial cut in import tariffs could result in domestic US products being displaced by imports.

Figure 2.17: EU 28 steel market



Source: World Steel Association.

European Union

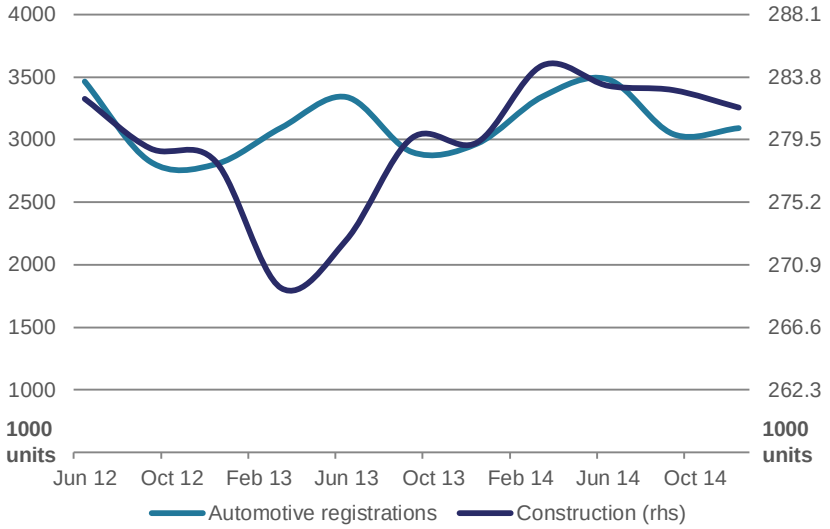
EU steel consumption is estimated to have contracted 0.5 per cent in 2014 to 153 million tonnes which coincided with generally moribund economic growth in the region. In 2015 EU steel consumption is forecast to rebound, albeit marginally, and grow 0.3 per cent to 154 million tonnes. The persistent spectre of recession amid a climate of continued sovereign debt will remain a key risk to this forecast increase. Further austerity cuts and reduced business investment could easily result in steel consumption declining further in the EU in 2015.

Over the remainder of the outlook period EU steel consumption is projected to grow by around 1.2 per cent a year to 163 million tonnes in 2020 as key EU economies are expected to emerge from the Eurozone debt crisis and increase investment in infrastructure.

EU steel production is estimated to have increased 1.2 per cent in 2014 to 167 million tonnes led by an increase in German and UK manufacturing activity. Over the outlook period EU steel production is projected to increase by 0.2 per cent to 169 million tonnes.

Ukraine steel production, a key producing region in the EU, has been disrupted by civil war. If these hostilities cease, then steel production in the Ukraine may increase and contribute to higher steel output in the EU.

Figure 2.18: European end-use growth



Source: Bloomberg.

Iron ore

Ben Witteveen

A further increase in iron ore supply combined with weak steel production growth in China is projected to drive prices lower in 2015 and into 2016. Prices are expected to rebound over the medium term as higher cost producers exit the market and growth in steel markets rebounds.

Prices

Another year of record Australian iron ore production combined with weak demand fundamentals in China drove the iron ore price down 47 per cent in 2014 to an average of US$88 (FOB). Unlike previous years, the persistent fall in prices in 2014 reflected the market balance shifting to oversupply rather than the typical volatile pricing cycles associated with seasonal inventory build-up in China. Throughout most of the past twelve months, iron ore producers have engaged in constant price cutting to move their production volumes in an increasingly competitive environment with some producers already operating at a loss.

Over the past five years seaborne iron ore trade has grown by 40 per cent. This increase, combined with moderating consumption, led to record stocks at China's ports throughout most of 2014. High stocks and increased supply availability in 2014 reduced supply risks previously experienced by China's steel mills during the periods of undersupply. Steel mills appear to have responded by no longer holding large inventories of iron ore in preparation for seasonal factors that disrupt iron ore availability as they can purchase cargoes as required.

China's domestic production of iron ore has proven to be far more resilient than expected in the face of falling prices. Raw production in 2014 increased by 4 per cent (year-on-year).

Figure 3.1: Iron ore and steel prices

Source: Bloomberg.

Figure 3.2: Iron ore price cycle

Source: Bloomberg

The viability of China's iron ore industry, which typically produces low grade ore with high operating costs associated with the concentration process, will be a key testing ground for the government's commitment to implement market based reforms and reduce support to inefficient producers.

Around 22 per cent of China's iron ore producers are loss making and at risk of closing without the continued support of either the provincial or national government. China's domestic iron ore concentrate production continued to attract a price premium in 2014 of around $42 a tonne in the fourth quarter. At such levels, steel producers that are struggling to remain commercially viable are likely to find imported materials increasingly attractive.

Premiums for lump continued to hold in 2014 as China's steel producers increased their demand for direct feed ore. Fines must first be sintered prior to loading into the blast furnace. Sintering is energy intensive and is the highest generator of pollution in the steel production process. Lump on the other hand can be directly fed into the blast furnace, cutting production costs and pollution. The premium for lump surged to US$21 a tonne in the fourth quarter 2014 and given the introduction of tighter environmental controls on 1 January 2015 this premium is forecast to grow.

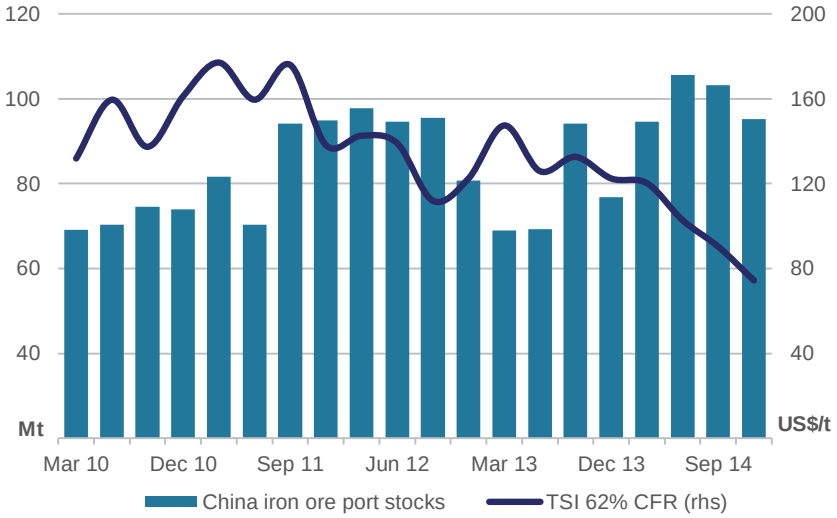
For 2015 the iron ore price is forecast to average US$60, down 31 per cent from 2014. China's steel consumption growth is forecast to remain lacklustre through 2015, dampening consumption growth for iron ore while an additional 111 million tonnes of production is forecast to enter the seaborne market. Some high cost suppliers are expected to exit, but the market is likely to remain oversupplied in the short term. The depreciation of major suppliers' currencies against the US dollar (which iron ore prices are denominated in) will add further pressure on prices as cash margins in local currencies will be maintained even at lower prices.

In response to falling prices iron ore miners around the world have turned their focus to cutting production costs and improving productivity. This focus is expected to continue through the medium term, and in the current climate of stronger competition provide more downwards pressure on prices.

Figure 3.3: Iron ore prices, FOB Australia

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

Figure 3.4: Iron ore price and China port stocks



Source: Bloomberg.

The issue for assessing the price outlook in the medium term then becomes how low producers can cut their costs and whether cuts to capital and staff can be sustained. Producers at the higher end of the cost curve appear to be limited in delivering further cuts and face the risk of closure as more output from new low cost mines enters the market in coming years.

Large producers such as Vale, Rio Tinto and BHP Billiton are all targeting higher production over the next five years and have significant cost advantages due to the scale of their operations and their superior ore grades.

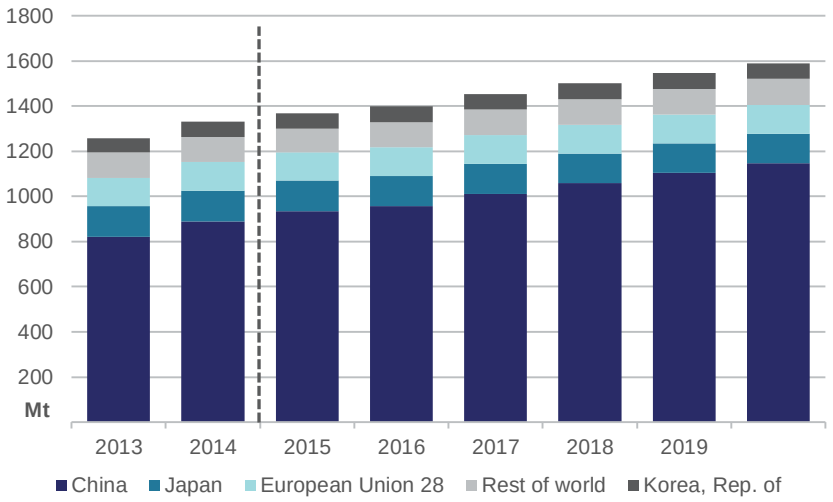
In 2016 prices are projected to fall further as increased supply enters a weak market and average US$56 (in 2015 dollars) for the year, before rebounding to average US$73 (in 2015 dollars) in 2020. Over the outlook period increasing supply from Australia and Brazil is expected to continue driving higher cost producers out of the market, easing some of the oversupply but creating a lower price environment. China's steel consumption growth is projected to pick up in the medium term, providing some price support in what should be a more consolidated seaborne market. However, China's residential construction growth rate remains a key area of uncertainty and presents a significant risk to iron ore prices.

World trade in iron ore

Overview

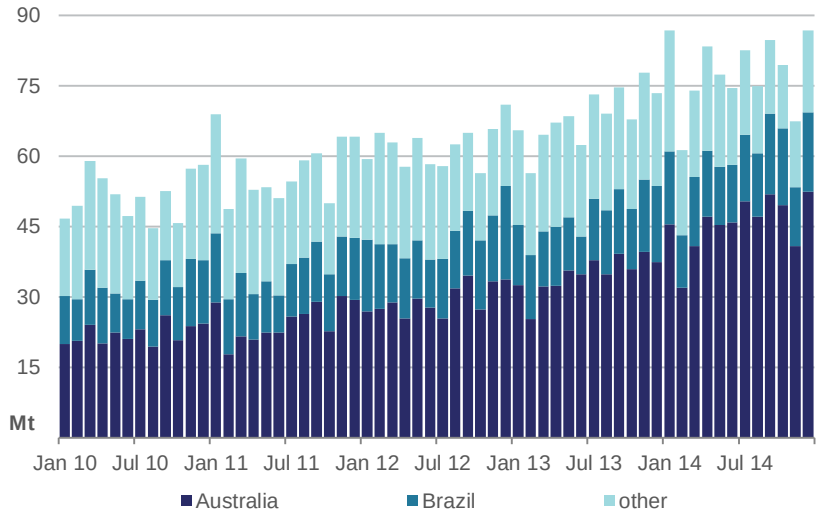
Global iron ore trade is estimated to have increased 9 per cent in 2014 to 1.3 billion tonnes. Supply from Australia is estimated to have increased 24 per cent to 717 million tonnes and iron ore imports into China by 8 per cent to 889 million tonnes. In 2015 iron ore trade is forecast to increase by 4 per cent to 1.4 billion tonnes, supported by an increase in supply from Australia and Brazil and an increase in China's imports. Over the outlook period world trade is projected to increase at an average annual rate of 2.8 per cent to total 1.6 billion tonnes in 2020, underpinned by an increase in the import share of China's iron ore consumption. Higher exports from Australia and Brazil are expected to be partially offset by a decrease in exports from high cost smaller producers around the world.

Figure 3.5: World iron ore import destinations



Source: UNCTAD.

Figure 3.6: China iron ore import volumes



Source: Bloomberg.

Table 3.1: World iron ore imports (Mt)

	2013	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
European Union 28	126	128	126	127	127	128	129	129
Japan	136	135	135	134	132	131	130	129
China	820	889	935	957	1011	1059	1105	1148
Korea, Rep. of	63	67	68	68	69	69	70	70

Table 3.2: World iron ore exports (Mt)

	2013	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
Australia	579	717	792	851	884	908	934	935
Brazil	330	363	388	410	424	464	484	509
India (net exports)	9	2	5	4	7	9	12	15
Canada	36	34	27	25	24	23	22	21
South Africa	48	46	41	36	31	28	25	23
World iron ore trade	**1 224**	**1 336**	**1 393**	**1 435**	**1 478**	**1 525**	**1 566**	**1 595**

f forecast. **z** projection.
Source: World Steel Association.

Iron ore imports

China's domestic iron ore producers faced a difficult year in 2014. While production increased by 4 per cent (year-on-year), the number of mines reporting a loss increased from 15 per cent at the start of 2014 to 22 per cent in December. China's iron ore producers were unable to lower price premiums for domestic concentrate in line with the fall in the price of seaborne iron ore, creating a significant price gap between the two substitutes and an increase in the use of seaborne iron ore.

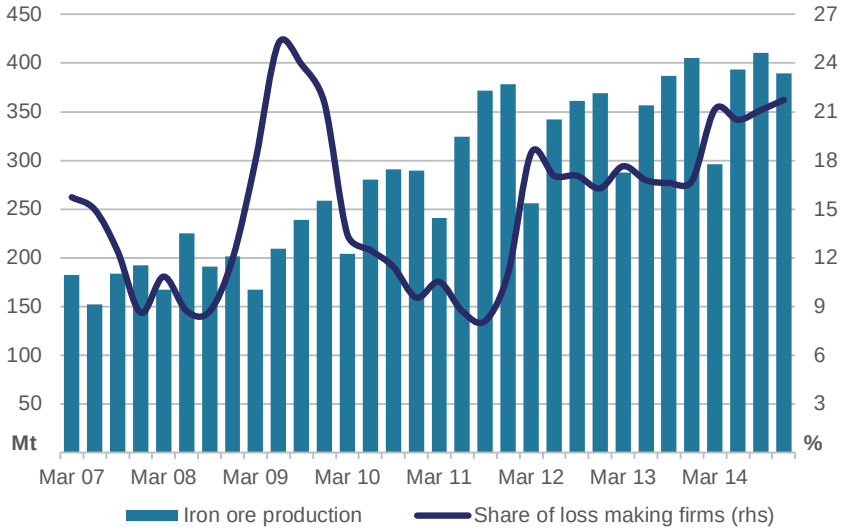
Australia's share of China's iron ore imports increased to 60 per cent in 2014 up from 50 per cent in 2013. This came at the expense of smaller, higher cost producers in South Africa, Iran and the Ukraine whose share of imports fell to 19 per cent during the year (from 30 per cent at the start of the year). Brazil's share of China's imports remained steady during the year at around 20 per cent.

In 2015 China's iron ore imports are forecast to increase by 5 per cent to 935 million tonnes. China's steel mills are forecast to face difficult operating conditions in 2015 with low steel prices and oversupply likely to be key features of the market. As a result they are forecast to continue their switch from higher cost domestic iron concentrate to cheaper seaborne iron ore, predominantly from Australia and Brazil. This trend is forecast to lead to further closures of high cost, low grade producers, both in China and around the world through 2015. However, any large scale mine closures are likely to test the government's commitment to market reform given that these mines are major regional employers.

Over the remainder of the outlook period China's iron ore imports are projected to increase at an average annual rate of 4.2 per cent and to total 1.2 billion tonnes in 2020. Imported iron ore is expected to retain its competitive advantage over domestically produced material and account for an increasing share of China's iron ore consumption.

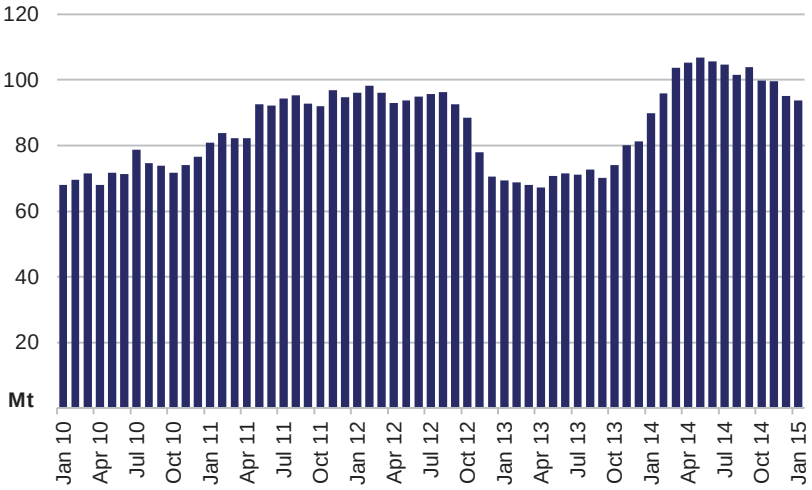
Japan's imports of iron ore are estimated to have decreased slightly in 2014 to 135 million tonnes, following a contraction in their steel production.

Figure 3.7: China domestic iron ore production



Sources: Bloomberg; CEIC.

Figure 3.8: China port inventories



Source: Bloomberg.

Over the outlook period Japan's imports of iron ore are projected to decrease by an average 0.8 per cent a year to total 129 million tonnes in 2020. A projected decrease in Japan's steel production during this period is anticipated to drive this contraction.

In 2014 South Korea's imports of iron ore are estimated to have increased 6.6 per cent to 67 million tonnes. Over the outlook period South Korea's imports are projected to average 1 per cent annual growth to 70 million tonnes in 2020.

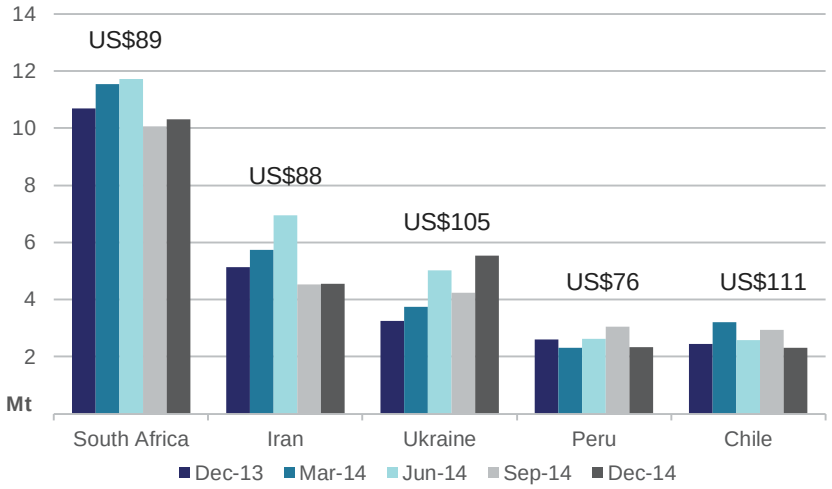
Iron ore exports

In 2014 Australia's iron ore exports continued to grow rapidly as a result of new mine capacity that started and ramped up to full production rates. Export volumes are estimated to have increased 24 per cent to a new record 717 million tonnes. The increase is the result of brownfield mine expansions in the Pilbara like Newman Jimblebar, the start of production at Kings Mine (part of the Solomon Hub) and infrastructure improvements, particularly in rail and ports.

In 2015 Australia's iron ore exports are forecast to increase by a further 11 per cent to 792 million tonnes. The increase will be supported by the start of production at Roy Hill, which at capacity is expected to produce around 55 million tonnes a year of high grade iron ore, and further output increases from Australia's major producers in the Pilbara. A period of subdued prices is unlikely to impact most Pilbara miners as they are some of the world's cheapest producers; even at prevailing prices most iron ore mines in Australia have positive cash margins. Nevertheless, lower industry profits are likely and Pilbara producers can be expected to continue driving cost and productivity improvements to maintain their market positions.

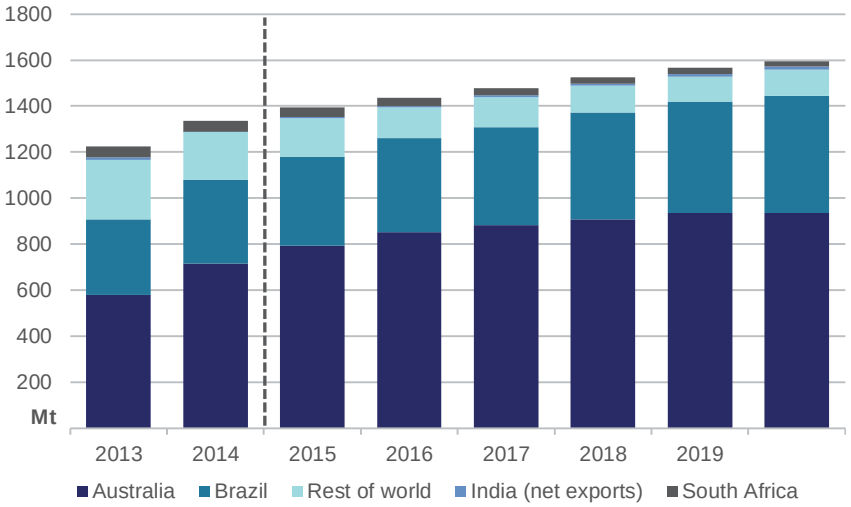
Over the remainder of the outlook period Australia's iron ore exports are projected to grow at an average annual rate of 3.4 per cent to 935 million tonnes in 2020. Increased production will be supported mainly by improving productivity, expanding capacity at existing mines and debottlenecking activities.

Figure 3.9: China's minor import sources and CFR costs



Sources: Bloomberg; AME.

Figure 3.10: World iron ore export sources



Sources: UNCTAD.

The introduction of new technologies such as driverless trucks and trains and increased use of information technology, is projected to increase production while reducing operating costs. However, the current operating environment is placing pressure on marginal producers, which may lead to the eventual closure of some Australian mines over the short to medium term if prices decline further.

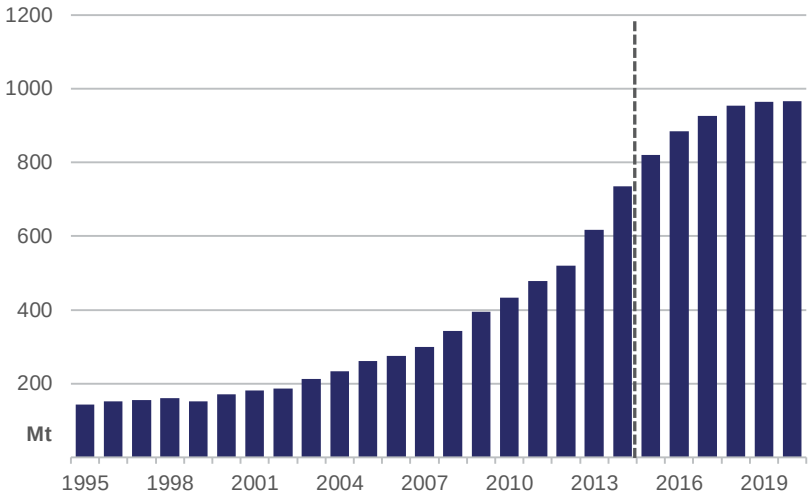
Brazil's iron ore exports are estimated to have increased 10 per cent in 2014 to 363 million tonnes. In 2015 Brazil's exports of iron ore are forecast to increase by 7 per cent to 388 million tonnes, supported by an increase in production at the recently commissioned Minas Rio mine and the use of the Valemax bulk freight vessel that have recently been approved to dock at ports in China.

With a carrying capacity of 400 000 tonnes and in an environment of lower petroleum and shipping costs, the use of the Valemax vessel will improve the competitive position of Vale in the Asia-Pacific market. Depending on future oil prices, Vale may fall below Rio Tinto and BHP Billiton on the iron ore cost curve.

Over the remainder of the outlook period iron ore exports from Brazil are projected to increase by 5.6 per cent a year to 509 million tonnes in 2020. Growth will be supported by expansions to existing mines and the completion of the 90 million tonne Serra Sul mine (or S11D project). Serra Sul is anticipated to be one of the lowest cost iron ore mines in the world and is expected to be profitable in the current market.

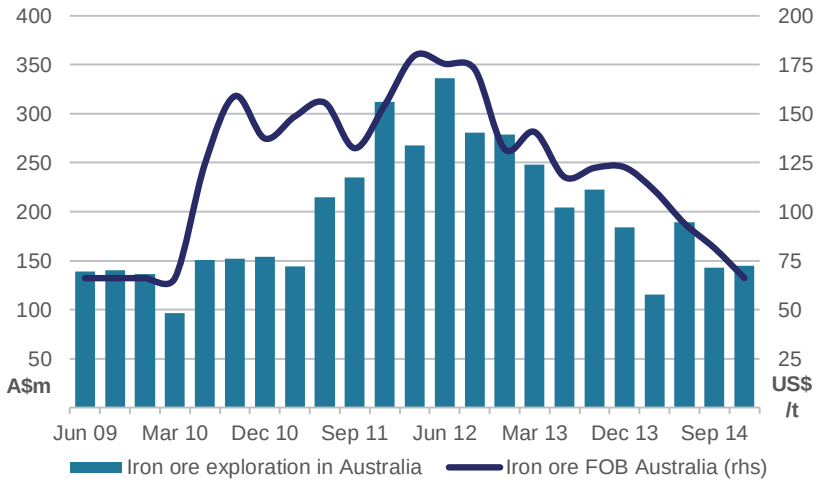
In 2014 Indian exports appear to have been negligible. In 2010 India's Supreme Court and state governments imposed production restrictions on iron ore mines operating in Karnataka, Goa and Odisha in an attempt to clamp down on illegal mining. This ban was lifted in April 2014; however, the restart of operations has been slow with around three-quarters of India's iron ore mines still estimated to be idle. Further, in order to conserve iron ore for India's steel industry the government increased freight charges for iron ore exports as well as royalty payments and export duties. These hurdles combined with a low seaborne price of iron ore led several large Indian steel producers to begin importing the raw material for the first time in 2014.

Figure 3.11: Australia annual iron ore production



Sources: Company Reports.

Figure 3.12: Australia iron ore exploration



Sources: ABS; Bloomberg.

Despite the tough operating conditions that India's iron ore miners now face exports are forecast to increase in 2015 as mines gradually reopen in Goa, an iron ore exporting hub, and begin production. However, the total tonnage is expected to be negligible. Over the remaining outlook period India's exports are projected to increase although they are not expected to approach anywhere near their pre-2010 peak, which was around 155 million tonnes a year.

Over the outlook period exports from other iron ore producing countries, including the Ukraine, South Africa and Iran are projected to decrease. Their higher production costs, primarily due to lower grade ore and infrastructure constraints, will reduce their ability to operate at a profit in an environment of low prices and plentiful supply.

Production at Simandou, a large undeveloped iron ore deposit in Guinea, is not expected to materially impact the supply of iron ore over the outlook period. Due to the project's substantial capital cost, difficulties in developing essential infrastructure and forecast lower iron ore prices the project is not expected to receive a positive final investment decision that will support production before 2020.

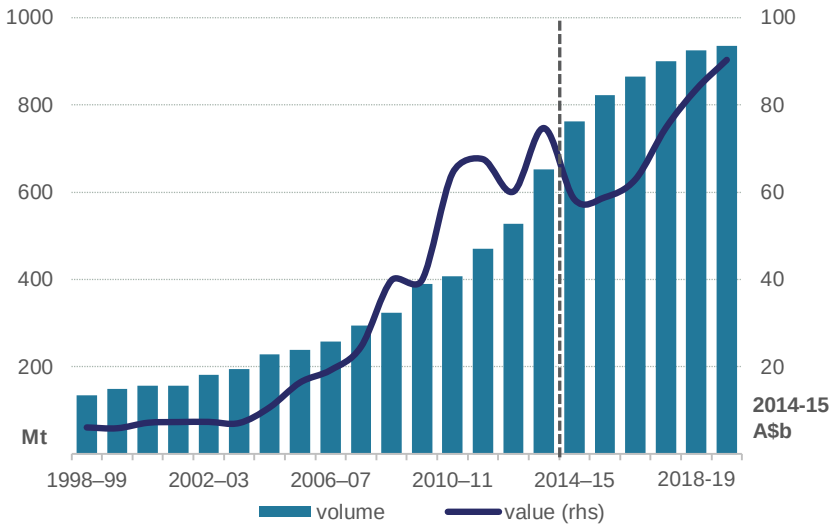
Australia

Iron ore exploration fell 21 per cent (year-on-year) in the December quarter. The fall is due to the significant increase in supply that occurred over the past few years and the subsequent fall in price through 2014. Iron ore exploration expenditure is not projected to rebound over the outlook period as the medium term outlook for the price of iron ore is not anticipated to encourage greenfield development.

A cost cutting drive by Australian producers in 2014 led to a reduction in operating expenses, low stockpiles (producers sold more iron ore than produced), a cut in exploration expenditure and delayed capital spending. As some of the cuts were one-off, like exploration, capital expenditure is anticipated to increase in the medium term.

In the drive to cut costs Australian producers received considerable assistance through a lower Australian dollar and a fall in the price of oil.

Figure 3.13: Australia's iron ore exports



Source: ABS.

The lower Australian dollar improved operating margins as the price of iron ore is denominated in US dollars and costs are primarily in Australian dollars.

The fall in the price of oil also helped reduce operating costs as fuel related costs make up approximately 12 per cent of the cost of production (C1 costs). However, for some miners the fall in the cost of production was not enough to offset the decrease in price and as a result several Australian mines were moved into care and maintenance through 2014.

In 2014-15 Australia's iron ore export volumes are forecast to increase 17 per cent to 763 million tonnes. The increase is forecast to be supported by another financial year of record production from the Pilbara miners. Rio Tinto, BHP and Fortescue have all signalled an increase in 2014-15 production supported by debottlenecking infrastructure initiatives and increased productivity. However, despite an increase in export volumes and a weaker dollar, export values are forecast to decrease by 23 per cent in 2014-15 to $58 billion, weighed down by low iron ore prices.

Over the outlook period Australia's iron ore export volumes are projected to average 4 per cent annual growth and total 935 million tonnes in 2019-20. This increase will be supported by the start and ramp-up of production at Roy Hill and further increases in supply from the major Pilbara producers. Export values are projected to total $81 billion (in 2014-15 dollar terms) in 2019-20 supported by an increase in the price of iron ore through the later years of the outlook period.

Table 2.5: Iron ore outlook

	unit	2014	2015 f	2016 z	2017 z	2018 z	2019 z	2020 z
World								
Prices b								
Iron ore c								
– nominal	US$/t	88.1	60.4	56.8	64.6	71.7	76.7	81.8
– real d	US$/t	90.1	60.4	55.6	61.7	66.9	70.0	73.0
		2013–14	**2014–15f**	**2015–16 f**	**2016–17 z**	**2017–18 z**	**2018–19 z**	**2019–20 z**
Australia								
Production								
Iron and steel gs	Mt	4.53	4.33	4.29	4.25	4.21	4.17	4.13
Iron ore	Mt	677.4	785.8	850.4	893.3	927.2	952.7	962.4
Exports								
Iron and steel gs	Mt	0.87	0.85	0.81	0.80	0.79	0.78	0.78
– nominal value	A$m	724	689	669	656	650	643	638
– real value h	A$m	743	689	652	627	607	588	570
Iron ore	Mt	651.4	762.9	822.3	865.4	899.5	925.2	934.9
– nominal value	A$m	74 671	57 627	58 813	62 908	74 719	83 575	90 299
– real value h	A$m	76 687	57 627	57 378	60 052	69 792	76 384	80 753

b fob Australian basis **c** Spot price, 62% iron content basis. **d** In current calendar year US dollars. **e** Contract price assessment for high-quality hard coking 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 current financial year Australian dollars.
f forecast. **s** estimate. **z** projection.
Sources: ABS; World Steel Association; UNCTAD.

Metallurgical coal

Kate Penney

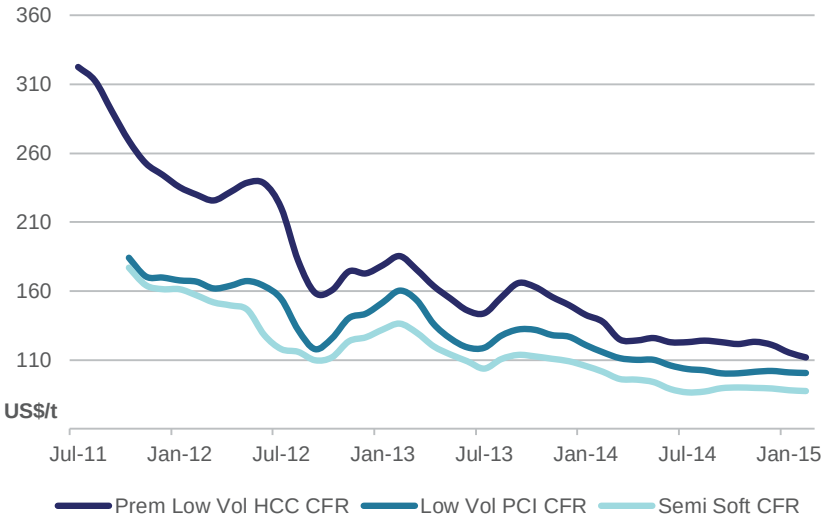
Metallurgical coal prices were relatively stable in 2014, unlike other bulk commodities, indicating the market is closer to balance. A strengthening US dollar and lower fuel prices have reduced costs in major producing regions. This has encouraged some price competition and supported a slight drop in prices in early 2015. The market balance is expected to tighten from 2016 as increased steel production in China and India and the closure of high-cost production capacity reduces supply availability.

Prices

After declining by US$20 a tonne in the first three months of 2014, metallurgical coal spot prices were relatively stable over the remainder of the year. Prices for low volatility hard coking coal (CFR China) declined by 22 per cent to average US$126 a tonne in 2014 in response to surplus supply and weaker import demand from China. However, there was some variation across grades. Lower prices encouraged some producers to focus on increasing production of higher value hard coking coal to maintain their revenue stream or opted to sell semi-soft coal as a premium thermal coal. As a result, some tightness in semi-soft coal supply emerged towards the end of the year and contributed to higher prices.

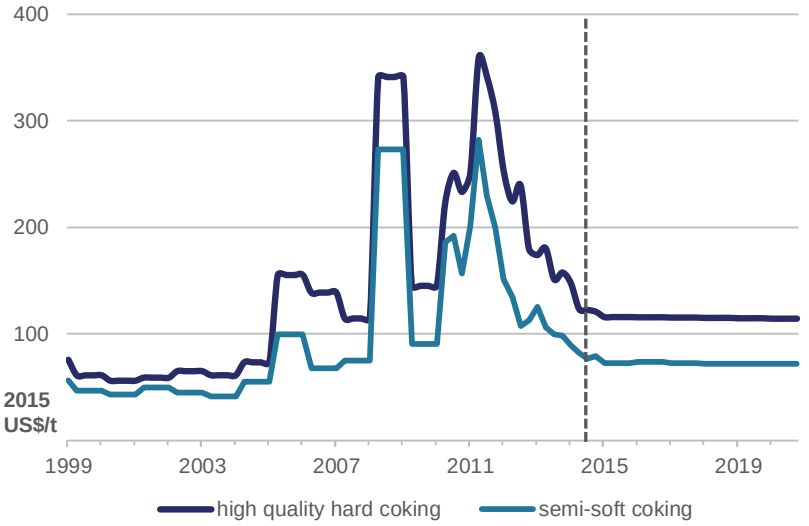
Many metallurgical coal operations were unprofitable at prevailing prices in 2014, which forced multiple mine closures throughout the year, particularly in the United States and Australia. An estimated 25 million tonnes of capacity (around 2 per cent of world production) was closed during 2014. Producers that continued to operate embarked on cost-cutting exercises to improve profit margins. The appreciation of the US dollar relative to the currencies of large producers and declining fuel prices has relieved some of the financial pressures. This has encouraged price competition among some suppliers and contributed to declining spot prices in early 2015.

Figure 4.1:Metallurgical coal spot prices



Source: Platts.

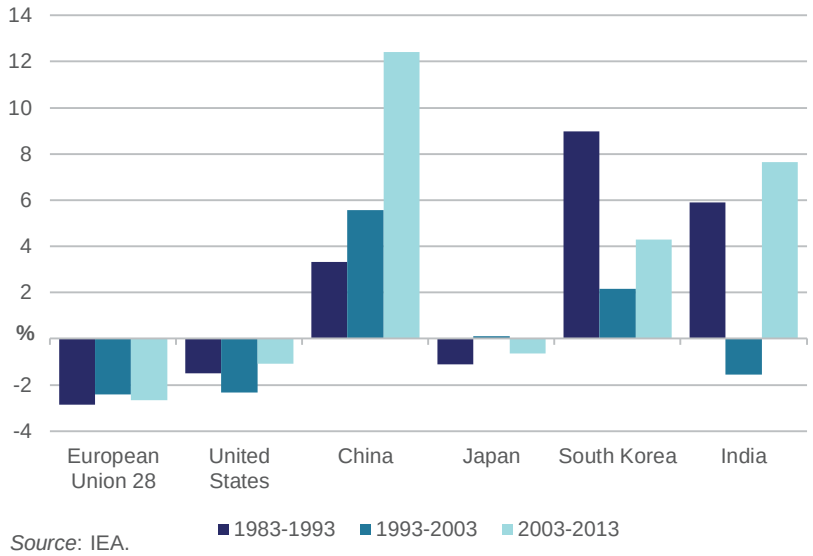
Figure 4.2: Metallurgical coal benchmark prices, FOB Australia



Australian benchmark contract prices for high-quality metallurgical coal for delivery in the March quarter 2015 settled at US$117 a tonne. Metallurgical coal prices are expected to remain subdued until demand growth recovers and further mine closures materialise. However, reduced financial pressures may slow the closure of high-cost operations. This, in combination with increased price competition, is expected to keep metallurgical coal prices low during 2015. High quality hard coking coal contract prices are forecast to decline by 8 per cent to average US$116 a tonne in 2015.

From 2016, the market balance is expected to tighten as growth in steel production in China and India increases and the prolonged period of oversupply comes to an end. Reduced costs and an assumed depreciation of the Australian dollar will lower the price required to achieve equilibrium in the market and therefore limit the growth in Australian benchmark contract prices. The metallurgical coal contract price is projected to rise modestly in nominal terms, but decline in real terms to average US$114 a tonne (in 2015 dollar terms) in 2020.

Figure 4.3: Average growth in metallurgical coal use



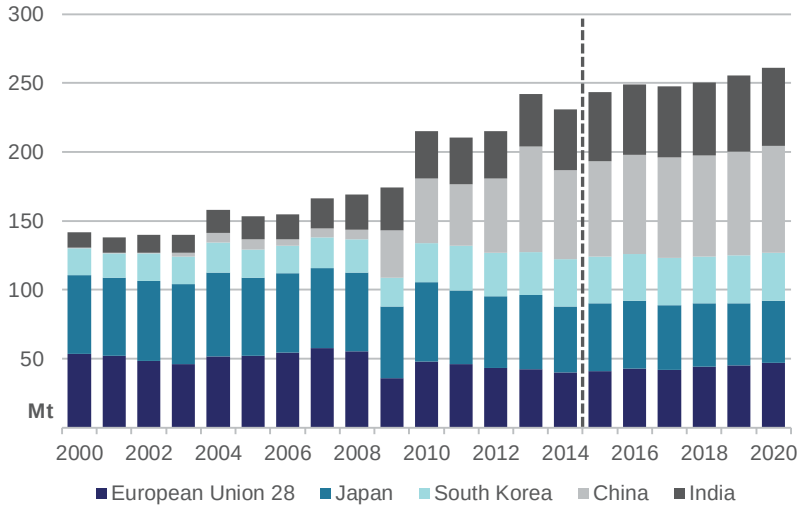
Source: IEA.

Consumption and trade

World metallurgical coal use will be determined by developments in world steel consumption and production. Growth in metallurgical coal use over the past decade has been driven by developing economies, particularly China, where steel production capacity has expanded rapidly. Conversely, use in developed economies has been relatively subdued. Developing economies are expected to remain the key driver of growth in metallurgical coal use over the medium term as new steel production capacity is developed to meet growing infrastructure needs.

World trade of metallurgical coal is forecast to increase by 2.3 per cent to 316 million tonnes in 2015. China is forecast to account for the bulk of the growth in import demand and Australia export supply. Reflecting projected growth in world steel production, world trade in metallurgical coal is projected to increase at an average annual rate of 1.1 per cent to 334 million tonnes.

Figure 4.4: Major metallurgical coal importers



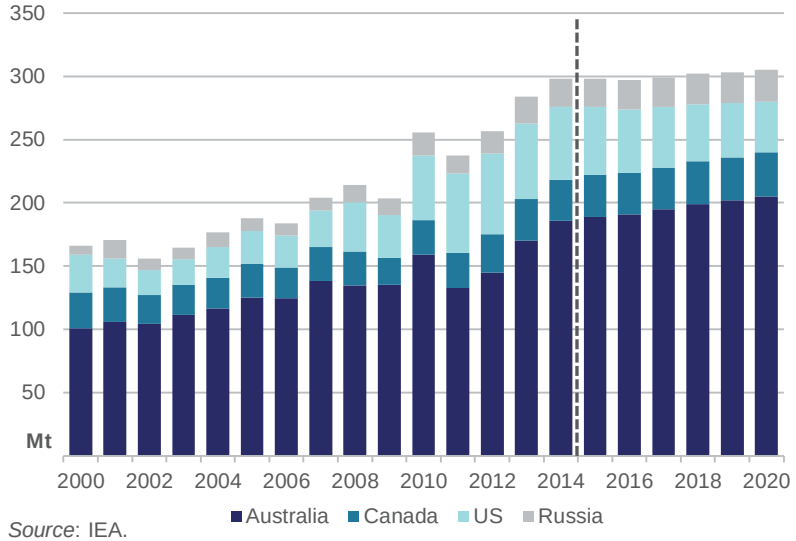
Source: IEA.

World imports

China's imports of metallurgical coal declined by an estimated 16 per cent to 65 million tonnes in 2014, driven by lower growth in steel production and increased use of domestic coal following the introduction of multiple measures to support the domestic industry. Although China's metallurgical coal imports declined in 2014, Australia's share of China's total imports increased as volumes from US and Canadian suppliers declined. China's imports from Australia increased by 4 per cent in 2014. The import tax of 3 per cent levied on all metallurgical coal imports in late 2014 will not apply to Australian-sourced coal following the signing of a Free Trade Agreement. As a result, Australia is likely to maintain or increase this market share over the medium term.

China's imports of metallurgical coal are forecast to increase by 6 per cent to 69 million tonnes in 2015, supported by forecast continued growth in steel production.

Figure 4.5: Major metallurgical coal exporters



Source: IEA.

Table 4.1: Metallurgical coal trade

	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
Metallurgical coal imports (Mt)							
European Union 28	40	41	43	42	44	45	47
Japan	48	49	49	47	46	45	45
China	65	69	72	73	74	75	77
South Korea	34	34	34	34	34	35	35
India	44	50	51	52	53	55	58
Metallurgical coal exports (Mt)							
Australia	186	189	191	195	199	202	205
Canada	32	33	33	33	34	34	35
United States	58	54	50	48	45	43	40
Russia	22	22	23	23	24	24	25
World trade	**309**	**316**	**320**	**322**	**326**	**330**	**334**

f forecast. **z** projection.
Source: IEA.

While policies to support the domestic industry will ensure demand growth will be largely met by domestic coal in the short term, China is expected to remain a major importer as its coal is typically higher cost and lower quality than imported coal. China's imports of metallurgical coal are projected to increase at an average annual rate of 2.2 per cent to 77 million tonnes in 2020. If policy measures to support the domestic industry are extended over the medium term, China's metallurgical coal imports may be lower than projected, presenting a downside risk to this assessment.

India's imports of India's metallurgical coal increased by an estimated 18 per cent to 44 million tonnes in 2014, underpinned by increased steel production. To meet an anticipated increase in India's steel requirements as it invests heavily in infrastructure, the Ministry of Steel is planning to increase steel production more than three-fold. While this target may be challenging to achieve, projected growth in India's steel production will still require a large volume of raw materials.

The announced increase in metallurgical coke tariffs from 2.5 to 5 per cent in the February budget may encourage greater use of domestic coal for coke production instead of importing coke from China. While India produces some metallurgical coal, it is relatively low quality and they will rely mostly on imports to meet requirements. India's imports of metallurgical coal are projected to increase at an annual average rate of 2.7 per cent to 57 million tonnes in 2020.

Imports into the European Union and South Korea are projected to increase to 47 million tonnes and 35 million tonnes by 2020, respectively. Japan's imports are projected to decline to 45 million tonnes as steel production relocates abroad.

World exports

Lower prices have removed the incentive to invest heavily in developing new capacity, particularly greenfield projects. As such, there is unlikely to be any large additions to supply from emerging producers and growth in exports from existing producers is projected to grow moderately.

Exports from Canada are projected to increase to 35 million tonnes and exports from Russia to 25 million tonnes by 2020. By contrast, exports from the United States are projected to decline to 40 million tonnes by 2020. Lower prices have reduced the viability of high-cost US production and forced the closure of some capacity during 2014. In addition, the US is expected to use more production domestically, supported by a projected expansion in steel production.

Mozambique could emerge as a large metallurgical coal exporter over the projection period. Vale and Mitsui are progressing plans to increase production at the Moatize mine from 4 million tonnes a year to 22 million tonnes a year by 2016. If they are successful in meeting this target, Mozambique's metallurgical coal exports could increase almost four-fold over the projection period.

Most of the growth in world metallurgical coal exports is expected to come from Australia. Australia's metallurgical coal exports are projected to increase at an average annual rate of 1.6 per cent to 205 million tonnes in 2020.

Australia's production and exports

The environment of lower metallurgical coal prices has encouraged some Australian producers to reduce capacity. In February, Glencore announced that it intends to reduce production at its Australian operations by 15 million tonnes in 2015, although this is expected to mostly affect thermal coal output.

A number of operations were closed in 2014 or are scheduled to be closed during 2015. These include Vale's Integra (3.5 million tonnes a year), Sumitomo's Isaac Plains (2.8 million tonnes a year) and Glencore's Ravensworth underground (5.6 million tonnes a year). These closures will be more than offset by increased production at existing operations, and new production from Maules Creek (around 5 million tonnes a year of metallurgical coal) and the expansion of Peabody's Metropolitan mine (1.5 million tonnes a year). Australia's metallurgical coal production is forecast to increase by 5 per cent to 190 million tonnes in 2014-15.

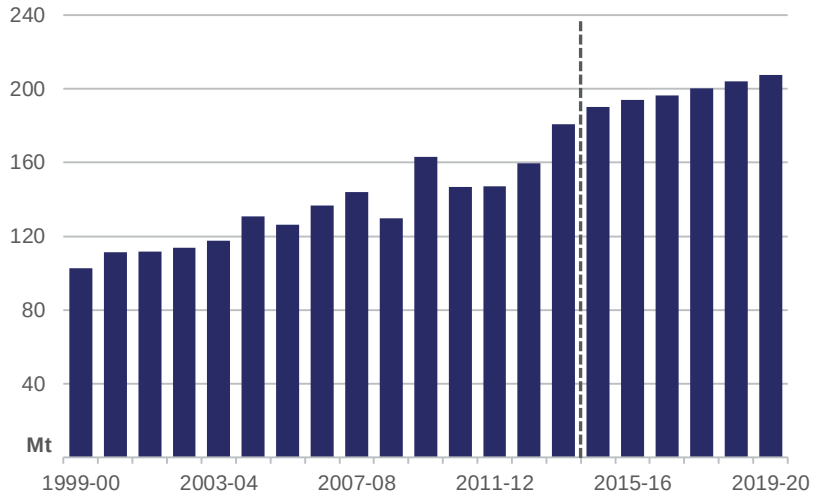
Australian producers continue to focus on cost-cutting exercises to remain viable. BHP Billiton announced that it had cut operating costs at its Queensland operations by 24 per cent. They intend to reduce costs by a further 10 per cent during 2014-15 to around US$90 a tonne.

Over the medium term, Australia's metallurgical coal production is projected to increase at an average annual rate of 1.8 per cent to 208 million tonnes in 2019-20. This will be supported by the completion of a number of projects over the projection period including Yancoal's Ashton South East opencut expansion; BHP Billiton's Appin Area 9; Anglo American's Grosvenor; and Aquila Resources and Vale's Eagle Downs.

Despite cost and price pressures, Australia increased its share of world metallurgical coal exports as relatively high-cost production in the US was closed. Australia's exports of metallurgical coal are forecast to increase by 5 per cent to 190 million tonnes in 2014-15, supported by increased production growth. The value of these exports are forecast to decline by 2 per cent to $22.8 billion as increased volumes and an assumed depreciation of the Australian dollar are offset by lower prices.

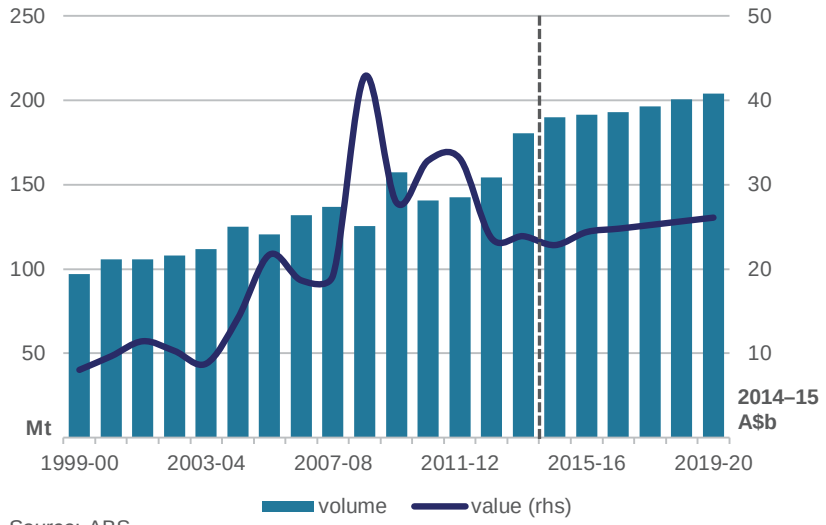
From 2015-16, Australia's exports of metallurgical coal are projected to increase at an average annual rate of 1.3 per cent a year to 204 million tonnes in 2019-20. Over the outlook period export earnings are projected to increase by 3 per cent a year to $26.1 billion (in 2014-15 dollar terms) by 2019-20, underpinned by higher export volumes, assumed higher contract prices and a depreciating Australian dollar.

Figure 4.6: Australia's metallurgical coal production



Sources: Coal Services; company reports.

Figure 4.7: Australia's metallurgical coal exports



Source: ABS.

Table 4.2: Metallurgical coal outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Contract prices bc								
– nominal	US$/t	125.5	115.8	118.2	120.7	123.1	125.6	128.0
– real d	US$/t	128.4	115.8	115.5	115.3	115.0	114.6	114.2
		2013–14	**2014–15 f**	**2015–16 f**	**2016–17 z**	**2017–18 z**	**2018–19 z**	**2019–20 z**
Australia								
Production	Mt	180.8	190.2	193.8	196.5	200.1	204.2	207.6
Export volume	Mt	180.5	190.0	191.4	192.8	196.4	200.5	203.9
– nominal value	A$m	23 254	22 826	24 980	25 944	26 981	28 057	29 163
– real value e	A$m	23 882	22 826	24 371	24 767	25 202	25 643	26 080

b fob Australian basis **c** Contract price assessment for high-quality hard coking coal. **d** In current calendar year US dollars. **e** In current financial year Australian dollars. **f** forecast. **s** estimate. **z** projection.
Source: ABS.

Thermal coal

Kate Penney

The large volume of new coal-fired capacity under construction or approved, particularly in non-OECD countries, indicates that coal is likely to remain a primary source of generation. The relative abundance, low-cost and geographic dispersion of coal resources and the reliability of coal-fired technology will continue to support its use. The supply overhang is projected to keep prices low into 2017, before increasing moderately by 2020 as demand continues to increase and uncompetitive operations are forced to close.

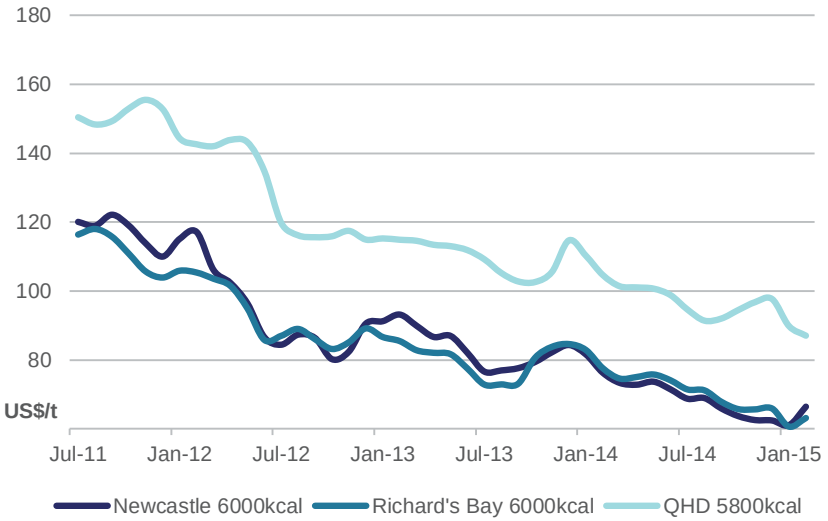
Prices

Thermal coal prices declined steadily over the course of 2014, reflecting surplus supply and reduced import demand from China in response to lower domestic prices and the implementation of several policy measures designed to support the domestic industry. In early 2014, large Chinese producers reduced their offer prices to utilities to recapture market share from imported coal. This reduced spot demand for Newcastle coal and put downward pressure on prices. Domestic producers stopped offering lower prices in August 2014. However, prices continued to decline as the Chinese Government introduced a number of policies that further reduced import demand towards the end of the year. Newcastle free on board spot prices for 6000 kilocalorie coal averaged around US$70 a tonne in 2014, 16 per cent lower than 2013.

While global coal consumption growth is forecast to remain strong in 2015, driven largely by Asia, the supply overhang is forecast to persist and contribute to lower prices. Benchmark prices for the Japanese Fiscal Year 2015 (JFY, April 2015 to March 2016) are forecast to settle at around US$70 a tonne, 15 per cent lower than JFY 2014.

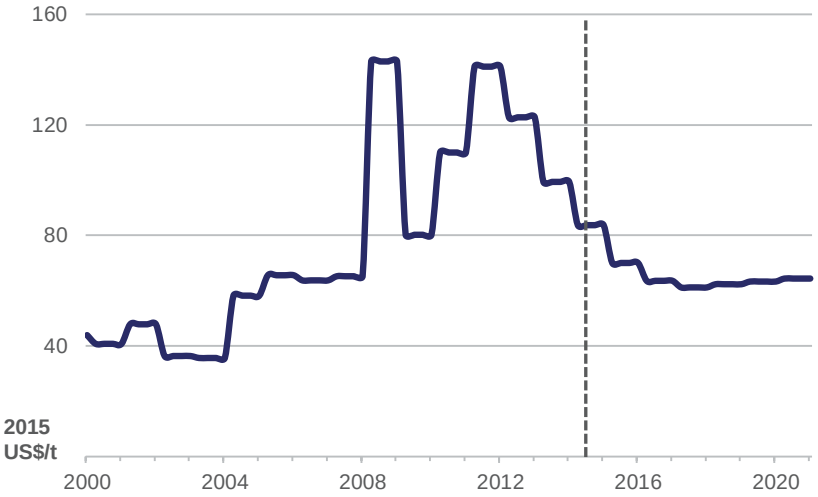
The sustained decline in thermal coal prices reduced operational profitability and encouraged a global cost-cutting drive.

Figure 5.1:Thermal coal spot prices



Source: Bloomberg.

Figure 5.2: JFY thermal coal prices



Some producers were forced to close capacity, while those locked into infrastructure supply services increased output to reduce unit costs. The appreciation of the US dollar relative to the currencies of major coal producers and a rapid decline in oil prices have provided some relief to struggling producers, which may delay the decision to close capacity.

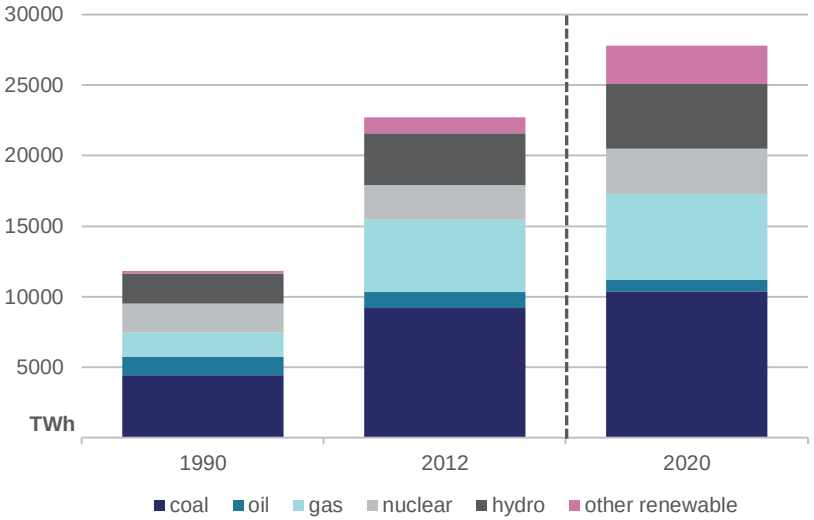
The delayed closure of unprofitable capacity is expected to extend the supply overhang into 2016–2017 and continue to place downward pressure on prices. Lower prices will reduce the incentive to invest in new capacity and eventually force less competitive operations to close. Beyond 2017, thermal coal prices are projected to rise as demand continues to increase, supply growth eases and the market balance tightens. However, benchmark contract prices are not likely to return to levels observed between 2008 and 2012 because cost cutting activities have reduced the price required for production to be viable. In addition, the assumed depreciation of the Australian dollar relative to the US dollar will partly offset the effect of lower US dollar denominated prices on the margins of Australian producers. The JFY contract price is projected to decline to US$61 a tonne (in 2015 dollar terms) in 2017, before increasing to around US$64 a tonne by 2020.

Consumption and trade

Concern about the effect of coal-use on the environment has prompted many countries to reconsider the use of coal in their energy mix. In particular, the United States and several European countries have announced their intention to phase out the use of coal over the medium to longer term. While these policies will undoubtedly reduce the demand for coal in advanced economies, this will be more than offset by increased coal use in emerging economies.

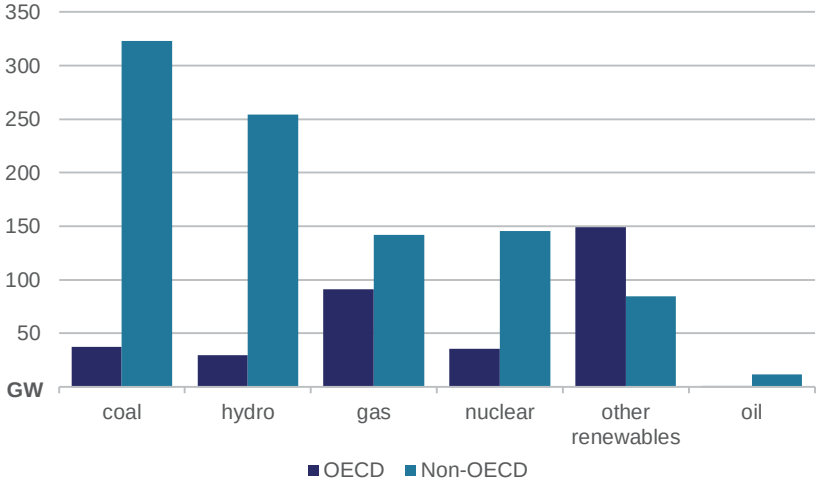
The development of electricity generation capacity is essential in emerging economies to support economic expansion and increase the living standards of their citizens. While all available technologies will be considered to meet electricity requirements, new capacity under construction or approved indicates that coal-fired generation is likely to remain a primary source of generation because the

Figure 5.3: Projected electricity generation by fuel



Source: IEA.

Figure 5.4: World electricity capacity under construction or approved



Source: Enerdata, www.enerdata.net.

technology is established and reliable; and coal is relatively low-cost, abundant and geographically dispersed. Although coal-fired generation is projected to increase over the medium term, many of the new projects being developed are based on modern supercritical or ultra-supercritical technologies. These plants emit less CO_2 and other pollutants than older technologies.

In line with higher consumption, world trade is projected to increase at an average annual rate of 2.8 per cent to 1235 million tonnes in 2020.

World thermal coal imports

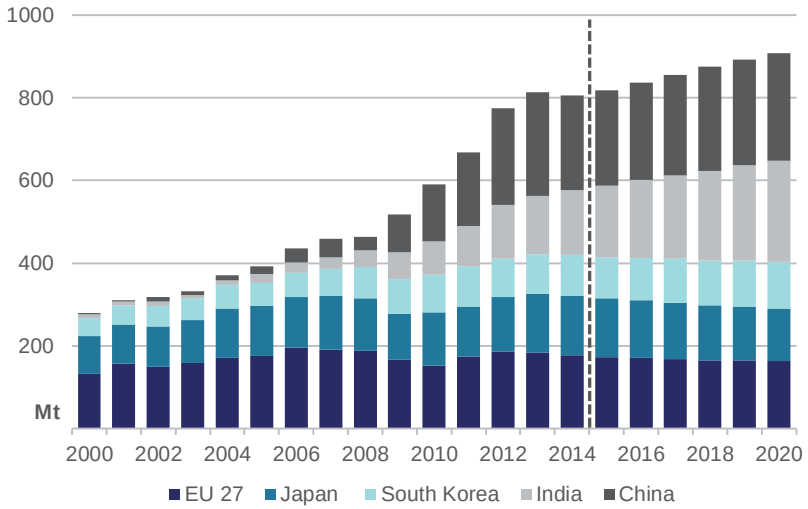
China

In 2014, China's imports of thermal coal declined by 9 per cent to an estimated 229 million tonnes, underpinned by relatively weaker economic activity that reduced growth in electricity consumption; increased utilisation of hydropower capacity; and government initiatives to support the domestic industry.

China's coal consumption growth is typically weaker in years where there has been heavy rainfall and hydropower generation capacity has increased, allowing for a large increase in hydropower generation. China's hydropower generation increased by 25 per cent in 2014 compared with relatively flat growth in thermal generation (coal and gas). Most of the growth in China's hydropower generation was achieved in the second half of 2014, particularly in the third quarter where output increased by 39 per cent year-on-year. Similarly China's hydropower capacity increased by 8 per cent in 2014 compared with 6 per cent for thermal capacity. However, the absolute increase in thermal capacity was more than twice the increase in hydropower capacity. It is likely that the pace of hydro capacity expansion will decline over the medium term as the number of suitable sites diminishes and obtaining approval becomes more difficult.

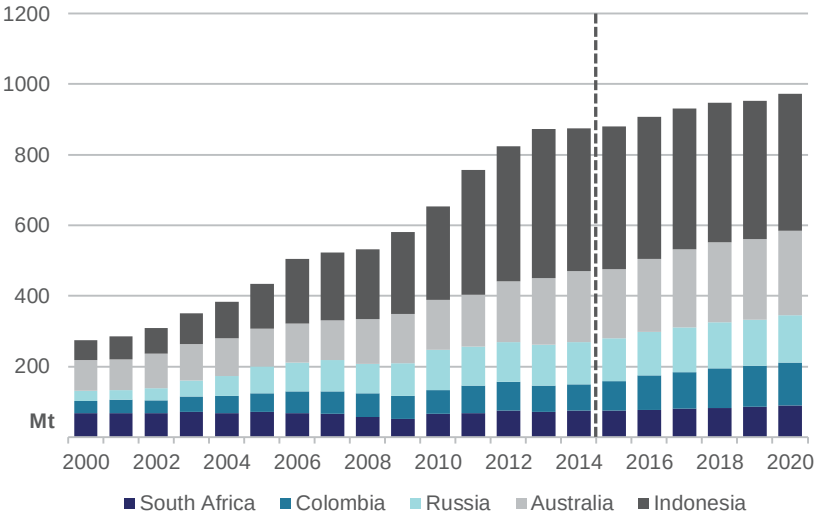
China's coal imports were also affected by the announcement of a suite of policy measures in late 2014, with the intention of supporting the domestic industry. The China Coal Association estimated that

Figure 5.5: Major thermal coal importers



Source: IEA.

Figure 5.6: Major thermal coal exporters



Source: IEA.

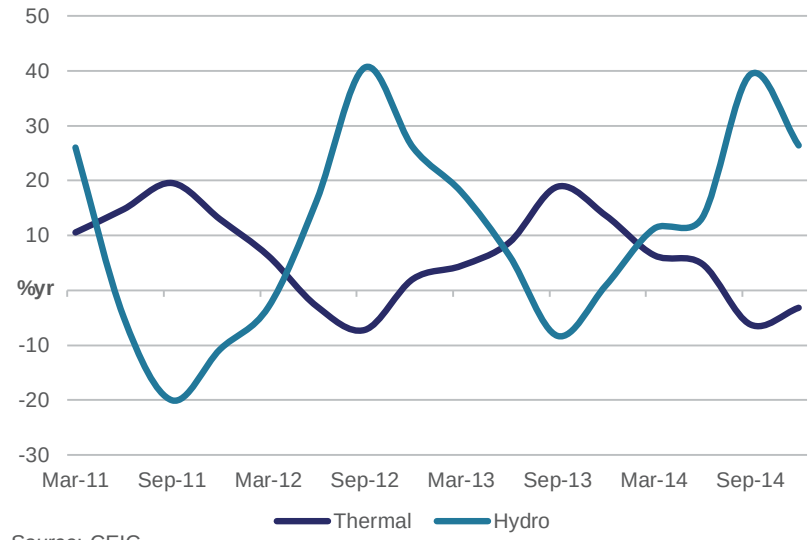
around 70 per cent of the industry was unprofitable. These measures included quality guidelines targeting the sulphur, ash and trace element (such as phosphorus, mercury and fluorine) content; and a directive to major utilities to reduce imports by around 50 million tonnes.

The Chinese Government also announced multiple policy measures aimed at improving air quality, particularly in highly populated areas in Beijing and neighbouring provinces, during 2014. The Energy Strategy Action Plan (2014–2020) released by the State Council in November outlined the government's plans to modernise China's energy structure and achieve its environmental objectives. In particular, it included a cap on energy consumption that would limit its energy growth over the next six years to around 3.5 per cent a year. In addition, the US and China signed a joint agreement on climate change in November. President Xi Jinping announced China's intention to target peak CO_2 emissions by 2030 or earlier. While these announcements will slow the growth in China's coal use, it is unlikely to result in a rapid shift away from coal.

China is projected to remain a major coal consumer over the medium term, supported by the expected expansion of coal-fired capacity in regions in western and central China. Coal currently accounts for around 65 per cent of China's electricity generating capacity. Coal-fired assets typically have an operating life of 40–60 years. A large proportion of China's installed capacity is still relatively new and is unlikely to be closed before the end of its useful life. China's electricity generation is projected to increase over the medium term as the economy expands, particularly in the central and western regions, and household consumption increases with rising incomes. To meet its growing energy needs, China is investing in a range of technologies including coal. China has around 90 gigawatts of coal-fired generation under construction or approved. Part of this will be the replacement of older, smaller facilities with large units. For example, Zheneng Power will commission four 1 gigawatt ultra-supercritical units in Zhejiang to replace the closure of six 135 megawatt units.

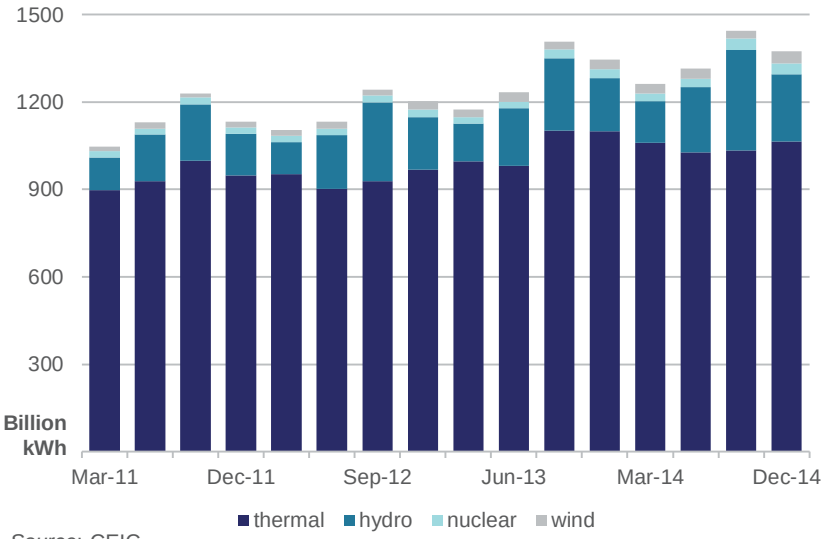
There are currently plans to develop integrated facilities in coal-rich areas of China that co-locate coal mines and power plants, with the electricity generated to be transmitted to other areas of the country

Figure 5.7: China's hydro and thermal generation, year-on-year



Source: CEIC.

Figure 5.8: China's quarterly electricity generation



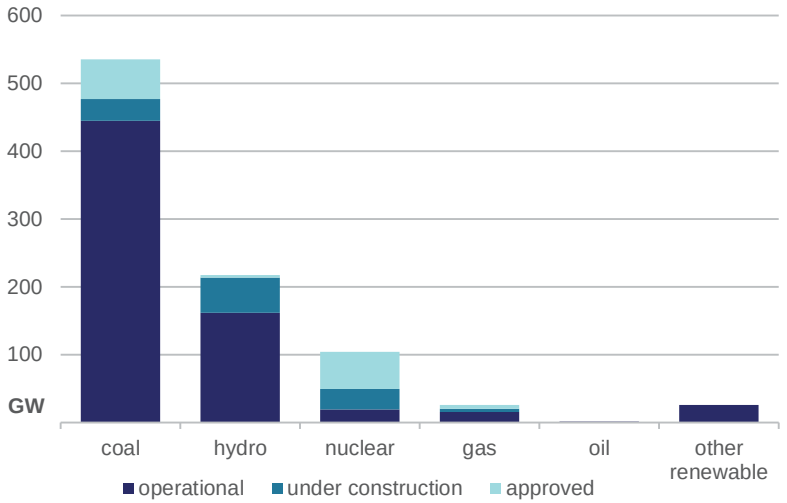
Source: CEIC.

through ultra-high voltage transmission lines. The State Grid Corporation has started construction of a US$11 billion network which will involve more than 4700 kilometres of transmission lines between Inner Mongolia and the major population centres of Shanghai and Beijing (where coal-fired generation capacity is being closed).

China's coal production declined in 2014 in response to the relatively weak demand, lower prices, competitive imports and a government directive to reduce output by around 125 million tonnes. There is likely to be some short-term fluctuation in China's coal production as companies continue to adapt to changing operating conditions. For example, fifteen of China's major coal producers agreed to temporarily stop production over Chinese New Year in order to alleviate oversupply. They are also exploring options for changing work practices to devote more time to maintenance than before. The consolidation of the coal industry undertaken over the past decade is expected to continue over the medium term, with smaller, inefficient and unsafe mines being closed. Despite this, China's coal production capacity is still expected to expand to meet growing requirements. China has around 4 billion tonnes of coal capacity, with another 1 billion tonnes of capacity being developed.

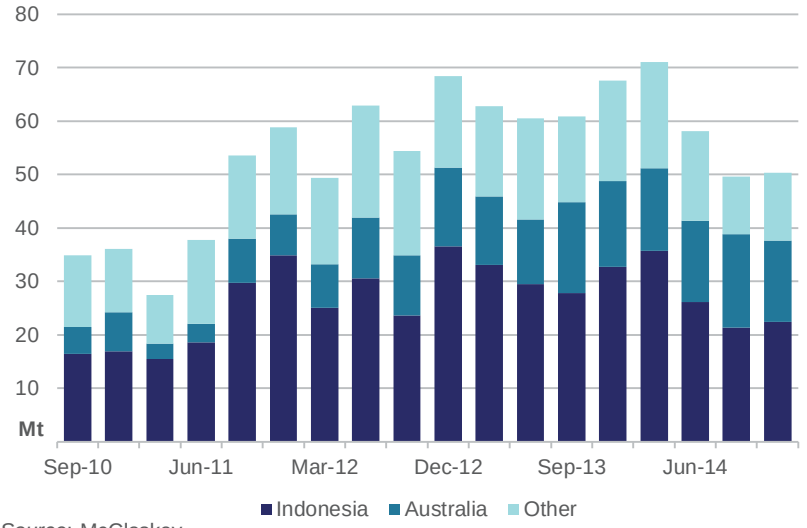
Although China's coal use is expected to grow, there is greater uncertainty over how much of this demand will be met through imports. China's imports will be influenced by relative import prices, the location of new generating capacity and government policy. China currently meets the majority of its needs through domestic production, with the balance imported. The long distance between mature mining regions and major consumption centres means that it can be uneconomic to transport large volumes of coal, which improves the competitiveness of imported coal. If new power plants are increasingly developed closer to domestic coal deposits, the demand for imported coal may be lower. However, Chinese coal is typically lower quality than imported coal, so if coal quality standards are continuously tightened then imports may increase at a more rapid rate than projected. China's thermal coal imports are projected to increase at an average annual rate of 2.6 per cent to 261 million tonnes in 2020.

Figure 5.9: China's electricity generation capacity >50MW



Source: Enerdata, www.enerdata.net.

Figure 5.10: China's quarterly coal imports by source



Source: McCloskey.

India

India's imports of thermal coal increased by 10 per cent to 157 million tonnes in 2014, supported by a rapid increase in the development of new coal-fired electricity capacity and relatively slow growth in domestic production. Import growth was constrained to some extent by infrastructure including port congestion; a shortage of rail wagons and insufficient rail capacity.

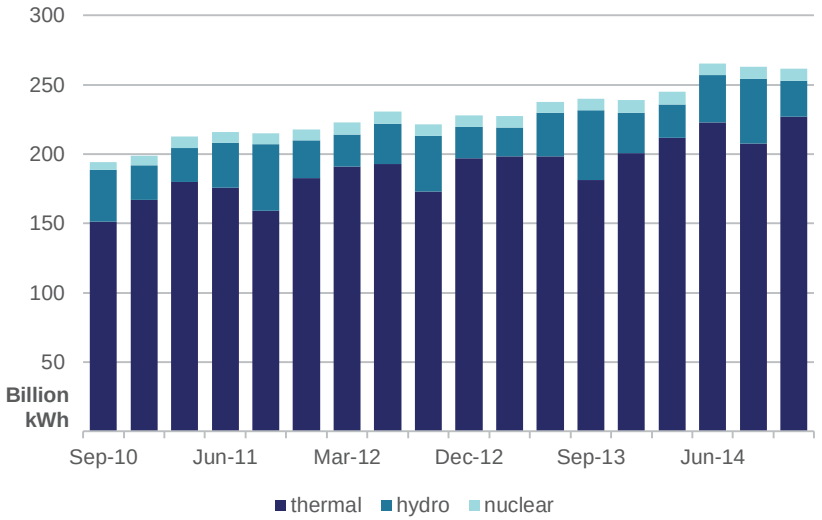
India's coal consumption is projected to increase rapidly over the medium term as the economy grows, household income increases and the government improves electrification. Prime Minister Modi has announced the government's intention to ensure all Indian villages have 24 hour access to electricity. Coal-fired generation is a key component of this plan and there are 118 gigawatts of coal-fired capacity under construction or approved.

Coal India (CIL) accounts for around 80 per cent of India's domestic production, the remainder is produced by Singareni Collieries Company Limited (10 per cent) and captive (own-use) producers (10 per cent). Over the past few years, India's domestic coal production has been unable to keep pace with the growth in consumption and contributed to a rapid rise in imports. Production and new project development have been stalled by difficulties in obtaining land access, environmental approvals and inadequate transport infrastructure.

In order to stem the growth in India's import requirements, Coal and Power Minister Goyal set a target in late 2014 to roughly double India's coal production to 1 billion tonnes by 2020. This target will require India's production to increase by around 100 million tonnes each year, which would equate to average annual production growth of almost 15 per cent a year. To assist in meeting this target, there has been a large effort to expedite environmental and forestry clearances and a drive to increase coordination by the railways.

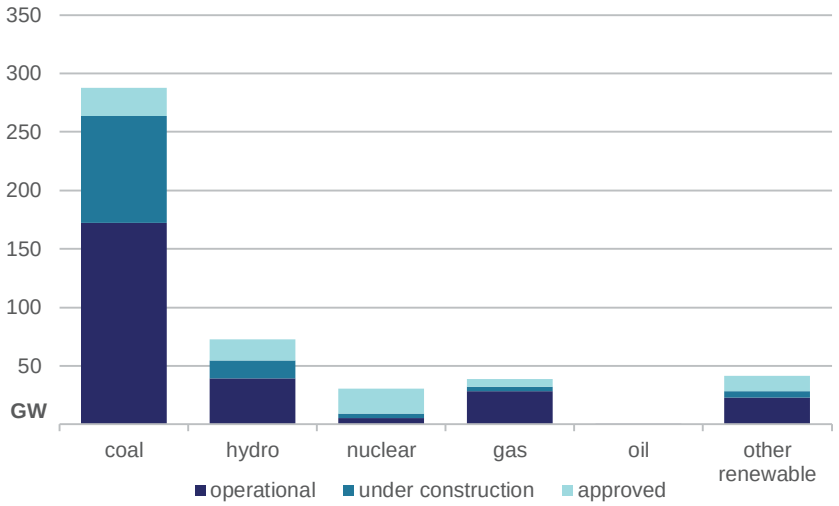
To reduce the reliance on CIL to achieve this target, increased production from captive producers will be required. In September 2014, the Supreme Court determined that the process for allocating captive coal blocks over the past few decades was arbitrary and illegal.

Figure 5.11: India's quarterly electricity generation



Source: CEIC.

Figure 5.12: India's electricity generating capacity >50MW



Source: Enerdata, www.enerdata.net.

As a result, 214 of the coal block licences, some of which had operating coal mines, were cancelled. Around 46 of the blocks will be open to two separate competitive auctions between mid-February and late March 2015. It could take a few years before new capacity from these blocks materialises.

Despite plans to rapidly increase production, it is not expected that pace of growth will be fast enough to meet the growth in India's coal requirements over the medium term. As such, India's coal imports are projected to increase at an average rate of 7 per cent a year to 244 million tonnes in 2020.

Japan

The protracted closure of nuclear capacity post-Fukushima has contributed to a sustained reliance on thermal power. There is still considerable uncertainty about the timing and speed of nuclear power plant restarts. While a few reactors have obtained approval from the Nuclear Regulatory Authority, final safety checks and general opposition to nuclear power have contributed to delays.

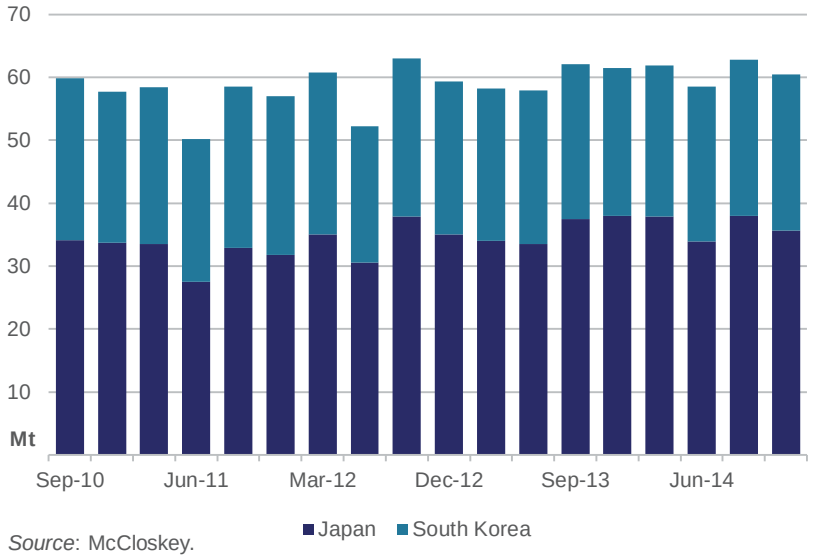
The government has started deliberations on establishing targets for Japan's energy mix by 2030. While nuclear power has been declared an important baseload energy source by the Abe government, they are also keen to reduce their reliance on the technology. It is reported that a decision may be announced in June prior to the Group of Seven meeting. Once targets have been set there will be a clearer indication of the role of all technologies in Japan, including coal.

As nuclear capacity is restarted, some of the pressure on coal-fired plants operating at capacity will be relieved. This will contribute to a gradual decline in Japan's imports to 127 million tonnes in 2020.

South Korea

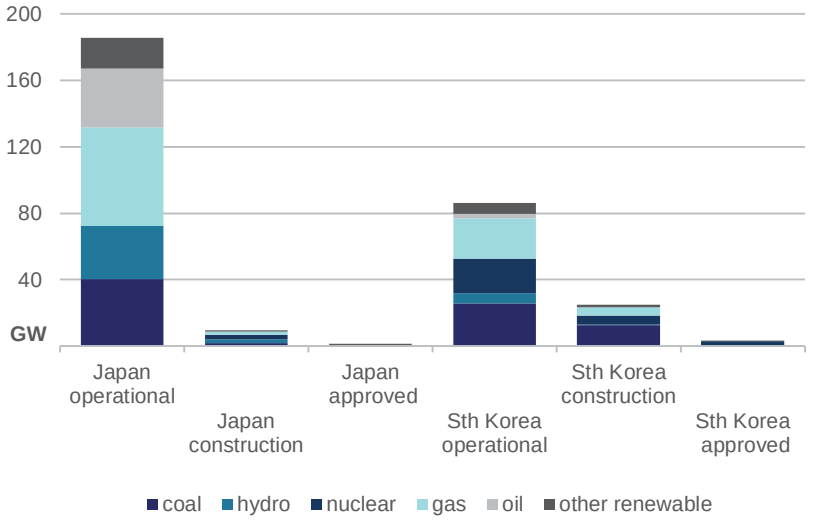
In 2014, South Korea imported an estimated 98 million tonnes of thermal coal, 2.7 per cent higher than 2013. South Korea's Second Energy Basic Plan was released in January 2014. In the plan nuclear power had a reduced role compared with the previous plan released in 2008.

Figure 5.13: Japan and South Korea's quarterly imports



Source: McCloskey.

Figure 5.14: Japan and South Korea electricity capacity



Source: Enerdata, www.enerdata.net.

While there is a larger role planned for gas and renewables in the absence of nuclear power, coal is likely to remain a key energy source in South Korea.

South Korea has around 12.8 gigawatts of new coal-fired capacity under construction or approved scheduled to be completed by 2017. These new plants will support South Korea's thermal coal imports increasing at a projected rate of 3 per cent a year to 113 million tonnes in 2020.

ASEAN

The Association of Southeast Asian Nations is expected to emerge as a source of import growth over the medium term, underpinned by the development of new coal-fired generation capacity. Vietnam's economy has grown at an average annual rate of 6.5 per cent over the past decade, but its electricity generation has grown at a much faster pace. In order to meet its rapidly growing energy requirements, Vietnam has 27 gigawatts of coal-fired electricity generation capacity under construction or approved. Vietnam is currently a net coal exporter, but is projected to become a net importer as production fails to keep pace with consumption.

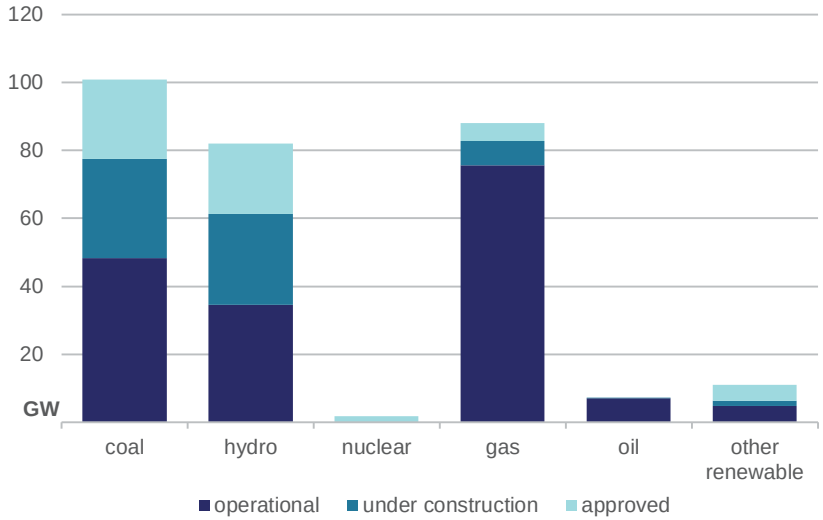
Malaysia has 5.2 gigawatts of coal-fired electricity generation capacity under construction or approved. These plants are being developed as part of a strategy to meet growing energy requirements and diversify fuel sources. Similarly, the Philippines and Myanmar have 4.8 gigawatts and 4.2 gigawatts of coal-fired generation capacity under construction or approved, respectively.

World thermal coal exports

Indonesia

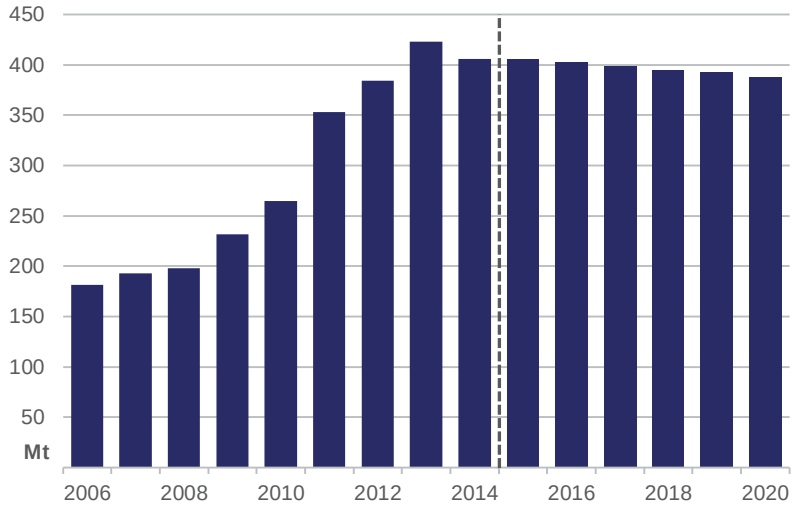
In 2014, Indonesia's thermal coal exports declined by 4.1 per cent to an estimated 406 million tonnes, as shipments were adversely affected by the introduction of export licencing and weaker import demand in China. In October 2014, the Indonesian Government introduced regulations requiring all exporters to provide documented evidence clearing them to produce before they could ship any coal.

Figure 5.15: ASEAN electricity capacity >50MW



Source: Enerdata, www.enerdata.net.

Figure 5.16: Indonesia's thermal coal exports



Source: IEA.

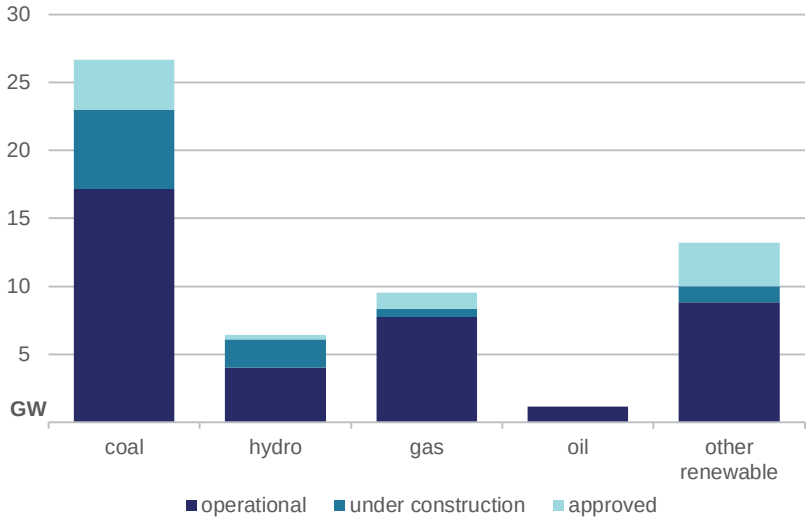
Many companies failed to obtain licences before implementation which created a backlog of exports.

The Indonesian Government has targeted coal production to decline to 400 million tonnes in 2019, from a target of 425 million tonnes in 2015. It is expected that this will be achieved through tightening of government control over the sector following the implementation of several policies targeting production and exports over the past few years. These policies are aimed at preserving resources, securing supply to meet domestic requirements and increasing revenue from coal production. For example, it is reported that Indonesia plans to almost double coal royalties from March 2015, which is likely to affect smaller producers and operations producing low calorific value coal. The Indonesian Government is also trying to curb growth in unlawful mining, which is reported to add more than 70 million tonnes a year to Indonesia's total output. It is expected that the export licencing introduced in 2014 will reduce the volume of unlawful mining considerably over the medium term.

Indonesia's coal consumption is projected to increase over the medium term, supported by the development of new coal-fired capacity to meet increasing electricity requirements. The Ministry of Energy and Mineral Resources are expecting domestic consumption to increase from around 90 million tonnes in 2014 to 190 million tonnes by 2019. There are currently 9.8 gigawatts of coal-fired generation capacity under construction or approved in Indonesia. The expansion of domestic coal use will be supported by the Domestic Market Obligation (DMO)—the proportion of output that needs to be reserved for the domestic market.

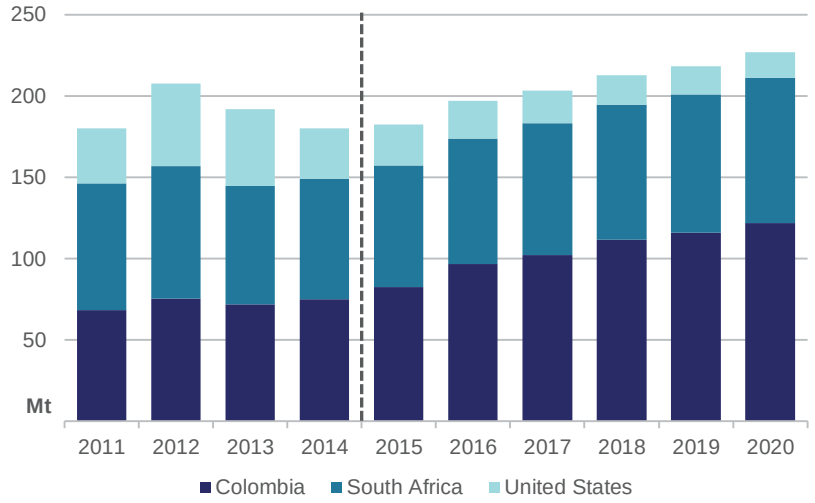
Lower coal production, combined with an expected increase in domestic requirements, are projected to result in Indonesia's thermal coal exports declining at an annual average rate of 1 per cent to 387 million tonnes in 2020. There will be many challenges in restraining production growth and developing coal-fired generation capacity. If targets are not met, exports are likely to be higher than projected.

Figure 5.17: Indonesia's electricity capacity >50MW



Source: Enerdata, www.enerdata.net.

Figure 5.18: Colombia, South Africa and US exports



Source: IEA.

Colombia

Colombia's thermal coal exports increased to an estimated 75 million tonnes in 2014, 2.9 per cent higher than 2013. The growth in exports was lower than targeted following an export ban placed on Drummond in early 2014. To prevent environmental damage associated with moving coal by barges, new transport rules were introduced in early 2014 that required the installation and use of enclosed transport systems. Drummond failed to meet the deadline and was prevented from exporting coal until the construction of enclosed facilities was completed.

Over the medium term, exports from Colombia are projected to increase at an annual average rate of 8 per cent to 122 million tonnes. This growth will be underpinned by the development of new projects and infrastructure. The government is also trying to resolve labour, mine safety and environmental issues to ensure that this expansion can occur.

Colombian coal is high quality and the cost of producing is low, so project development is still profitable, even at lower prices. Traditionally, the majority of Colombia's exports have been directed to the US and European markets. However, as consumption in these regions declines over the medium term it is expected that more coal will be directed to the Asia-Pacific market. It is estimated that the expansion of the Panama Canal may reduce the shipping time by up to 15 days and reduce the cost of shipping to the Asian market.

South Africa

South Africa's thermal coal exports increased by 3 per cent to an estimated 74 million tonnes in 2014 as exports from the Richard's Bay coal terminal were affected by a shortage of electricity early in the year. A lack of investment in new electricity generating capacity resulted in electricity blackouts in 2014, the first time in several years. Eksom, the publicly owned electricity utility, has warned that further power cuts are likely over the next few years as it struggles to maintain its ageing fleet.

The majority of South Africa's electricity supply is sourced from coal-fired generation. Several large-scale coal-fired generation plants are under construction but are well behind schedule. Decisions to develop new electricity generating capacity over the medium term will be influenced by the planned introduction of a carbon tax in 2016. Most of South Africa's coal mines are reliant on grid connection for electricity supply and may be affected by electricity availability shortfalls over the medium term.

There has been substantial investment in South Africa's rail infrastructure to facilitate an increase in exports—the Richard's Bay Coal Terminal has a capacity of 91 million tonnes. Despite this, exports from South Africa are projected to increase at a modest rate of 3.5 per cent a year to 89 million tonnes in 2020.

Australia

Exploration

Lower coal prices have reduced the incentive to invest in exploration, with many companies reducing their exploration activity as part of cost-cutting activities. Australia's coal exploration was around $78 million in the December quarter, down 2.9 per cent on the September quarter and 27 per cent on the December quarter 2013. For 2014 as a whole, exploration for coal was $341 million, 29 per cent lower than 2013.

Production

Australia's thermal coal production is forecast to decline slightly to 243.5 million tonnes in 2014-15. Increased production from recently completed projects and operations aiming to reduce unit costs are expected to be offset by announced mine closures and Glencore's decision to reduce production from its Australian operations by 15 million tonnes in 2015. Lower prices have affected the profitability of some higher cost operations and increased the pressure to cut costs and close capacity. Several companies announced their intention to close capacity during 2014 because the mines were no longer economic or had exhausted their resources.

In 2015-16, Australia's thermal coal production is forecast to increase moderately to 246.3 million tonnes as output from new

projects is partly offset by scheduled mine closures and the effect of the cut to production at Glencore's operations.

Whitehaven Coal's Maules Creek (around 5 million tonnes a year of thermal coal) began production in the December quarter 2014 and will increase production as it approaches capacity over the course of 2015. Idemitsu Kosan's Boggabri expansion (3.5 million tonnes a year) is also scheduled to be completed during 2015. Partly offsetting this output will be the expected closure of Anglo American's Drayton South after it failed to get approval to extend the life of the project; Centennial Coal's Angus Place; and BHP Billiton's Crinum.

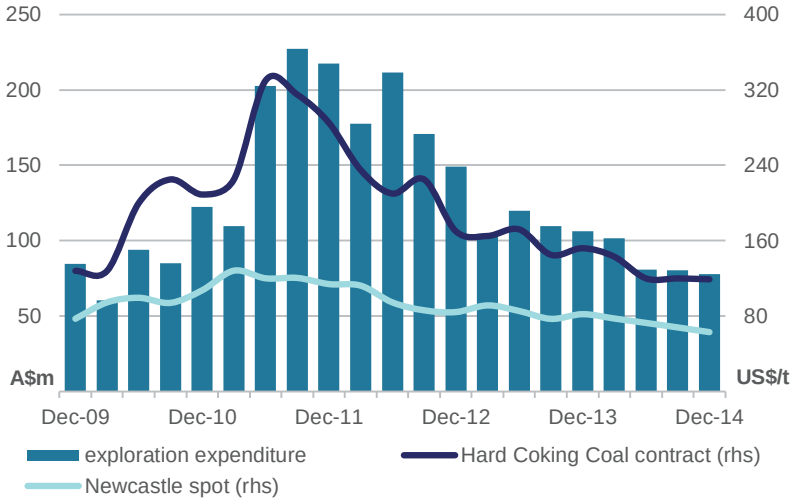
From 2016-17, growth in production is projected to accelerate as projects completed during 2015 and 2016 approach full capacity. Towards the end of the projection period, production will be influenced by Adani's Carmichael mine (60 million tonnes a year) in the Galilee Basin. In an environment of sustained lower prices, it is possible that there could be further mine closures over the projection period. Lower profits may also encourage some consolidation in the Australian industry. Australia's thermal coal production is projected to reach 278 million tonnes by 2019-20.

Exports

Despite the more challenging operating environment in 2014, Australia managed to increase market share in some key export markets, including China. Exports are forecast to increase by 3.3 per cent to 201 million tonnes in 2014-15, reflecting strong growth in exports in the second half of 2014. The value of these exports is forecast to decline by 6 per cent to $15.8 billion as the increase in volumes and effect of the depreciating dollar is more than offset by lower prices.

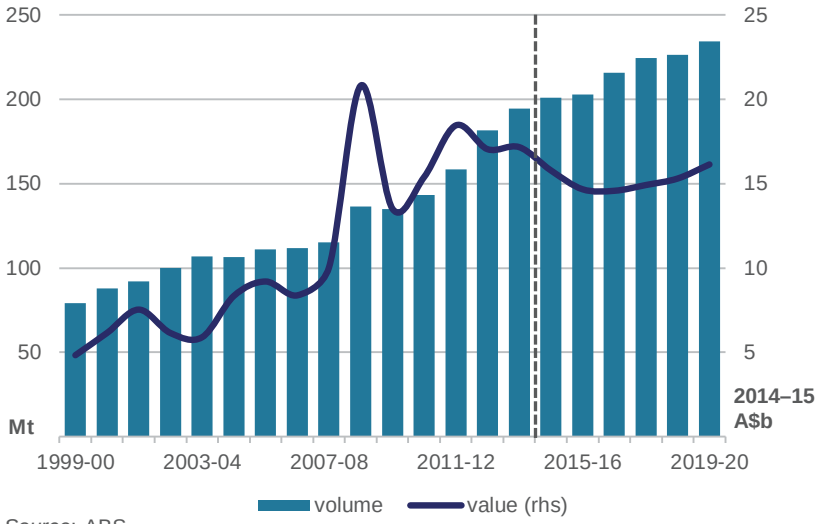
Over the remainder of the outlook period, Australia's thermal coal exports are projected to increase at an average annual rate of 3 per cent to 234 million tonnes in 2019-20. Export earnings are projected to increase by 0.4 per cent a year to around $16.1 billion (in 2014-15 dollar terms).

Figure 5.19: Australia's coal exploration expenditure



Source: ABS; Bloomberg.

Figure 5.20: Australia's thermal coal exports



Source: ABS.

Table 5.1: Thermal coal outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Contract prices b								
– nominal	US$/t	82	70	65	64	67	69	72
– real c	US$/t	84	70	64	61	62	63	64
Coal trade	Mt	1 058	1 077	1 106	1 129	1 178	1 206	1 235
Imports								
Asia	Mt	762	785	808	841	878	902	927
China	Mt	229	230	235	242	253	256	261
Chinese Taipei	Mt	61	62	62	68	75	78	78
India	Mt	157	174	188	202	216	230	244
Japan	Mt	144	143	140	137	133	130	127
South Korea	Mt	98	99	102	106	109	111	113
Europe	Mt	228	222	224	214	223	225	224
European Union 27	Mt	178	172	171	168	164	165	163
other Europe	Mt	50	50	53	46	58	60	61
Exports								
Australia	Mt	201	196	206	222	227	228	240
Colombia	Mt	75	82	97	102	112	116	122
Indonesia	Mt	406	405	403	399	395	393	387
Russia	Mt	120	122	125	127	130	131	134
South Africa	Mt	74	75	77	81	83	85	89
United States	Mt	31	25	23	20	18	17	16
		2013–14	**2014–15 f**	**2015–16 f**	**2016–17 z**	**2017–18 z**	**2018–19 z**	**2019–20 z**
Australia								
Production	Mt	245.2	243.5	246.3	260.0	269.0	270.2	278.0
Export volume	Mt	194.6	201.0	202.9	215.8	224.4	226.1	234.4
– nominal value	A$m	16 705	15 783	15 026	15 265	15 967	16 739	18 038
– real value d	A$m	17 156	15 783	14 659	14 572	14 914	15 299	16 131

b Japanese Fiscal Year (JFY), starting April 1, fob Australia basis. Australia–Japan average contract price assessment for steaming coal with a calorific value of 6700 kcal/kg gross air dried. **c** In current JFY US dollars. **d** In current financial year Australian dollars. **f** forecast. **z** projection.
Sources: ABS; IEA; Coal Services Pty Ltd; Queensland Department of Natural Resources and Mines.

Gas

Tom Willcock

Global LNG trade will grow rapidly to 2020 as Australia emerges as the world's largest LNG exporter. New LNG projects will triple Australia's export capacity and double total gas production, but lower prices will temper export value growth.

Prices

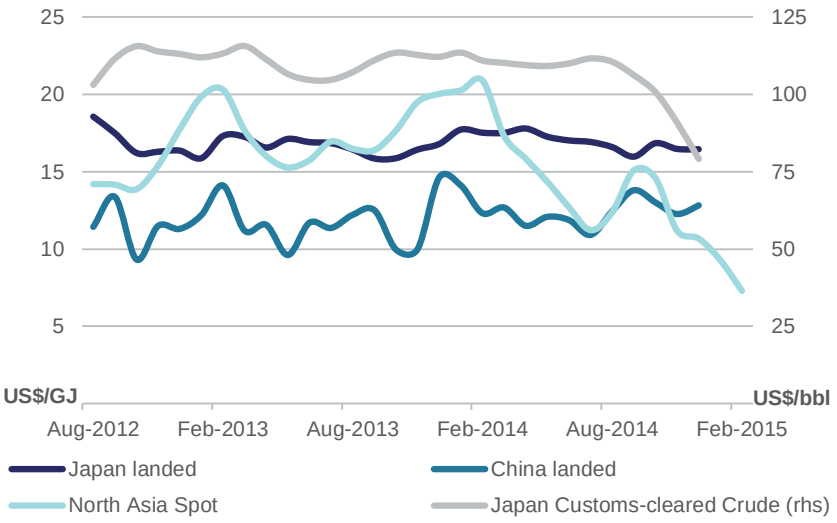
Asian LNG prices

Prices for delivered LNG into Northeast Asia are yet to respond to the falling oil price. The landed price in Japan was $US16.6 a gigajoule in the December quarter, identical to September. Prices in South Korea and China were similarly flat. LNG contracts, particularly into Asia, are usually linked to an average oil price that lags by six to nine months.

Spot prices were low for most of 2014 but bounced slightly in September due to some winter buying. They have since continued their downward trajectory as demand has become more subdued and the market increasingly well-supplied. Bontang LNG in Indonesia has been offering a number of spot cargoes following multiple contracts with Japanese buyers expiring in 2013 and 2014. PNG and North West Shelf (NWS) LNG have also been offering regional spot sales. This has resulted in spot cargoes reportedly being sold for as little as US$6.5 a gigajoule delivered in February; a stark contrast to US$20 a gigajoule a year ago.

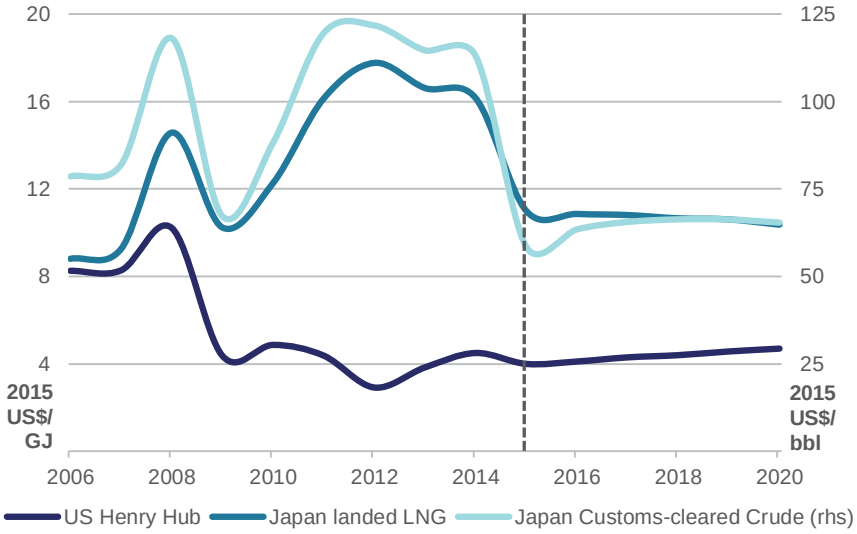
Sharply lower oil prices will start to weigh heavily on LNG contracts and landed Asian LNG prices, likely from the March quarter onward. Increased supply from Australia and Indonesia over the next 12 to 18 months will continue to apply downward pressure to regional spot prices as a number of new contracts commence.

Figure 6.1: Monthly Asian LNG and oil prices



Sources: Argus; Petroleum Association of Japan.

Figure 6.2: Annual international gas and oil price outlook



Sources: IEA and METI.

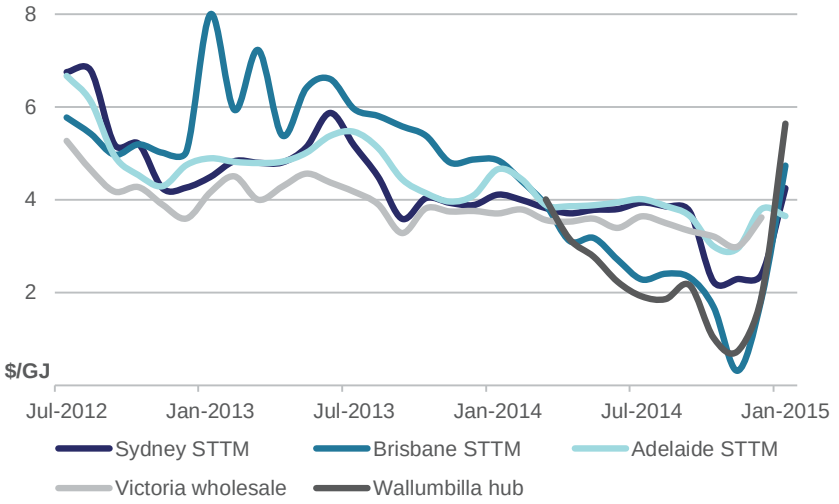
Supply-side growth is expected to continue strongly over the remainder of the outlook period, outpacing demand growth and resulting in subdued spot prices. Contract prices are expected to bottom out this year and remain flat in real terms as CPI and oil prices increase in unison to 2020. Landed LNG prices in Japan are not expected to approach the highs seen in recent years over the outlook period.

Eastern Australian prices

Gas prices along the Eastern seaboard were mixed over the past quarter. In Queensland, the Brisbane Short Term Trading Market (STTM) fell consistently through 2014 up until November, when it averaged $0.3 a gigajoule for the month. The price rebounded in December and averaged $4.7 a gigajoule in January as the Queensland Curtis LNG (QCLNG) project began operation – reducing the amount of uncontracted gas available to the market. The other STTMs and Victoria wholesale market followed similar patterns of November lows giving way to prices more in line with long term averages in January.

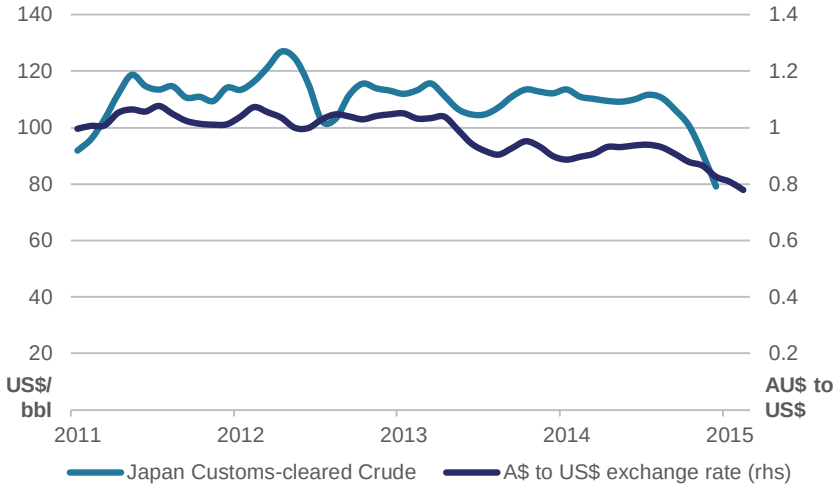
Prices are not expected to ease again over the outlook period as the ramp up of QCLNG combined with the impending start-up of Asia-Pacific LNG (APLNG) and Gladstone LNG (GLNG) maintain pressure on gas supply later this year. Prices in the STTMs are expected to be higher and more volatile over the outlook period as uncontracted gas is in greater demand. Lower oil prices will result in much lower netback prices in Queensland, but this will do little to ease demand from LNG projects which have contracted volumes to supply regardless of oil price. Buyers renewing and re-negotiating domestic contracts, which cover the majority of domestically consumed gas are also expected to face higher real prices, than they have in the past as a large portion of gas reserves are allocated to LNG plants.

Figure 6.3: Indicative monthly Eastern Australian gas prices



Notes: STTM prices are ex ante, and tend to cover less than 10 per cent of the gas consumed in those markets. The Victoria wholesale price is ex post, and typically 10 to 20 per cent of the gas consumed in Victoria is exposed to that price.
Sources: AEMO.

Figure 6.4: Monthly crude oil price and AUD exchange rates



Source: Petroleum Association of Japan.

Box 6.1: Oil price and exchange rate impacts on LNG

Recent falls in global oil prices and the Australian dollar are affecting the Australian LNG industry in a variety of ways.

The majority of Australian LNG is sold under long-term bilateral contracts linked to the price of oil. The terms of individual contracts are confidential, but generally take the following format:

$$P_{LNG} = \alpha \times P_{JCC} + \beta$$

Where:

P_{LNG} = the LNG Price in US dollars per million British thermal units (MBtu)

α = the slope or linkage (historically related to the energy content of gas relative to oil)

P_{JCC} = the Japan Customs-cleared Crude price in US dollars per barrel

β = a constant in US dollars per MBtu

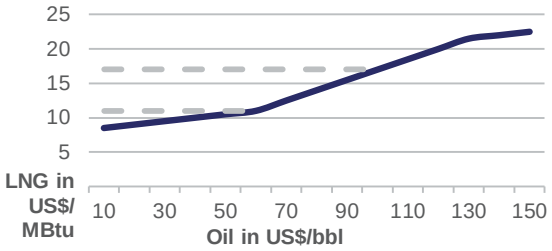
So, the LNG price with $100 crude, a slope of 15 per cent and a constant of $1 will be $16 per MBtu (0.15*100+1 = 16).

LNG contract curves also have kinks in them – known as S-curves – where the slope of the curve changes to provide protection for buyers at high oil prices and producers at low prices. The ceiling and floor kinks are determined on a contract by contract basis, but in general, older contracts have lower ceilings and floors and newer ones higher.

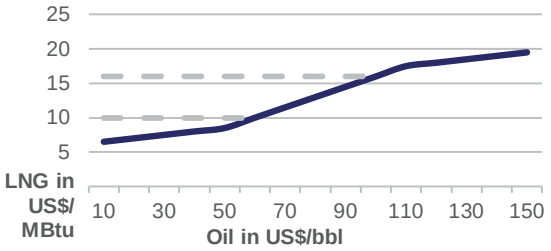
In the short term, lower oil prices are detrimental to Australian LNG producers as they squeeze the economics and cash flow of projects, a number of which are already over budget. The extent of the squeeze depends on the slope, the constant and the price floor established in their sales contracts. A bottom contract kink would reasonably be assumed to be agreed at a level that is at least slightly above a project's shutdown costs. The challenge for a number of new Australian projects is that cost overruns will have raised the breakeven point higher than when contracts were signed. Nonetheless, projects currently under construction are expected to reach operations, given capital investments and contractual obligations. Equity ownership and contract reopeners may provide some protection for producers even if oil prices remain depressed. The falling Australian dollar is also cushioning the impact of lower oil prices as contracts are almost uniformly priced in US dollars. Depreciation therefore increases the Australia dollar revenue companies receive.

Over the medium term, lower oil prices will have broader effects on the LNG market. Producers will focus on efficiency improvements and savings, but lower prices could also stimulate demand for LNG as its competitiveness against other fuels, excluding oil, increases. Most competing projects yet to make a final investment decision (FID) are likely to be deferred or cancelled which may reduce competition in the medium to longer term and contribute to a cobweb cycle – whereby long project lead times and producer's reliance on forecasting leads to market instability and commodity cycles.

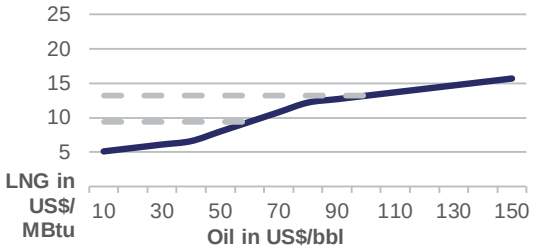
Figure 6.5: LNG contract variations with $60 and $100 a barrel oil marked



Note: contract assumes a slope of 15%, a constant of $2 per MBtu and kinks at $60 and $130 a barrel.



Note: contract assumes a slope of 15%, a constant of $1 per MBtu and kinks at $50 and $110 a barrel.



Note: contract assumes a slope of 14%, a constant of $1 per MBtu and kinks at $40 and $80 a barrel.

Global LNG developments

After five years of tightness, the global LNG market is currently undergoing structural change. High prices spurred huge global investments in liquefaction capacity, much of it in Australia, which is now beginning to enter production. A second wave of capacity expansion currently under construction in the US will exacerbate these cyclical effects.

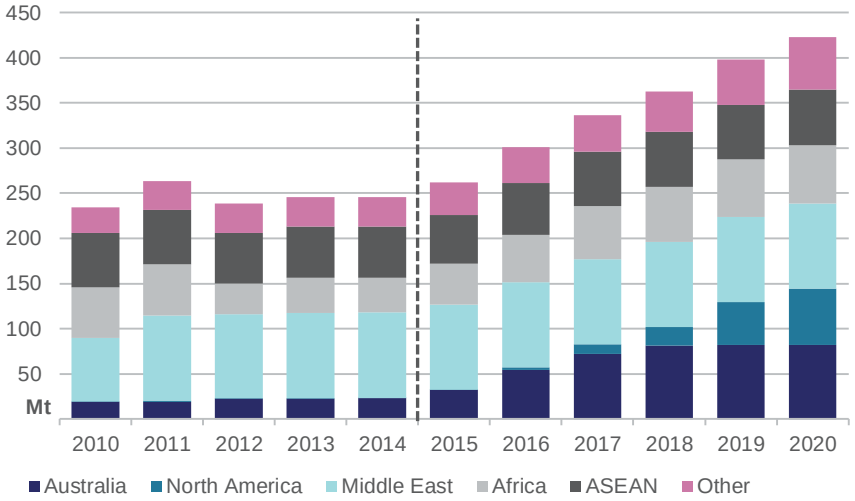
The most notable sign of market tightness easing is the low North Asian LNG spot price. Prices have fallen sharply over the past year as the start-up of PNG LNG and QCLNG have come in a climate of subdued economic growth and mild weather. Interestingly, spot LNG has recently been trading more cheaply in the Pacific basin than in the Atlantic as African LNG projects continue to experience difficulties which are constraining supply.

This supply glut coincides with a falling oil price – which has more than halved in the last six months – and will accentuate cost pressures on the LNG sector (see Box 1). Supply-side competition is becoming fiercer as buyers face greater choices between suppliers and contract and spot LNG prices plummet. New project delays and deferrals are becoming commonplace as producers struggle to find new buyers at prices that will underwrite investment in new LNG plants. New developments seem highly unlikely to go ahead in the medium term, particularly following cost and time overruns and issues with build quality at a number of recently completed and under construction projects.

The United States

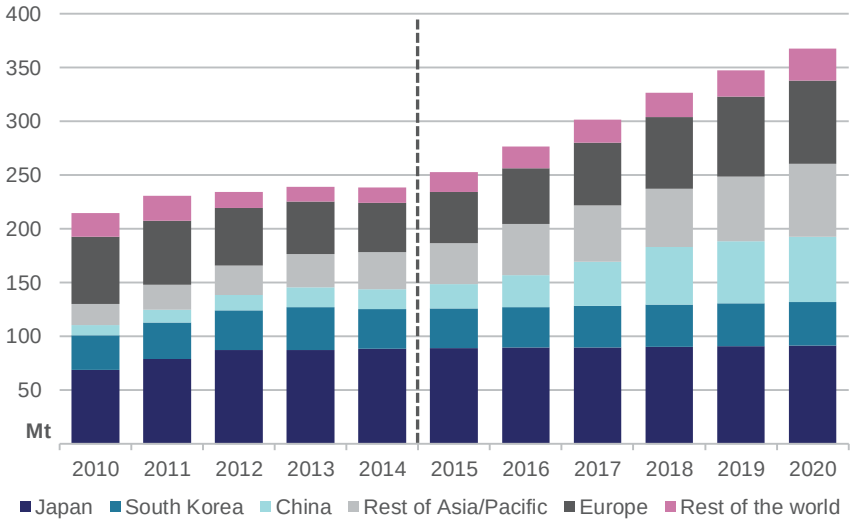
The United States, where gas production continues to grow, provides the exception to increasing LNG market pessimism. Four LNG plants are currently under construction – Sabine Pass and Cameron in Louisiana, Freeport in Texas and Cove Point in Maryland. Another two, Corpus Christi and Elba Island, have received regulatory approval and are expected to go ahead despite not yet making FID. These plants are forecast to generate around 62 million tonnes of annual LNG export capacity by 2020.

Figure 6.6: Global LNG supply capacity



Note: Includes allowances for plant downtime and maintenance.
Sources: Nexant and IEA.

Figure 6.7: Global LNG imports



Sources: Nexant and IEA.

New capacity in other countries

This new US export capacity will combine with Australia's soon to be completed plants (59 million additional tonnes) to add around 121 million tonnes of LNG export capacity to the global market over the next five years. This compares with total global LNG trade of only around 238 million tonnes in 2014. Increased production from other new plants in ASEAN, Africa and Russia are expected to add another 56 million tonnes, bringing total global capacity to 423 million tonnes by 2020.

Global LNG imports are expected to grow from 238 million tonnes in 2014 to 368 million tonnes in 2020, but will lag increasing supply. China – increasing from 18 to 61 million tonnes over that period – and the Middle East and South and East Asia are expected to be the main sources of LNG import growth.

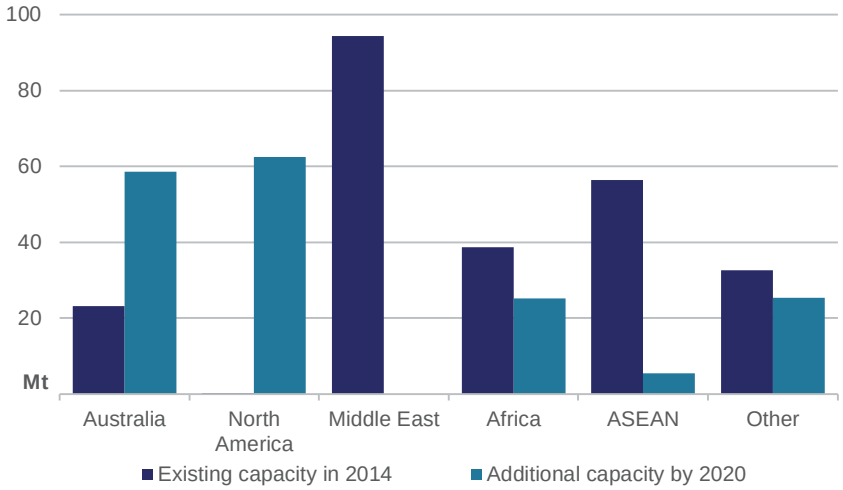
Regional LNG markets

Japan

Japan is the world's largest importer of LNG and the destination for around 80 per cent of Australia's LNG exports. Japan relies on LNG to meet almost all domestic demand for gas, the majority of which supplies the electricity generation sector, as well as the manufacturing and residential sectors. Mild weather resulted in relatively flat Japanese LNG imports in 2014, at 88 million tonnes.

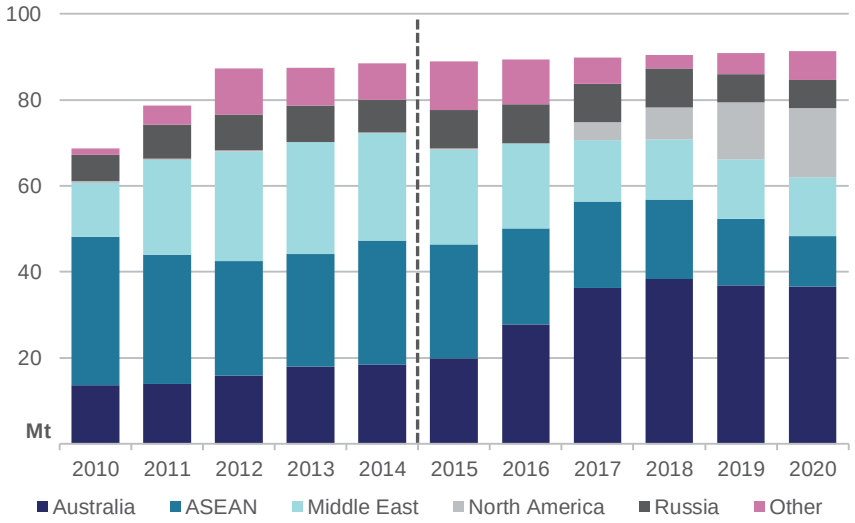
Japan's LNG imports are projected to increase slightly over the outlook period, reflecting modest economic growth. Oil price falls will lower Japan's expenditure on imported fuels but are not expected to materially increase LNG demand. The composition of Japan's LNG import mix is expected to shift over the medium term as contracts with new LNG projects commence. Australia in particular will increase its share of Japanese imports, from around 21 per cent currently, to 40 per cent in 2020. This will come mostly at the expense of ASEAN and Middle Eastern imports. The United States is also expected to become a significant exporter to Japan by 2020, with around 16 million tonnes of LNG in that year.

Figure 6.8: Global existing and incremental liquefaction capacity



Note: Includes allowances for plant downtime and maintenance.
Source: Nexant.

Figure 6.9: Japan LNG import outlook



Source: Nexant and IEA.

The risk to Japan's LNG import outlook remains to the downside due to uncertainty regarding nuclear reactor restarts. Four reactors have been approved to restart, but are not expected to have any impact on LNG imports as they will displace less efficient oil-fired electricity generation. However, if the initial restarts go smoothly and the program is accelerated, Japanese LNG imports could be materially lower by the end of the outlook period than anticipated.

China

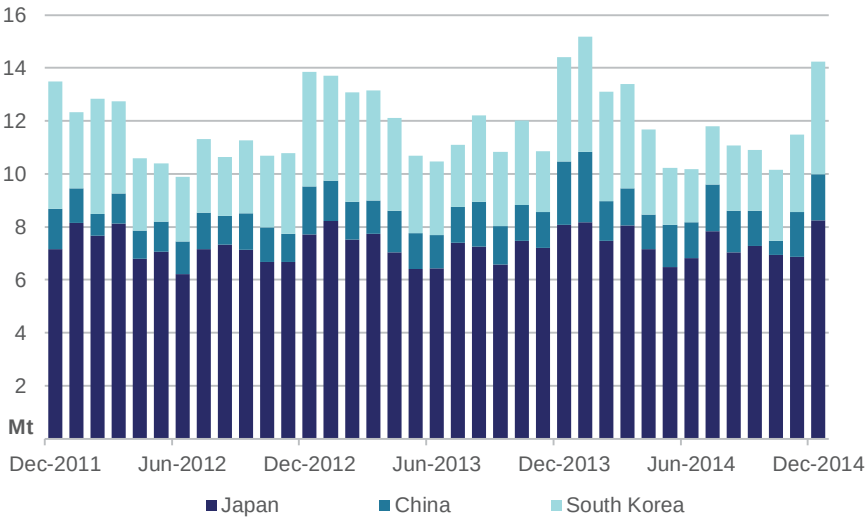
China is the world's third largest LNG importer, despite only building its first regasification plant in 2006. Since then, imports have grown at 59 per cent a year to reach 18 million tonnes in 2013. In contrast, strong hydro-electric output and relatively mild weather resulted in only 3 per cent growth in 2014 – the lowest year on year growth since LNG imports began.

Strong LNG import growth is expected to return in 2015 driven by new contracts starting and relatively low spot prices. Imports are projected to grow rapidly to reach 61 million tonnes in 2020, more than triple the volume imported in 2014, and enough to overtake South Korea as the world's second largest LNG importer.

Australia will support this growth through increasing supply to China to around 18 million tonnes a year by 2020, but will remain a smaller source of LNG than ASEAN producers. The majority of ASEAN LNG being displaced by new Australian and North American contracts to Japan and South Korea is expected to be redirected to China (or consumed with ASEAN itself).

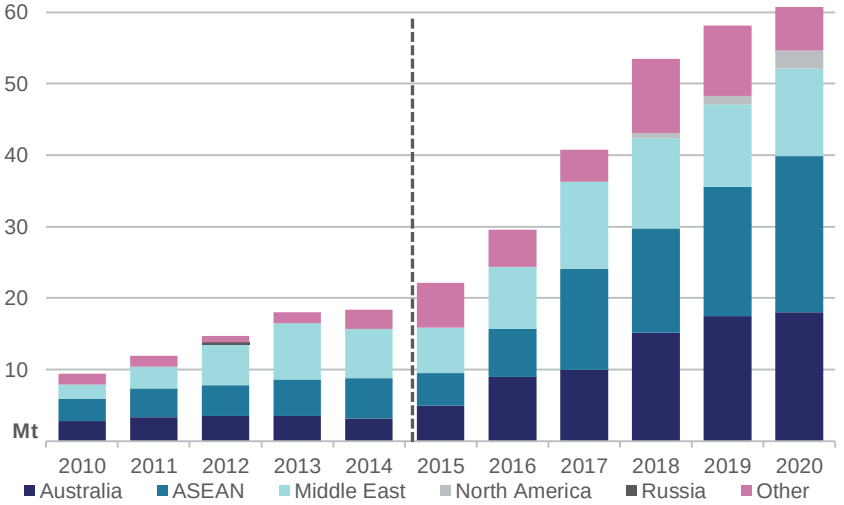
Despite some concerns around the economic growth outlook, the prospects for Chinese gas demand remain positive. Gas is attractive as a means of reducing air pollution in major cities and rapid urbanisation is driving strong residential sector consumption. Recent reforms which will result in increased domestic prices are good for producers but it remains to be seen how consumers will respond.

Figure 6.10: Monthly LNG imports



Source: Argus Global LNG.

Figure 6.11: China LNG import outlook



Sources: Nexant and IEA.

Uncertainty also remains regarding the development of the Chinese gas supply mix. The Central Government has set ambitious targets for domestic gas production as well as promoting pipeline connections with Central Asia and Russia. However, LNG's competitiveness against these other sources is greatly increased at current oil and spot prices and may result in some pipeline gas being squeezed out. Pipeline gas is estimated to reach the Western China border at US$8 to $10 a gigajoule, higher than the current spot price for LNG delivered into ports in Eastern China. Pipeline gas prices also incur considerable costs associated with piping the gas across China to Eastern demand centres.

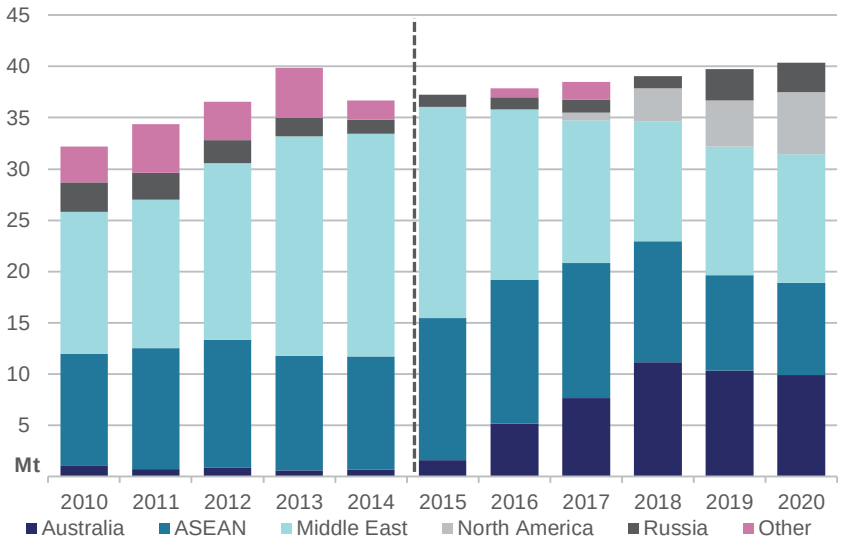
South Korea

South Korea is the world's second largest LNG importer after Japan. Small domestic resources and geopolitical impediments to pipelines combine with sizable domestic demand, particularly from the electricity generation sector, to drive LNG demand.

South Korea's gas consumption grew steadily over the decade to 2013, culminating in 39.9 million tonnes being imported following nuclear shutdowns in 2013. Despite the nuclear industry's continued challenges in 2014, LNG, which has been expensive throughout the year, has not made inroads in the electricity generation sector due to increased imports of cheaper thermal coal. Total 2014 LNG imports are estimated to have been 7 per cent lower than 2013 at 36.7 million tonnes.

South Korea is expected to import around 40.4 million tonnes of LNG in 2020, a slight increase on 2014 imports. While growth will be modest, the supply mix is expected to change in a similar fashion to Japan. New contracts with Australia and the United States will commence from 2016, which will push out supply from ASEAN and the Middle East. Australia is expected to supply around 10 million tonnes of LNG to South Korea in 2020, a tenfold increase on current volumes.

Figure 6.12: South Korea LNG import outlook



Sources: Nexant and IEA.

Australia

Production

Australian gas production was 15.9 billion cubic metres in the December quarter, a 9 per cent decrease on September volumes. Decreases in production for both domestic and export markets contributed to the fall. The North West Shelf and Pluto LNG projects produced less LNG than in the previous quarter, which more than offset increased production from Darwin LNG following maintenance.

Domestic gas production was generally lower as well. In the Eastern market, Gippsland basin production fell sharply from winter highs, as did Bass and Otway basin output. Western and Northern market domestic production was flatter as reduced customer demand resulting in lower output from the NWS project's domestic gas plant was largely matched by slight increases elsewhere.

Australia is forecast to produce 67.1 billion cubic metres of gas in 2014–15, a 6 per cent increase on the 63.1 billion cubic metres produced in 2013–14. The ramp-up of train 1 at QCLNG, which began operations in the December quarter, and the start-up of Gladstone LNG around mid-year will be the only two sources of additional production in 2015.

Production outlook

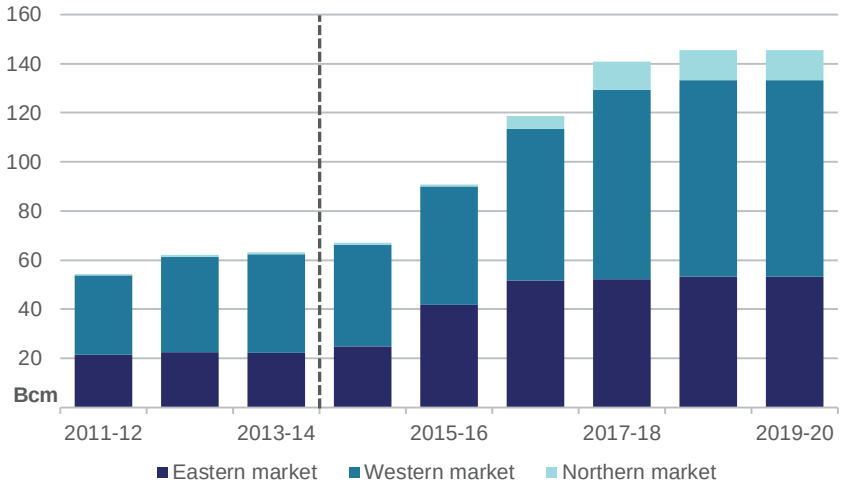
Australian gas production is expected to grow strongly over the outlook period, at an average rate of 17 per cent a year. This colossal expansion in Australian gas production is a result of the seven new LNG projects which will begin operations between 2014 and 2018. Gas production is projected to more than double to 145.6 billion cubic metres by 2019–20.

Growth in Eastern market gas production will come almost entirely from CSG fields in the Bowen-Surat basins in Queensland which are supplying LNG projects in Gladstone. Production in Eastern Australia is projected to increase from 25.0 billion cubic metres in 2014–15 to 53.2 billion cubic metres in 2019–20.

The first LNG cargo from QCLNG was loaded in late December 2014 and heralds the expansion of a new industry for Eastern Australia. When fully operational in 2016, it will add 8.5 million tonnes a year of LNG export capacity, roughly equivalent to Victoria and NSW's combined annual gas consumption.

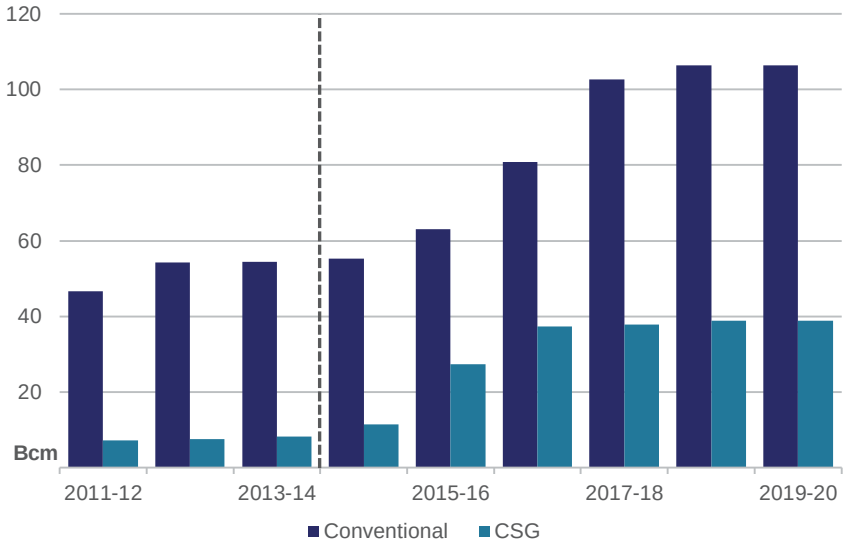
GLNG, currently around 90 per cent complete, is expected to achieve first-LNG in mid-2015 and represents another 7.8 million tonnes a year of capacity when fully operational. GLNG will be followed later in 2015 by Australia Pacific LNG (APLNG) with 9 million tonnes of annual capacity. QCLNG is expected to start approaching full capacity by mid-2016 and all three are expected to be running at effective capacity by 2018.

Figure 6.13: Australian gas production outlook by market



Note: Gas production associated with Darwin LNG is not included in the Northern market as it comes from the Bayu-Undan Joint Petroleum Development Area.

Figure 6.14: Australian gas production outlook by type



Western market production, already Australia's largest, is projected to almost double from 41.4 billion cubic metres in 2014–15 to 80.1 billion cubic metres in 2019–20. Gorgon LNG, a 15.6 million tonne a year project that is currently 90 per cent complete, is expected to begin operations later this year and will be Australia's second largest LNG plant behind NWS. Wheatstone, 55 per cent complete, and Prelude LNG are both expected to begin operations in 2017 and will add another 8.9 and 3.6 million tonnes a year of LNG export capacity, respectively, when at full capacity in 2018–19.

Gas production in the northern market is expected to grow to 12.3 billion cubic metres in 2019–20, from just 0.7 billion cubic metres in 2014–15. This dramatic growth will supply the 8.4 million tonnes a year Ichthys LNG project, which is currently around 64 per cent complete and due for completion in 2017.

Exports

Australia exported 5.9 million tonnes of LNG in the December quarter, a 6 per cent decrease from the previous quarter. Production rebounded significantly at Darwin LNG, but this was more than offset by decreases at NWS, due to maintenance, and Pluto, due to unplanned outages. The start-up of QCLNG is forecast to result in total export volume for 2014–15 reaching a record 25.5 million tonnes, 10 per cent higher than 2013–14.

LNG export values reached $4.8 billion in the December quarter, another record high. The depreciating Australian dollar and high contract prices (contracts lag the oil price by 6 to 9 months) outweighed volume decreases. Total export value for 2014–15 is forecast to be $18.2 billion, almost $2 billion higher than the previous year. Oil price falls are expected to reduce quarterly export values in the short term, but volume effects will begin outweighing them by the end of the year, when quarterly export value records are expected to be set again.

Figure 6.15: Australian liquefaction capacity and LNG exports

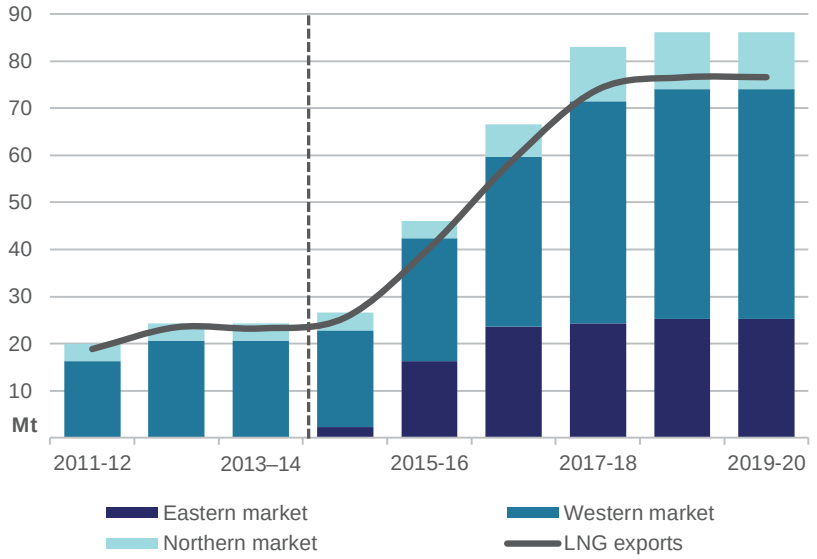
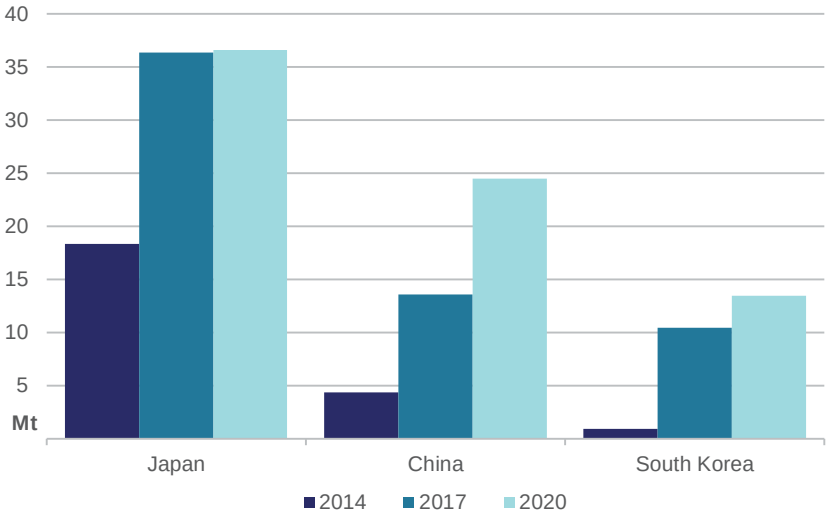


Figure 6.16: Australian LNG export outlook by destination



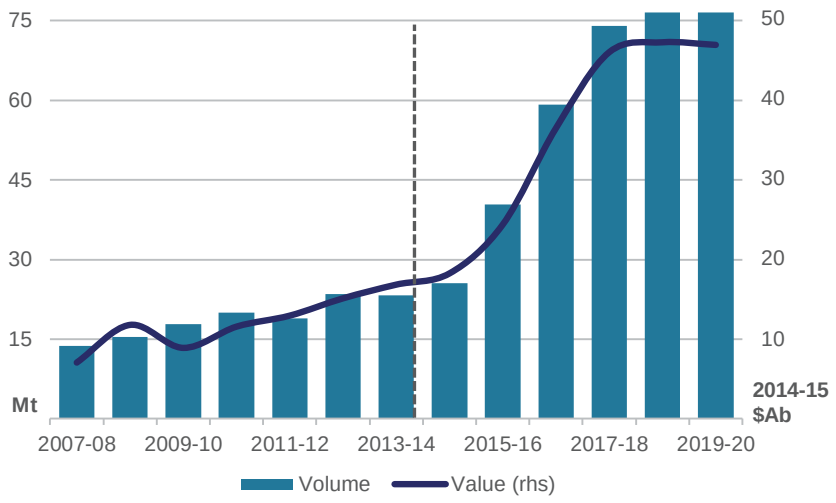
Source: Nexant.

Export outlook

LNG export volumes are projected to triple in the next five years, transforming the Australian LNG sector. The recently completed QCLNG will be joined by GLNG, APLNG and Gorgon LNG in 2015 and Ichthys, Wheatstone and Prelude LNG in 2016 and 2017. Combined with the existing NWS, Darwin and Pluto LNG projects, Australia is on track to boast ten LNG plants comprising 21 trains and 86.1 million tonnes of liquefaction capacity in 2020. Exports are projected to be 76.6 million tonnes in 2019–20, slightly below effective capacity due to strong global competition, but enough to overtake Qatar as the world's largest LNG exporter.

Strong growth in export volumes will be the key driver of projected increases in export values. The effect of lower oil prices, which leads to significantly lower export values than previously forecast, is partially offset by the expected currency depreciation. Export values are projected to increase at an annual growth rate of 21 per cent from $18.2 billion in 2014–15 to $46.7 billion in 2019–20 (in 2014–15 dollars).

Figure 6.17: Australian LNG exports



Source: ABS.

Table 6.1: Gas outlook

	unit	2013–14	2014–15f	2015–16f	2016–17z	2017–18z	2018–19z	2019–20z
Australia								
Production b	Bcm	63.1	67.1	90.8	118.6	140.9	145.5	145.6
– Eastern market	Bcm	22.3	25.0	41.7	51.7	52.3	53.2	53.2
– Western market	Bcm	40.1	41.4	48.4	61.9	77.1	80.0	80.1
– Northern market c	Bcm	0.7	0.7	0.7	5.0	11.5	12.3	12.3
LNG export volume	Mt d	23.2	25.5	40.3	59.1	74.0	76.5	76.6
– nominal value	A$m	16 305	18 147	24 849	38 004	48 979	51 405	52 171
– real value e	A$m	16 745	18 147	24 243	36 279	45 749	46 981	46 656

b Production includes both sales gas and gas used in the production process (i.e. plant use). **c** Browse basin production associated with the Ichthys project is classified as Northern market. **d** 1 million tonnes of LNG is equivalent to approximately 1.36 million cubic metres of gas. **e** In current financial year Australian dollars. **f** forecast. **z** projection.
Sources: ABS; Company reports and World Bank.

Oil

Kieran Bernie

The value of Australia's exports will fall in the short term due to lower prices, before growing as new capacity comes on line. Over the medium term, weak but rising global consumption will outweigh slower growth in production caused by reduced upstream investment, placing upward pressure on prices.

Prices

Oil prices declined sharply in the second half of 2014 as continued growth in unconventional production in the US compounded weakening global economic growth and oil demand. Prices continued to decline into 2015, with West-Texas Intermediate (WTI) falling to US$44 a barrel in late January, while Brent fell to US$45 a barrel.

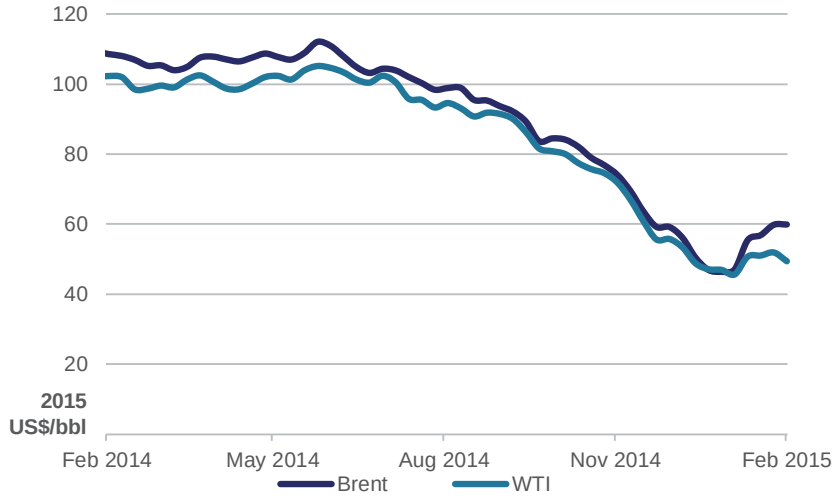
Although the decline in prices has been considerable, most energy and resource commodities are subject to price cycles, which can at times be volatile.

There have been two major spikes in oil price volatility over the last 25 years. The first spike occurred shortly before the first Gulf War in 1991 due to concerns over supply from Iraq, Kuwait and Saudi Arabia. The second spike coincided with the global financial crisis, when the price of oil declined by almost 80 per cent over a six-month period before rebounding strongly in 2009.

Volatility associated with the recent decline remains below levels associated with the cases outlined above, but the true extent of the current episode will necessarily depend on the behaviour of oil prices into the future.

In real terms, the price of WTI is forecast to average US$52 a barrel in 2015, down 46 per cent from US$97 a barrel in 2014. Brent is forecast to average US$60 a barrel in 2015, falling 42 per cent from US$103 a barrel in 2014.

Figure 7.1: Weekly oil prices



Note: February prices calculated using an assumed deflator.
Source: US Bureau of Labor Statistics.

Figure 7.2: Oil price volatility

Note: Volitility calculated as the standard deviation of daily percentage price changes for WTI over previous 125 day period.
Source: EIA.

Prices are expected to increase over the medium term, with growth in consumption outweighing slower growth in production caused by reduced upstream investment. In real terms, the price of WTI is projected to increase to US$64 a barrel by 2020, while the price of Brent is projected to reach US$67 a barrel.

Prices remain subject to considerable uncertainty over the outlook period due to ongoing conflicts that have the potential to disrupt supply, and possible economic instability in states impacted heavily by the recent decline in prices.

World oil consumption

World oil consumption grew by just 0.7 per cent in 2014 to average 92.4 million barrels a day, the smallest increase in five years. The low rate of growth was a result of large absolute declines in consumption by OECD economies in Asia and Europe, and relatively weak demand growth in China.

Growth is expected to recover in the medium term but is forecast to remain below levels that prevailed prior to the financial crisis. World oil consumption is projected to increase by 1.2 per cent a year over the outlook period, to average 99.1 million barrels a day in 2020. Growth will continue to be driven by increased consumption in non-OECD economies, particularly those in Asia and the Middle-East.

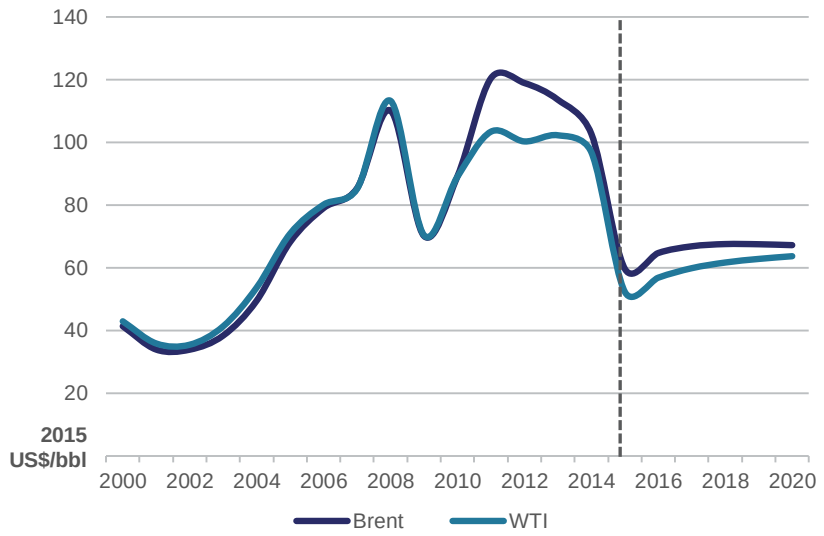
OECD economies

Oil consumption in OECD economies fell by 0.9 per cent in 2014 to average 45.6 million barrels a day, largely as a result of sharp declines in Japan and a number of European economies.

The decline in OECD consumption is forecast to moderate in the near term but is expected to gain momentum towards the end of the outlook period, falling to 45.1 million barrels a day in 2020. In the near term, patterns of consumption within the group are expected to vary according to underlying differences in economic growth.

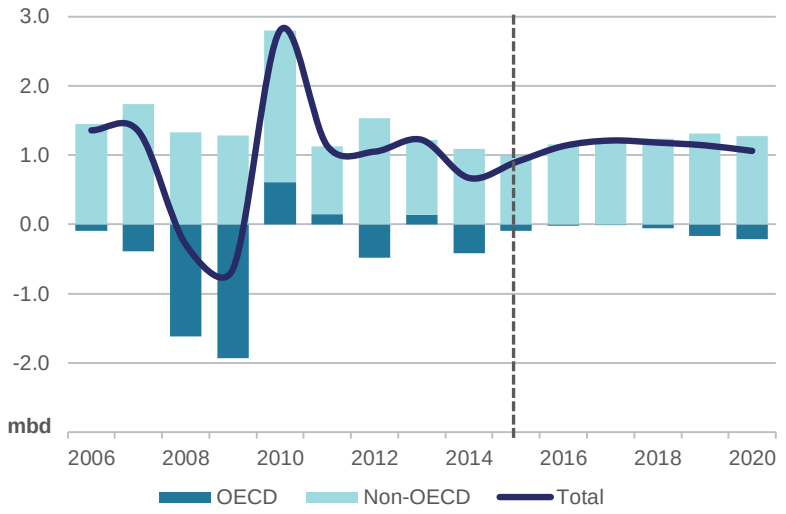
In North America, ongoing economic recovery is expected to support increasing consumption over the first half of the outlook period.

Figure 7.3: Annual oil prices



Source: Bloomberg.

Figure 7.4: Growth in world oil consumption



Source: IEA.

Oil consumption in North America is forecast to increase by 0.3 per cent a year to 2018, before falling to 24.4 million barrels a day in 2020 as a result of improving efficiency in the transport sector.

The sharp decline in consumption by European economies is expected to continue into 2015 in line with escalating deflationary pressures, before moderating somewhat as conditions improve. Toward the end of the decade, the decline is expected to gather momentum again as demographic and consumer trends dampen oil consumption. From 2018, consumption by OECD economies in Europe is projected to decline by 1.0 per cent a year, to average 12.9 million barrels a day in 2020.

In the Asia Oceania region, weak growth and deflationary pressures, particularly in Japan, are also expected to contribute to a decline in oil consumption over the medium term. For the region as a whole, oil consumption is forecast to decline by 0.4 per cent a year, falling to 7.8 million barrels a day by the end of the decade.

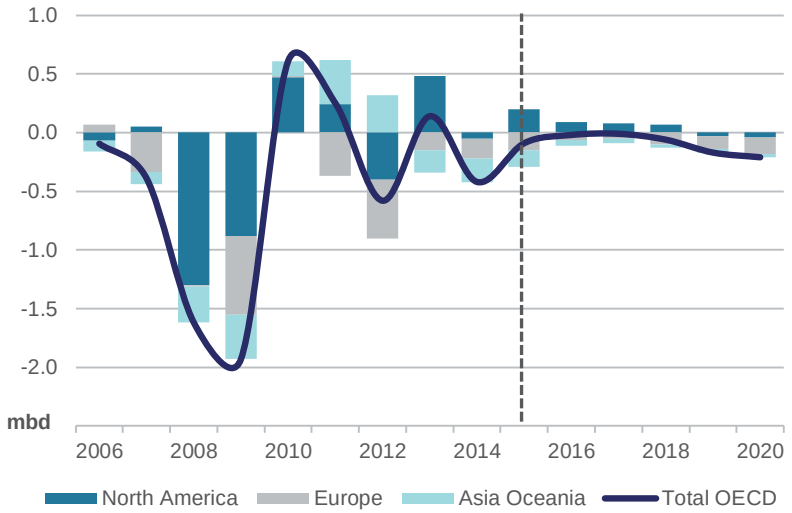
Non-OECD economies

Oil consumption in non-OECD economies increased by 2.4 per cent in 2014 to average 46.8 million barrels a day, driven by continued growth in Asia and the Middle-East.

The strong increase in non-OECD consumption is projected to continue in the medium term, but the distribution of incremental consumption within the group is expected to differ from earlier patterns. Over the outlook period, consumption by non-OECD economies is forecast to increase by 2.5 per cent a year, to reach 54.0 million barrels a day in 2020.

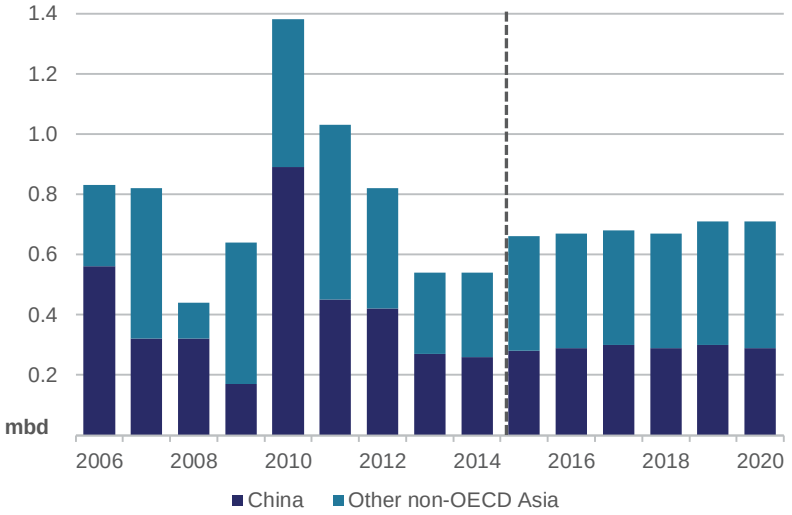
In China, consumption growth is projected to slow considerably as the economy transitions and there is an increased focus on domestic demand and environmental amenity. Oil demand in China is forecast to increase by 2.6 per cent a year over the outlook period, to reach 12.1 million barrels a day in 2020. This compares with an annual growth rate of 4.8 per cent for the period between 2009 and 2014.

Figure 7.5: Change in OECD consumption



Source: IEA.

Figure 7.6: Growth in oil consumption in non-OECD Asia



Source: IEA.

Slowing growth in China is expected to be offset by strong increases in consumption by other non-OECD economies in Asia – particularly India, where increasing numbers of passenger and commercial vehicles are expected to drive future growth. Increases in consumption by other non-OECD economies in Asia are forecast to grow by 3.0 per cent a year over the outlook period, to reach 14.5 million barrels a day in 2020.

In the Middle-East, oil consumption is projected to continue to increase despite ongoing conflicts and trends towards improved efficiency in the transport sector. Over the outlook period, oil consumption by non-OECD economies in the Middle-East is forecast to increase by 2.6 per cent a year, to reach 9.5 million barrels a day by the end of the decade.

In Russia and a number of other non-OECD economies in Latin America, the recent decline in oil prices is expected to significantly reduce government revenues and dampen economic growth and oil consumption in the near term. The effect will be most pronounced in Russia, where oil consumption is forecast to contract by 4.5 percent in 2015 to 3.4 million barrels a day.

World oil production

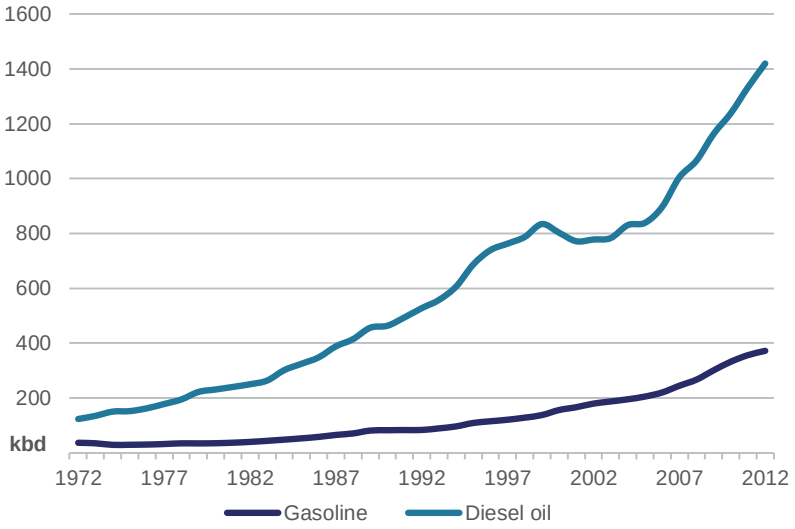
Despite ongoing conflicts and sanctions affecting major suppliers, world oil production grew by 2.1 per cent in 2014 to reach 93.3 million barrels a day, as a result of strong increases in supply from non-OPEC producers.

World oil production is expected to continue to increase in the medium term, but growth will slow as a result of reductions in exploration and development investment caused by the decline in oil prices. Global production is projected to increase by 0.9 per cent a year over the outlook period, growing to 98.3 million barrels a day in 2020.

OPEC oil production

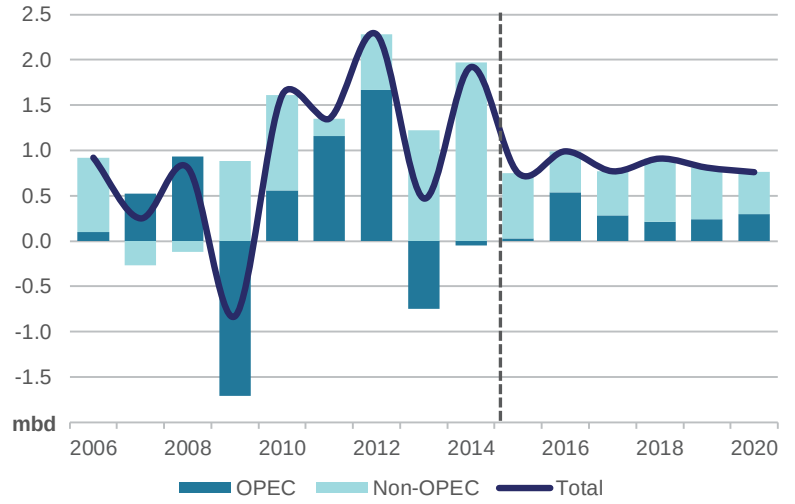
In 2014, declines in Libyan production outweighed increased production from Iraq and Iran, causing OPEC production to fall by 0.1 per cent to average 36.7 million barrels a day.

Figure 7.7: Indian consumption of road transport fuels



Source: IEA.

Figure 7.8: Growth in world oil production



Source: IEA.

Production by OPEC states is expected to remain relatively flat in 2015 but is forecast to increase in 2016 as a result of continued growth in Iraq and the United Arab Emirates (UAE), recovering Libyan output, and expanding production of natural gas liquids. Production will increase more slowly over the remainder of the outlook period, growing by 0.7 per cent a year to average 38.3 million barrels a day in 2020.

Iraqi production increased to a 35 year high of 3.7 million barrels a day in late 2014, supported by strong growth in output from its Southern oil fields, which are not threatened by ISIL forces. While the ongoing conflict presents a downside risk to future supply, production in Iraq is forecast to continue to increase by 3.7 per cent a year over the outlook period, to reach 4.3 million barrels a day in 2020.

In the UAE, production is projected to increase over the medium term, in line with the development of the large offshore Upper Zakum field, which has the potential to lift production by as much as 750 thousand barrels a day. Over the outlook period the UAE is projected to lift production by 1.8 per cent a year, to average 3.0 million barrels a day by the end of the decade.

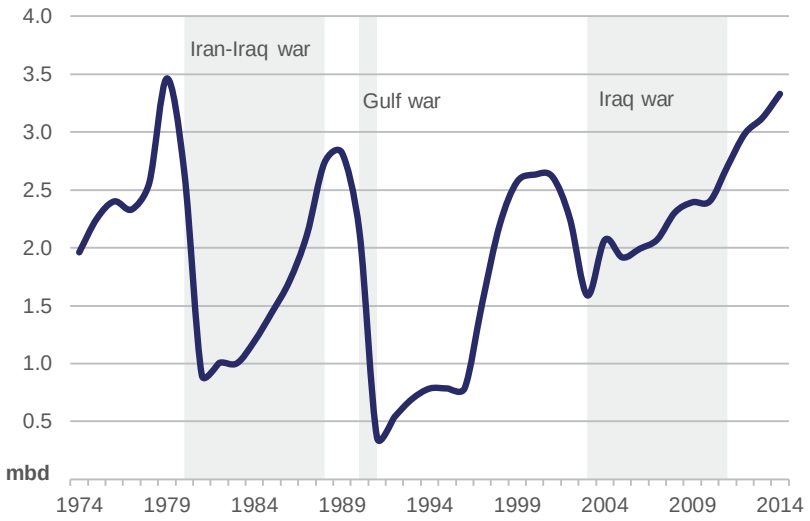
Libyan production briefly reached 1.0 million barrels a day in October 2014, but subsequent attacks on oil fields and key pieces of infrastructure have severely degraded supply capacity. As a result, Libyan output remains the most uncertain component of OPEC production over the medium term. Production is forecast to average 0.3 million barrels a day in 2015 before gradually recovering to reach an average of 0.5 million barrels a day in 2020.

In Venezuela, production is expected to fall in the first half of the outlook period due to reduced expenditure on capacity expansions caused by the decline in the price of oil. Production is projected to fall to 2.3 million barrels a day in 2017, before recovering to 2.5 million barrels a day by the end of the decade.

Non-OPEC oil production

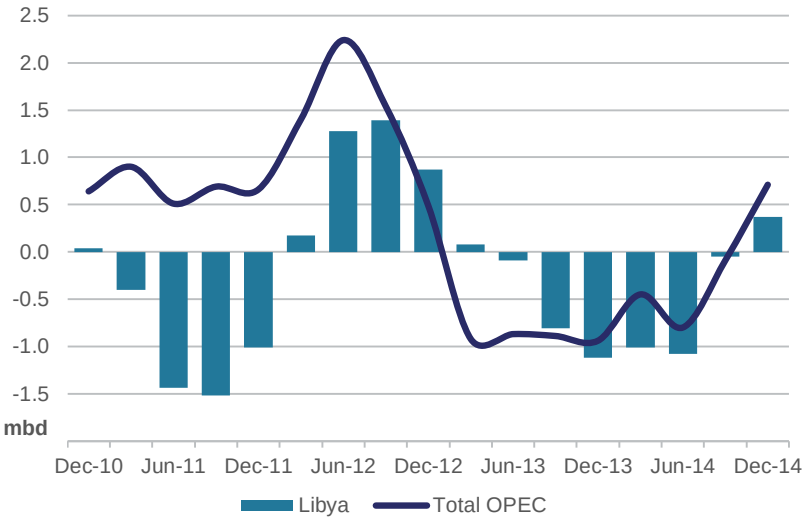
Output from non-OPEC producers increased considerably in 2014, growing by 3.6 per cent to average 56.6 million barrels a day, driven by strong growth in supply from unconventional sources in the US.

Figure 7.9: Oil production in Iraq



Source: IEA.

Figure 7.10: Year on year change in Libyan oil production



Source: IEA.

Non-OPEC production is expected to continue to increase over the medium term, but at a much lower rate of growth due to reduced capital expenditure on new and existing fields. Output from non-OPEC producers is projected to grow by 0.9 per cent a year over the outlook period, to reach 60.0 million barrels a day by the end of the decade, accounting for 61 per cent of global supply.

US output remains the largest source of growth in non-OPEC supply in the medium term, despite lower upstream investment that significantly lowers expected production growth. Production in the US is projected to grow by 2.3 per cent a year over the outlook period, increasing to 14.0 million barrels a day in 2020. This compares with an annual growth rate of 11.2 per cent for the period between 2010 and 2014.

While growth is expected to slow, the recent sharp decline in the number of oil rigs deployed in the US will not necessarily translate into a commensurate decline in output. Recent improvements in drilling efficiency, lower production costs and an increased focus on the most productive drilling areas may partially offset the declining rig count.

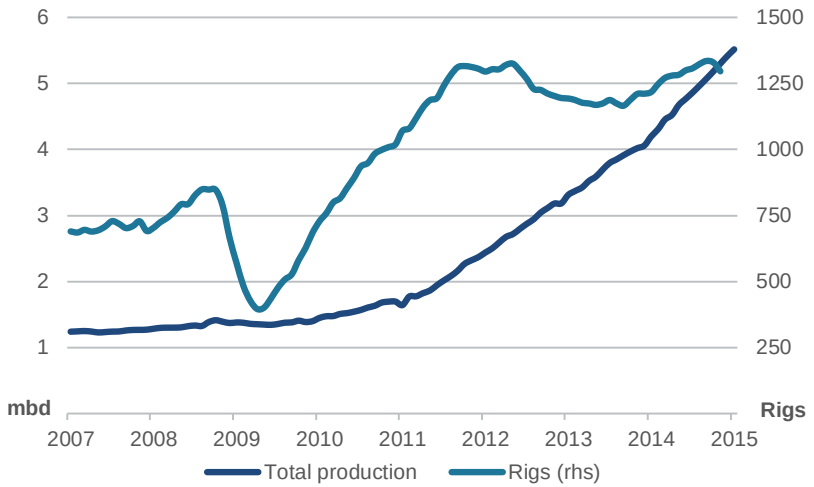
Unconventional production in the US is also likely to be more price elastic than conventional supply, due to its rapid decline rates, need for recurrent investment, and short lead times and payback periods.

Unconventional oil sands projects in Canada, which accounted for more than half of national production in 2014, are less price sensitive due to comparatively high upfront capital costs, long lead times, and longer payback periods.

The decline in oil prices is not expected to affect existing oil sands projects but lower prices are likely to reduce any investment in new projects in the near term. Canadian production is projected to increase by 2.9 per cent over the outlook period, to reach 5 million barrels a day by the end of the decade.

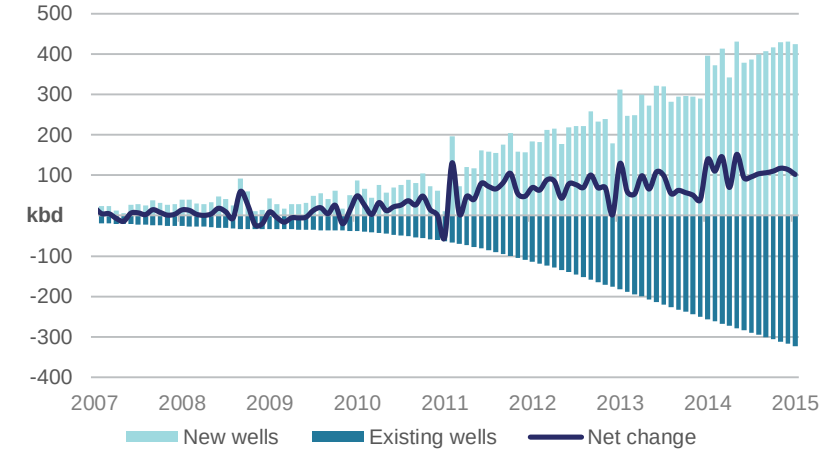
Production in Brazil is expected to provide the second largest incremental increase in non-OECD supply in the medium term. However, the rate of growth is projected to decline from current levels as lower oil prices and high levels of debt constrain output from technically challenging pre-salt water oil fields.

Figure 7.11: Production from US shale oil regions



Note: Covers Bakken, Eagle Ford, Haynesville, Marcellus, Niorara, Permian and Utica regions.
Source: EIA.

Figure 7.12: Change in production in US shale oil regions



Note: Covers *Bakken*, Eagle Ford, Haynesville, Marcellus, Niobrara, Permian and Utica regions.
Source: EIA.

Brazilian production is forecast to increase by 5.0 per cent a year over the outlook period, growing to 3.2 million barrels a day by 2020.

In Russia, the sharp decline in oil prices, currency movements, and sanctions-related restrictions on technology and financing are expected to cause production to contract considerably over the medium term. Russian production is projected to decline by 0.7 per cent a year over the outlook period, falling to 10.4 million barrels a day by the end of the decade.

Australian production and exports

Australia produced 356 thousand barrels of crude oil and condensate a day in the December quarter; up 6.4 per cent on a year-on-year basis, due to increased output from the Carnarvon and Gippsland Basins. Annual production is forecast to increase by 6.8 per cent in 2014-15, to reach 375 thousand barrels a day.

The recent decline in oil prices is not expected to affect Australian projects under construction or currently producing, but is likely to reduce investment in exploration and development, which may slow growth in future supply capacity.

Despite this, output is projected to increase to 430 thousand barrels a day in 2017-18 in line with increasing condensate production associated with the Prelude and Icthys projects, before falling to 377 thousand barrels a day in 2019-20.

The volume of Australia's exports of crude oil and condensate averaged 301 thousand barrels a day in the December quarter, significantly more than the seasonally low 233 thousand barrels a day recorded in the 2013 December quarter. Similar to production, export volumes are forecast to expand in 2014-15, to reach 290 thousand barrels a day.

Export volumes are then projected to increase to 331 thousand barrels a day in 2017-18, in line with additional production from new projects close to regional trading hubs in Asia, before falling to 295 million barrels a day in 2019-20 as declining production in mature fields offsets additional capacity from new projects.

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Figure 7.13: Australian petroleum production

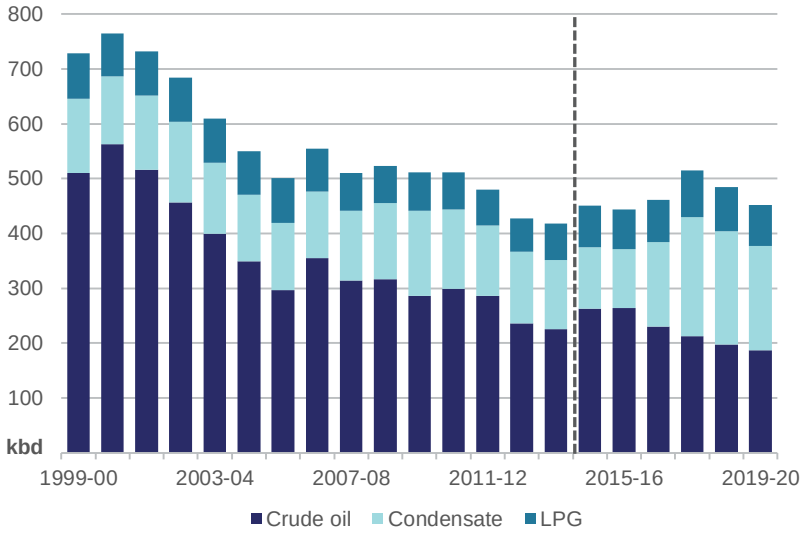
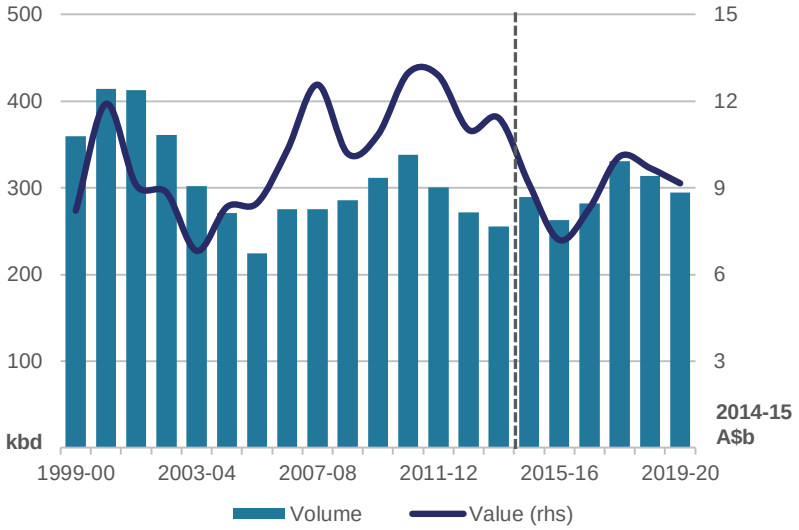


Figure 7.14: Australian crude oil and condensate exports



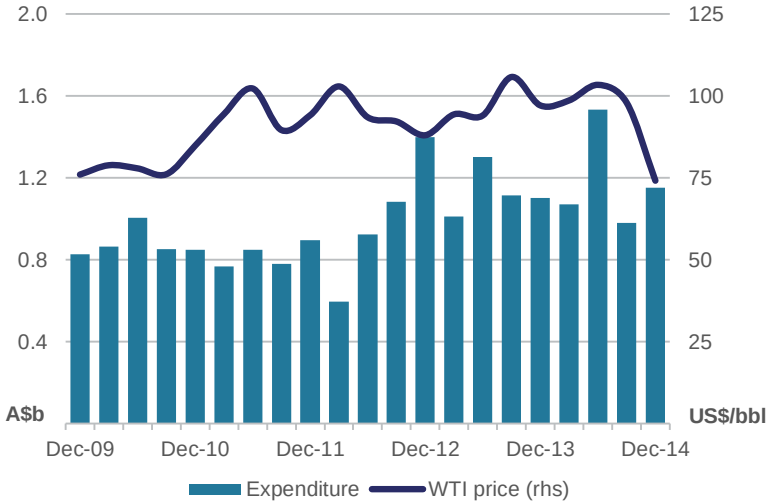
Source: ABS.

Despite increased export volumes and a lower Australian dollar, the value of exports of crude oil and condensate are forecast to decline until 2015-16 as a result of significantly lower prices. Export earnings are then projected to grow as volumes increase; in real terms, reaching A$10.1 billion in 2017-18, before falling to A$9.2 billion by the end of the decade.

Production of refined products declined by 11 per cent on a year-on-year basis in the December quarter, largely as a result of the cessation of refining operations at the Kurnell facility in October. Output from Australian refineries is projected to fall further over the medium term with end of refining at the Bulwer Island facility by mid-2015.

As a result, the volume of imported refined products is projected to increase over the outlook period, rising by 6.7 per cent a year, to reach 796 million barrels a day in 2019-20.

Figure 7.15: Australian petroleum exploration expenditure



Source: ABS.

Table 7.1: Oil outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Production b	Mbd	93.3	94.0	95.0	95.8	96.7	97.5	98.3
Consumption b	Mbd	92.4	93.3	94.5	95.7	96.9	98.0	99.1
WTI crude oil price								
– nominal	US$/bbl	94.7	52.3	58.2	62.7	66.1	68.8	71.4
– real c	US$/bbl	96.8	52.3	56.9	59.9	61.7	62.8	63.7
Brent crude oil price								
– nominal	US$/bbl	100.4	59.7	66.2	70.0	72.4	74.0	75.3
– real c	US$/bbl	102.7	59.7	64.7	66.9	67.6	67.5	67.2
		2013–14	**2014–15 f**	**2015–16 f**	**2016–17 z**	**2017–18 z**	**2018–19 z**	**2019–20 z**
Australia								
Crude oil and condensate								
Production b	kbd	352	375	371	384	430	404	377
Export volume b	kbd	255	290	263	282	331	314	295
– nominal value	A$m	11 115	9 134	7 377	8 693	10 801	10 599	10 241
– real value d	A$m	11 415	9 134	7 197	8 298	10 089	9 687	9 158
Imports b	kbd	488	403	290	287	284	286	290
LPG								
Production be	kbd	66	76	73	77	85	80	75
Export volume b	kbd	42	47	44	48	52	49	46
– nominal value	A$m	1 265	1 000	918	1 076	1 245	1 215	1 160
– real value d	A$m	1 299	1 000	896	1 027	1 163	1 110	1 038
Petroleum products								
Refinery production b	kbd	589	506	389	384	378	372	367
Exports bg	kbd	11	11	11	10	10	10	10
Imports b	kbd	423	541	697	722	750	773	796
Consumption bh	kbd	944	977	1 007	1 023	1 041	1 060	1 081

b Number of days in a year is assumed to be exactly 365. A barrel of oil equals 158.987 litres. **c** In current calendar year US dollars. **d** In current financial year Australian dollars. **e** Primary products sold as LPG. **g** Excludes LPG. **h** Domestic sales of marketable products. **f** forecast. **z** projection.
Sources: ABS; IEA; Energy Information Administration (US Department of Energy); Geoscience Australia.

Box 7.1: The economic consequences of a decline in the price of oil

The effect of a fall in the price of oil differs across economies, mainly as a result of variations in patterns of trade in oil and related commodities, and in the oil intensity of production.

For importers, a decline in the price of oil operates through three channels. The first is the effect of the increase in real incomes on consumption. The second is the effect on the rate of inflation. The third is the effect on the costs of production, and in turn, on profits and investment.

The strength of the effect on real incomes depends on the degree of import dependence, with a comparatively smaller benefit accruing to economies that rely less heavily on imports to meet domestic consumption.

Australia imports a significant proportion of its oil supply, but this is partly because a considerable share of domestic production is exported due to its proximity to regional trading hubs in Asia.

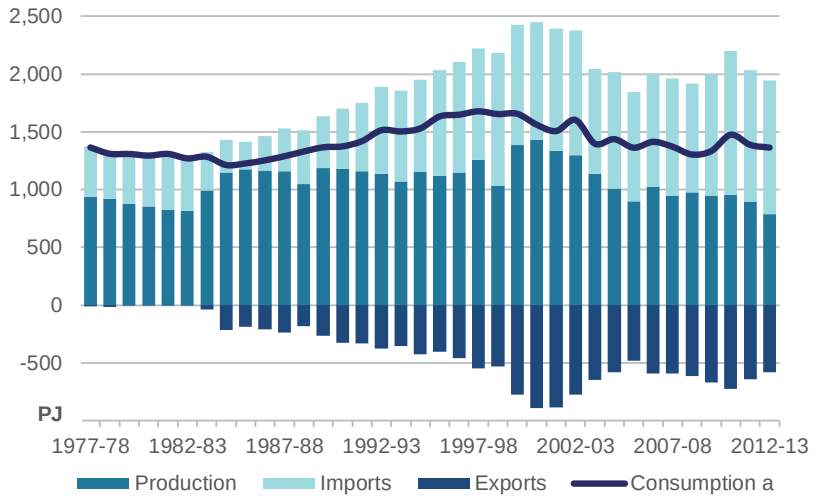
The effect on real incomes and profits also depends on the energy intensity of the economy. Economies and sectors that use oil more intensely in the production of goods and services are likely to enjoy a comparatively larger benefit from a decline in the price of oil.

While the oil intensity of production in Australia is lower now than it was 20 years ago, oil remains an important input into the production of many goods and services. Oil is Australia's largest energy source, accounting for 38 per cent of domestic consumption in 2012-13.

The effect on inflation depends on the direct effect of lower oil prices, and the influence of oil prices on wages and other prices. The strength of these secondary effects depend on the way wages respond to inflation, and how expectations of future inflation respond to changes in the price of oil. In the immediate term, the main effect on inflation in Australia is expected to occur through reductions in the price of automotive fuels.

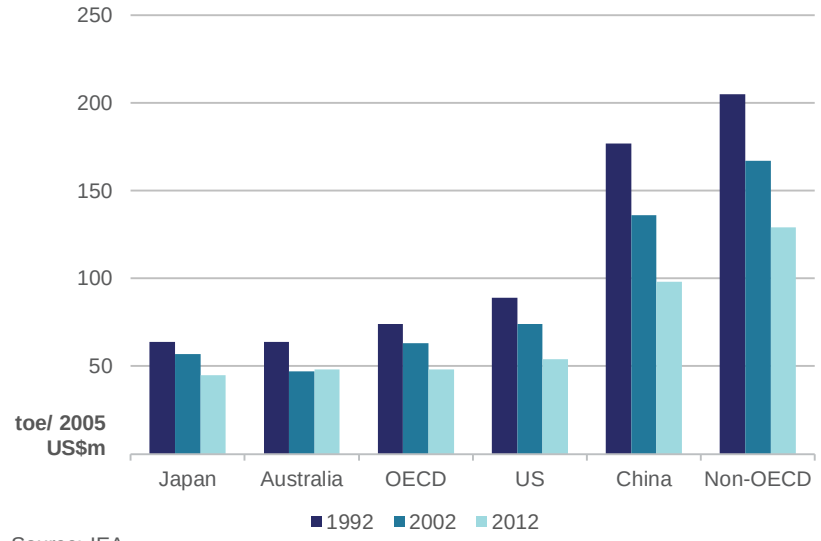
A change in the price of oil can also indirectly affect prices for other goods and services by altering the costs of production.

Figure 7.16: Australia's oil balance



Note: a Includes statistical discrepancies.

Figure 7.17: Oil intensity of GDP



Source: IEA.

The extent and timing of these indirect effects are difficult to quantify, and tend to occur over a very long period. In practice, movements in the price of oil also tend to be partly absorbed into the profit margins of intermediate producers.

For exporters of petroleum, a decline in the price of oil tends to reduce real incomes and profits in petroleum production. However, the degree to which this occurs depends on the degree of dependence on petroleum exports, and the proportion of oil revenues that go to the state.

In general, to the extent that the prices of other energy products move with oil prices, the net effect of a decline in oil prices depends on whether an economy is a net importer or net exporter of energy commodities.

In the immediate term, the decline in the price of oil is likely to support economic growth in the Australian economy. As a net importer of oil, a decline in the price of oil tends to lead to an increase in the terms of trade and in the purchasing power of Australian incomes.

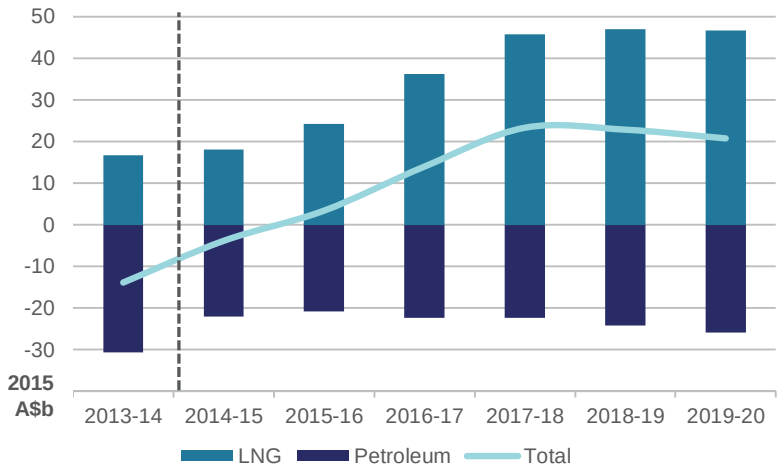
To some extent, this may be offset by declining LNG prices, which are linked to the price of crude oil. This offsetting effect is likely to be small in the near term but may increase as exports of Australian LNG grow into the future.

A decline in the price of oil also places pressure on petroleum producers to reduce current and future costs. This tends to reduce investment in oil and gas exploration activity, which places downward pressure on future growth in production capacity.

In contrast, existing projects or projects under construction tend to be less sensitive to changes in the price of oil. This is because conventional oil and gas projects are typically characterised by a very large fixed-cost component, which creates a strong incentive for firms to continue production in the face of low prices. In general, the optimal strategy for existing producers is to operate as long as the prevailing price covers the variable costs of production.

For projects under construction, the relevant consideration is the likely behaviour of the price over the productive life of the investment, not the price that prevails at the time of construction.

Figure 7.18: Net exports of oil and LNG



Note: Petroluem includes crude oil and other refinery feedstocks, LPG, and refined products.

Conventional oil and gas projects typically have long lead times and even longer production phases, which oblige investors to take a longer-term perspective on prices.

For further discussion see:

Arezki, R & Blanchard, O 2014, *Seven Questions about the Recent Oil Price Slump*, iMFdirect, Accessed 22 December 2014, <http://blog-imfdirect.imf.org/2014/12/22/seven-questions-about-therecent-oil-price-slump/>.

Reserve Bank of Australia, 2015, *The Effects of the Fall in Oil Prices*, February Statement of Monetary Policy, Sydney.

Uranium

John Barber

The uranium market finally showed signs of life in late 2014 with supply constraints leading to a moderate price recovery. Prices remain well below pre-Fukushima levels but the long awaited restart of some Japanese reactors and continued growth in nuclear power in emerging economies provide some optimism for further price gains in the medium term.

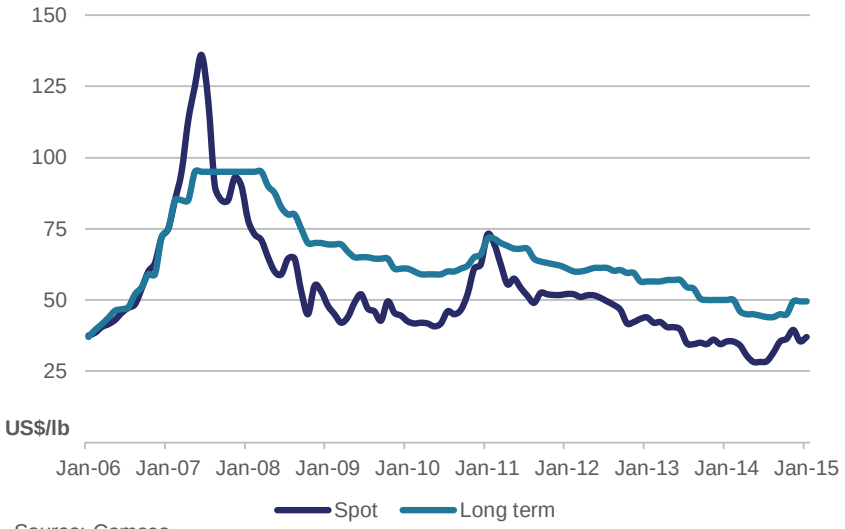
Prices

Uranium prices averaged US$33 a pound in 2014, down 13 per cent from 2013. This fall in price was not constant across the year and uranium was one of the few commodities with prices finishing 2014 higher than it began. After reaching a low of around US$28 a pound in May, prices hit US$39 a pound in November as a result of supply disruptions at key mines and positive market sentiment over the progress towards restarting some reactors in Japan.

In 2015 uranium prices are forecast average around US$39 a pound, 19 per cent higher than 2014. While consumption is forecast to increase in line with new reactors starting up, particularly in China, production at mines that reported lower output in 2014 are expected to rebound and limit price growth. Progress on restarting reactors in Japan remains slow but a small number are finally expected to begin producing electricity again in 2015 after passing all required safety checks and administrative hurdles. While this may affect market sentiment, stockpiled materials in Japan are more than adequate to cover the restarts in the short term and have little impact on market balance or prices.

Over the outlook period to 2020, the growth in nuclear power in emerging economies will remain the driving force in uranium markets. With around 70 reactors currently under construction, nuclear power generating capacity is expected to increase by almost 20 per cent in the next five years.

Figure 8.1: Uranium prices, monthly



Source: Cameco.

Figure 8.2: Quarterly uranium prices

Source: Cameco.

Uranium prices are projected to increase in response to this growth in demand; however several large mining projects are sufficiently advanced in their plans and are likely to limit prices growing too rapidly. In 2020 the uranium price is projected to average US$58 a pound (in 2015 dollars).

Consumption

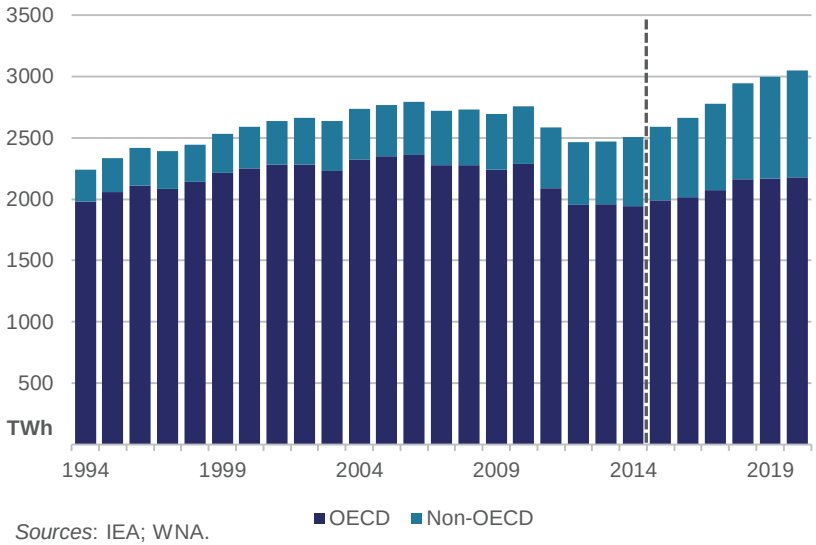
Uranium consumption for electricity production in 2014 is estimated at around 76 900 tonnes (U_3O_8 equivalent), 0.4 per cent higher than 2013. Growth in China's nuclear power output and uranium consumption was partially offset by declines in advanced economies, particularly Japan which had no nuclear reactors operating in 2014.

World nuclear power output remains below its peak pre-Fukushima levels. However, the medium and long term prospects for nuclear power remain positive given the large number of new reactors under construction and the increased focus on limiting growth in carbon emissions in emerging economies. There are currently 71 nuclear reactors under construction around the world with a combined capacity of over 76 gigawatts and plans for further expansions in several countries.

In 2015 world uranium consumption is forecast to increase 2.9 per cent and total 79 100 tonnes. Forecast growth will continue to be supported by the initial start up of new reactors in China as well as moderate output increases across existing reactors in developed economies. Japan's nuclear power industry continues to make progress towards re-starting, but only three reactors are expected to restart in 2015.

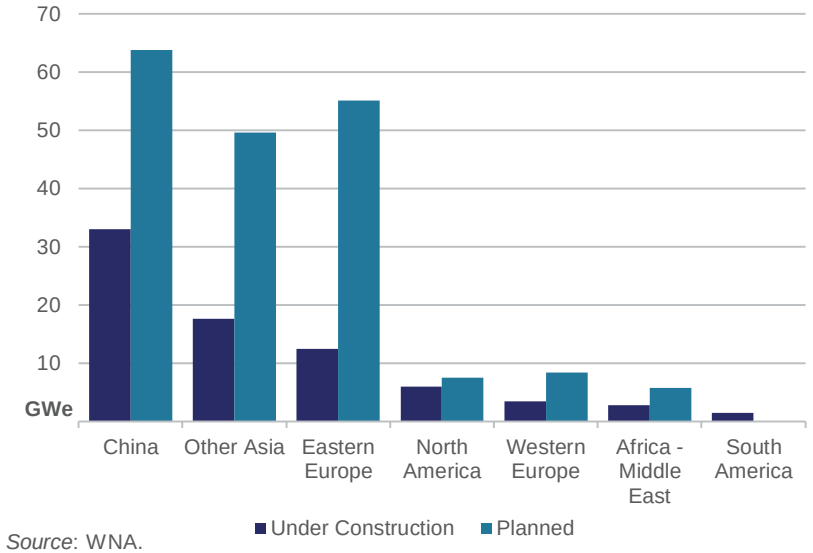
Over the outlook period rapid growth in the number of operating nuclear power reactors is expected to underpin substantial increases in demand for uranium. As a result, world uranium consumption is projected to grow at an average annual rate of 4.2 per cent from 2013 and to total 98 400 tonnes of U_3O_8 in 2020. This growth will come primarily from emerging economies whose energy policies are shifting towards nuclear power to provide relatively cheap and low carbon emitting supplies of electricity to support their increasing energy requirements.

Figure 8.3: World nuclear power generation



Sources: IEA; WNA.

Figure 8.4: New nuclear capacity



Source: WNA.

In addition, several older reactors that were scheduled for closure in OECD economies are developing plans to extend their operating lives further into the future.

The US will remain the largest producer of nuclear power in the medium term. While five reactors have been closed over the last two years, this should be offset over the medium term by the five new reactors currently under construction and increased power output rates at several plants. Over the medium term, US uranium consumption is projected to increase at an average annual rate of 0.9 per cent to total around 24 200 tonnes of U_3O_8 in 2020.

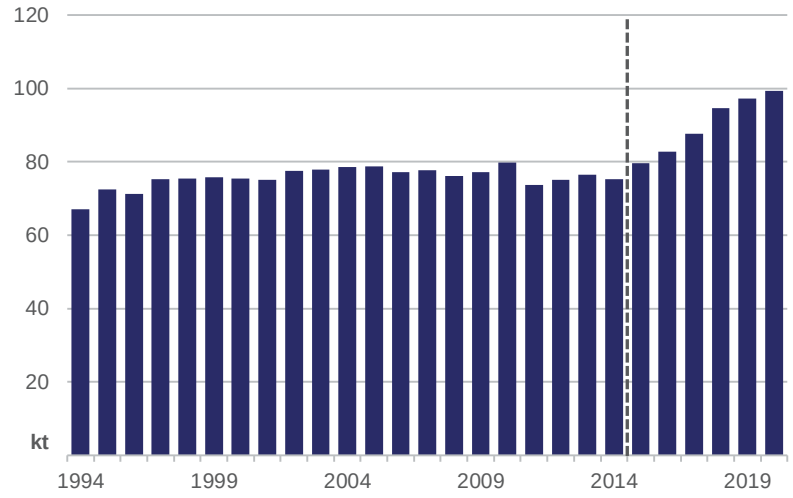
China is expected to the be the principal source of uranium demand growth over the next five years. With 31 nuclear reactors already under construction, China's nuclear power industry is expected to more than triple its capacity over the next five years to more 55 gigawatts. To fuel this increase in nuclear power output, China's uranium consumption is projected to increase at an average annual rate of 14 per cent from 2015 to around 19 000 tonnes of U_3O_8 in 2020. After this period, China's nuclear power industry is likely to continue to grow with plans for an additional 64 gigawatts of capacity already being developed.

Several other countries are continuing to develop their industries, albeit on a smaller scale than China. India has six reactors under construction and plans for several more to meet the rapid growth in its energy needs; the UAE already have three reactors under construction and Bangladesh has commissioned its first nuclear reactor. Schedule risk is high in these developing markets; nevertheless, the outlook for nuclear power in the medium to long term is for substantial growth relative to current levels.

Production

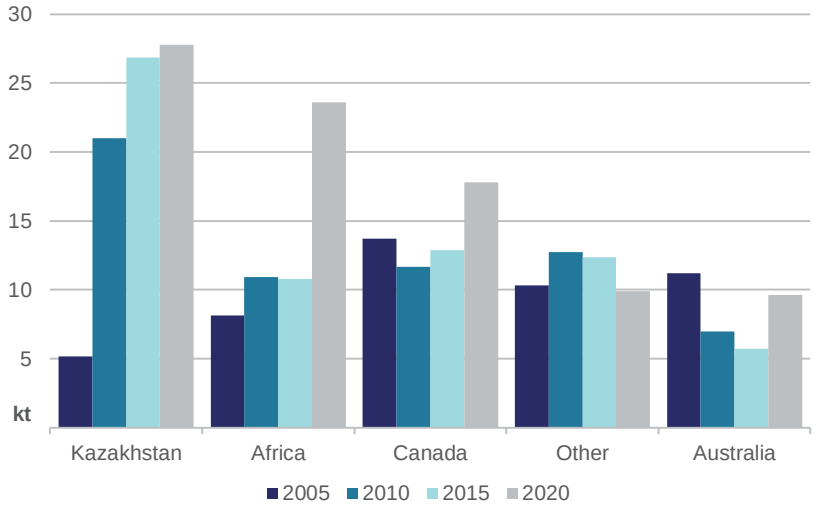
In 2014 the closure of Paladin's Kayalekera mine in Malawi and production disruptions at several mines, particularly Rio Tinto's Rossing mine in Namibia, led to a decline in world uranium output. World uranium production is estimated to have decreased to around 65 300 tonnes of U_3O_8 in 2014, down 7 per cent from 2013. Many producers have continued to produce despite the low prices that prevailed in early and mid 2014 on the expectation that prices would

Figure 8.5: World uranium consumption (U_3O_8)



Sources: IEA; WNA.

Figure 8.6: World uranium production (U_3O_8)



Sources: WNA; NEA; UXC.

eventually increase. Few new mines opened in 2014 with the low prices of recent years reducing investment, the notable exception being Cameco's Cigar Lake mine in Canada.

In 2015 world uranium production is forecast to rebound and increase 4.4 per cent to around 68 200 tonnes of U_3O_8. This forecast growth will be underpinned by the ramp up of production at Cigar Lake and higher production rates at a number of existing mines to meet a rise in demand for primary uranium following the drop in secondary supplies associated with the end of the US-Russian highly enriched uranium agreement in December 2013.

Over the outlook period uranium mine production is projected to rebound and grow at an average annual rate of 6 per cent to total 89 700 tonnes U_3O_8 in 2020. The proportion of world uranium consumption sourced from primary production is expected to increase over the outlook period as the use of reprocessed uranium in the fledging nuclear power industries of emerging economies is likely to be less than the mature industries of OECD economies.

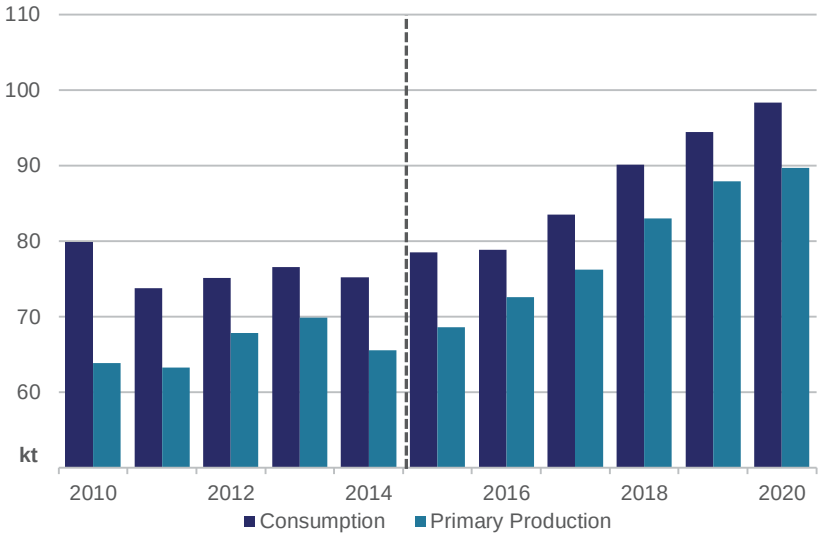
To meet the projected growth in uranium consumption new mines will be required to open. Several large operations are already under development and are well positioned to supply the market in coming years. However, as many of these new mines have higher production costs, a sustained rebound in uranium prices will be required to both incentivise investment and keep mines operating. In the long term, the slow down in investment in new uranium mines has already increased the risk of future market imbalances. The time to gain regulatory approval to build new uranium mines in nearly all jurisdictions with large uranium deposits has increased and mine development may now struggle to keep up with energy growth in emerging economy nuclear industries in the long term.

Australia

Exploration and production

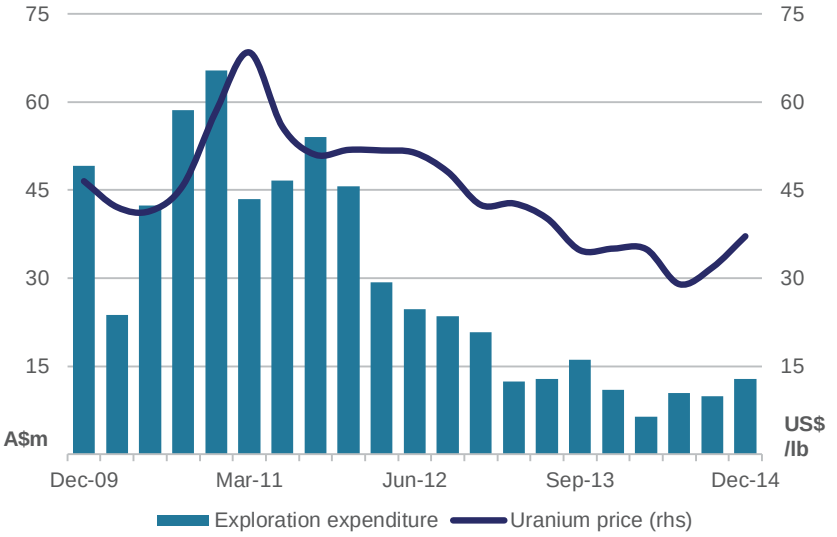
Despite a moderate uptick in the December quarter, Australia's uranium exploration expenditure decreased 24 per cent in 2014 to total $52.3 million. Following a moderate price rebound, exploration

Figure 8.7: Uranium demand-supply balance (U_3O_8)



Sources: WNA; IAEA; UXC.

Figure 8.8: Australia's uranium exploration



Sources: Cameco; ABS.

expenditure rebounded 29 per cent, relative to the September quarter, and totalled $12.6 million.

Australia's uranium production is forecast to rebound in 2014-15 as Ranger returns to normal production (but continue processing existing ore stocks rather than mine new material) and Four Mile has a full year of production. Uranium production is forecast to increase 11 per cent from 2013-14 and total 6499 tonnes of U_3O_8 in 2014-15.

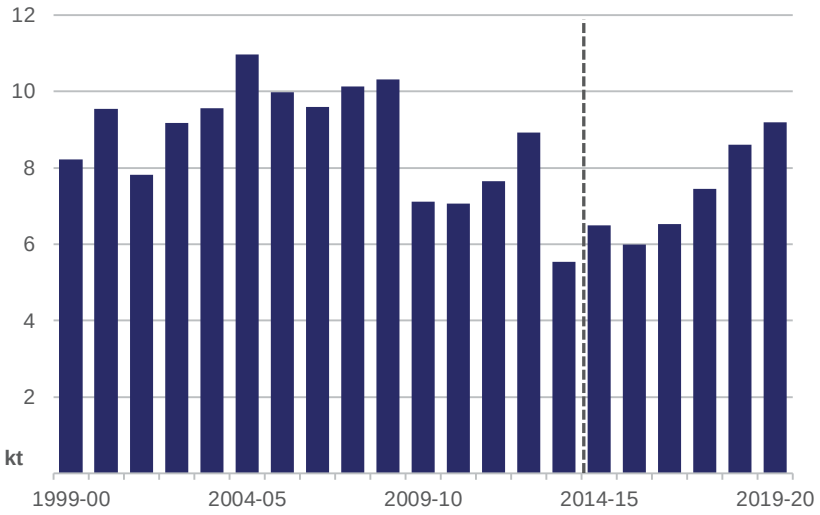
In 2015-16 Australia's uranium production is projected to decline as the ore pile at Ranger is run down over the next two years. Australia's production is expected to rebound in the medium term as new mines under development, such as ERA's Ranger 3 Deeps and Toro Energy's Wiluna, start to come on line in response to higher uranium prices. In 2019-20 Australia's uranium production is projected to total 9200 tonnes; however, the start date of the aforementioned mines remains uncertain due to the schedule delays that prevailing low uranium prices have already caused.

Exports

In 2013-14 Australia exported 6701 tonnes of U_3O_8 worth $622 million. These export volumes and values were down 20 per cent and 24 per cent, respectively. In 2014-15, uranium export volumes are forecast to fall a further 7 per cent, despite higher production, and total 6239 tonnes. Export values are forecast to rebound to around $669 million, supported by a depreciating Australian dollar.

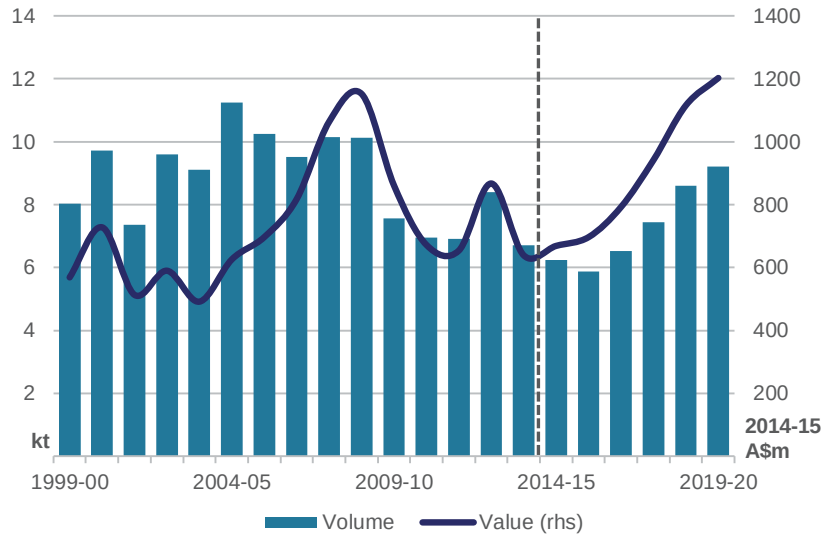
Over the outlook period to 2019-20 projected higher production volumes will underpin growth in Australia's uranium exports. Export volumes are projected to increase at an average annual rate of 8 per cent and total 9200 tonnes in 2019-20. Export values are projected to increase at an average annual rate of 12 per cent, due to rising prices and lower exchange rate, and total $1.3 billion in 2019-20.

Figure 8.9: Australia's uranium production



Source: company reports.

Figure 8.10: Australia's uranium exports



Sources: ABS; ASNO.

Table 8.1: Uranium outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Production	kt	65.3	68.2	70.9	75.3	82.5	87.9	89.7
Africa b	kt	9.9	10.3	11.0	13.7	17.8	21.0	24.0
Canada	kt	10.7	12.9	14.1	14.2	15.5	16.4	17.8
Kazakhstan	kt	26.4	26.9	26.9	26.9	27.3	27.8	28.3
Russia	kt	3.5	3.5	3.5	4.0	4.0	4.0	0.0
Consumption	kt	76.9	79.1	78.9	83.6	90.1	94.5	98.4
China	kt	9.1	9.8	10.8	12.9	15.8	17.7	19.0
European Union 27	kt	23.1	23.0	22.5	24.0	24.0	22.9	0.0
Japan	kt	0.0	0.4	1.3	3.0	4.7	4.7	4.7
Russia	kt	6.4	6.2	6.5	6.8	7.4	7.4	7.4
United States	kt	22.2	23.1	23.1	23.1	23.4	23.9	24.2
Spot price	US$/lb	33.2	39.4	43.5	49.0	57.0	62.0	65.0
real c	US$/lb	34.0	39.4	42.5	46.8	53.2	56.6	58.0
		2013–14	**2014–15 f**	**2015–16 f**	**2016–17 z**	**2017–18 z**	**2018–19 z**	**2019–20 z**
Australia								
Production	t	5 548	6 499	6 000	6 525	7 450	8 600	9 200
Export volume	t	6 701	6 239	5 884	6 525	7 450	8 600	9 200
– nominal value	A$m	622	669	714	830	1 008	1 220	1 344
– real value d	A$m	639	669	697	792	942	1 115	1 202
Average price	A$/kg	92.8	107.2	121.4	127.2	135.3	141.9	146.1
– real d	A$/kg	95.3	107.2	118.4	121.4	126.4	129.7	130.7

b Includes Niger, Namibia, South Africa and Malawi. **c** In current calendar year US dollars. **d** In current financial year Australian dollars. **f** forecast. **z** projection.
Sources: ANSO; Cameco, WNA, IEA, UxC.

Gold

Gayathiri Bragatheswaran

The unexpected removal of the Swiss franc peg to the Euro as well as quantitative easing measures implemented in the European Union caused some price volatility in the gold market in early 2015 as investors purchased gold in response to the uncertain economic outlook. However, the conclusion of quantitative easing in the US and expected higher interest rates will provide a higher return on low risk assets and shift investor sentiment away from gold, leading to lower gold prices in 2015.

Prices

Lower global gold consumption in key markets, expectations for higher interest rates and better returns on other assets led average gold prices to decrease 10 per cent in 2014, relative to 2013, to US$1266 per ounce. Despite lower prices, China's gold consumption declined in 2014 and resulted in India reclaiming its position as the world's largest gold consuming country. LME gold spot prices averaged US$1441 in the first quarter of 2014 before declining to US$1200 by the end of the year in response to falling consumption in China.

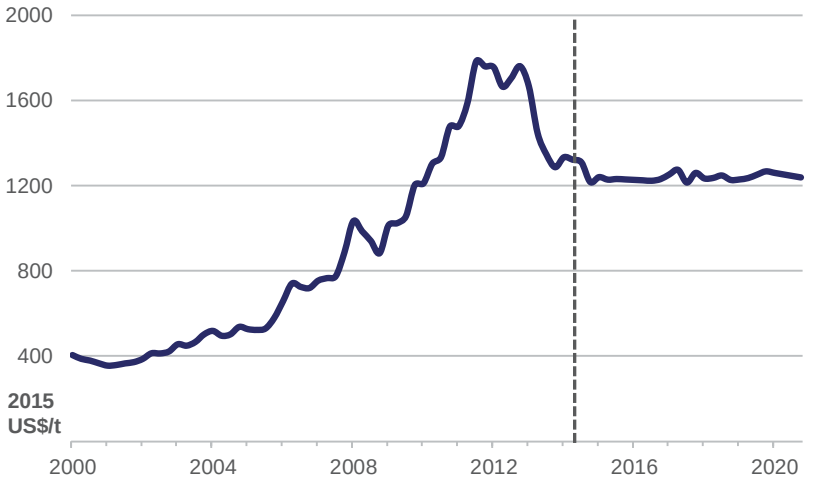
Gold prices are forecast to decrease by 2.8 per cent in 2015 and average US$1231 per ounce as the expected increase in US interest rates in mid-2015 reduces the appeal of gold as an investment asset. However, inflation in the US remains contained and may lead the US Federal Reserve to delay the decision to increase rates until employment growth picks up. In the event the interest rate increase is delayed higher prices may prevail for longer.

Over the outlook period prices are projected to increase at an annual average rate of 0.3 per cent to US$1250 an ounce (in 2015 dollar terms) in 2020 as jewellery purchases of gold increase. Jewellery purchases are becoming more important in determining gold prices as it accounts for an increasing proportion of gold consumption.

Figure 9.1: Daily gold prices

Sources: LBMA; US Federal Reserve.

Figure 9.2: Quarterly gold prices



Source: LBMA.

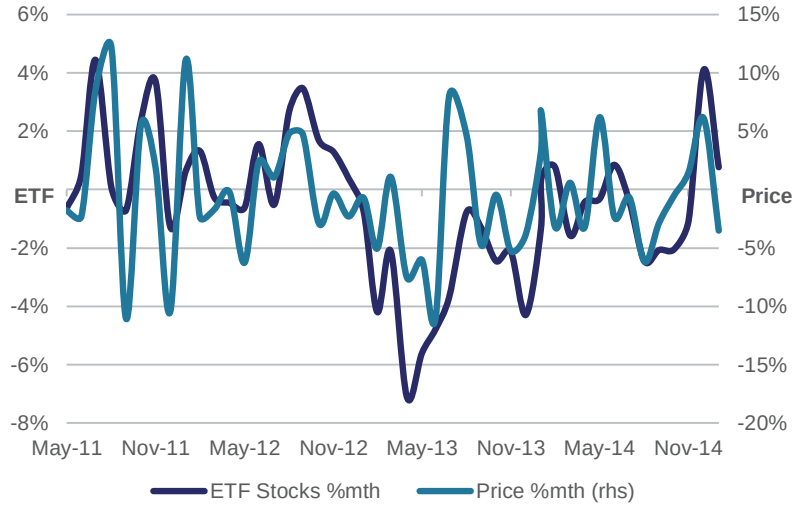
Over the outlook period, jewellery consumption and buying by central banks is expected to increase and should offset the shift away from investor purchases as they seek better returns on lower risk assets. Jewellery purchases are projected to increase as household income in emerging markets grow. Consumption of gold bars and coins is expected to continue to decline as the US economy recovers and reduces the demand for gold as an investment. As a result, gold prices are projected to be well below the average highs of US$1618 per ounce recorded in 2011 and 2012.

Consumption

Based on World Gold Council data, total gold purchased in China (including jewellery and gold bar and coin for investment purposes) decreased by 38 per cent to 814 tonnes in 2014. Following strong growth in 2013, China's jewellery consumption declined 33 per cent to 623 tonnes in 2014. Purchases of gold bars and coins in China also decreased 50 per cent in 2014 to 190 tonnes as investors sought high return assets. There had been a strong correlation between China's jewellery consumption and GDP per capita. However, that relationship weakened in 2014 when jewellery consumption declined but GDP per capita increased by 9 per cent. The substantial drop in consumption is due to the anti-graft measures introduced in 2014 to combat corruption and growing concerns over China's economic performance. In addition, the 15 per cent decline in average prices through 2013 encouraged Chinese consumers to increase their gold jewellery purchases to total 927 tonnes in 2013, a substantial increase, from an average 495 tonnes between 2010 and 2012. As such, China's consumption in 2013 can be viewed as temporary increase from trend.

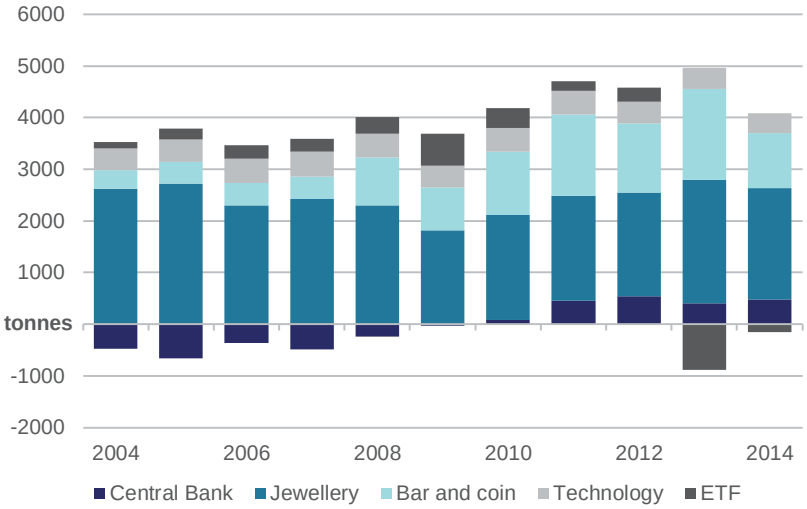
In 2014 India was the world's largest gold consumer and accounted for 26 per cent of global purchases, despite total gold purchases (including jewellery and gold bars and coins) declining by 14 per cent to 843 tonnes. Jewellery consumption in India grew by 8 per cent to 662 tonnes in 2014 following the relaxation of import restrictions imposed in 2013. However this was more than offset by a 50 per cent decline in gold bar and coin purchases to 181 tonnes.

Figure 9.3: ETF stocks and gold prices (% change)



Source: Bloomberg.

Figure 9.4: World gold demand



Source: World Gold Council.

India's gold consumption is closely linked to income growth. Between 2008 and 2014 India's GDP per capita grew on average by 6.7 per cent, while jewellery purchases increased on average by 6.5 per cent. The forecast increase in GDP per capita, supported by a business-focused government, and the existing steady jewellery demand in India, based on the annual wedding and festival seasons, are key drivers of India's consumption and are expected to boost demand over the outlook period.

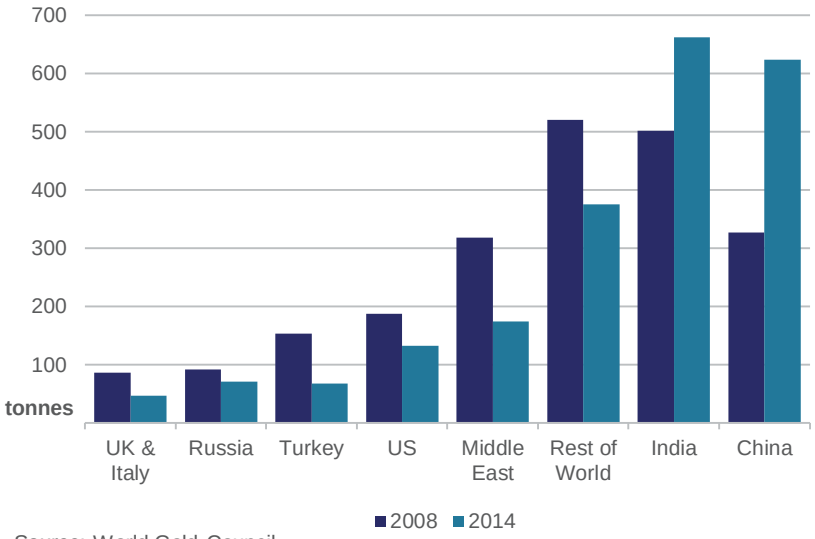
World gold consumption is forecast to increase 3.8 per cent in 2015 to 2638 tonne, underpinned by strong demand from emerging economies. China's gold consumption is forecast to rebound and jewellery purchases are expected to increase supported by rising incomes and price declines.

According to the World Gold Council total global consumption of gold bars and coins declined by 40 per cent to 1064 tonnes in 2014 relative to 2013, demonstrating the move to high return assets as gold prices remain low.

In 2010 purchases of gold bullion by central banks accounted for less than 2 per cent of total global gold purchases, in 2014 this share increased to more than 11 per cent. Global central bank purchases of gold increased by 17 per cent in 2014 to 477 tonnes. Prior to 2010 central banks were net sellers of gold. However they have since become net purchasers. Slowing demand from European central banks and increased demand from rapidly growing economies in Latin America and Asia along with strong economic uncertainty during the US financial crisis drove this change. Gold is believed to store value and hedge against inflation and is thus considered a safe investment in times of economic uncertainty especially uncertainty surrounding financial markets and paper currencies.

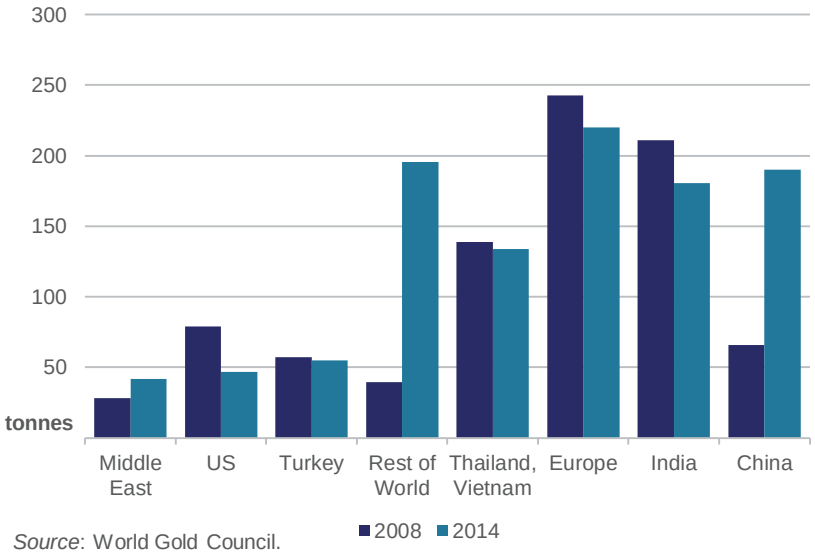
Russia is expected to become a major consumer of gold bullion in response to the declining Rouble and increased economic and geopolitical instability. Given the economic uncertainty in the European Union over the outlook period European central banks may also increase their investment in gold.

Figure 9.5: Gold jewellery consumption



Source: World Gold Council.

Figure 9.6: Gold bar and coin purchases



Source: World Gold Council.

Gold consumption is projected to increase at an annual average rate of 4 per cent to 3269 tonnes in 2020. Over the outlook period central bank purchases and higher jewellery demand are projected to contribute to higher gold consumption. Central banks are expected to increase their gold asset holdings to avoid financial market uncertainty and an increase in jewellery consumption will be underpinned by increasing incomes in emerging economies. Purchases of gold jewellery in both China and India are expected to increase over the outlook period with China reclaiming its position as the world's largest gold consumer over the period.

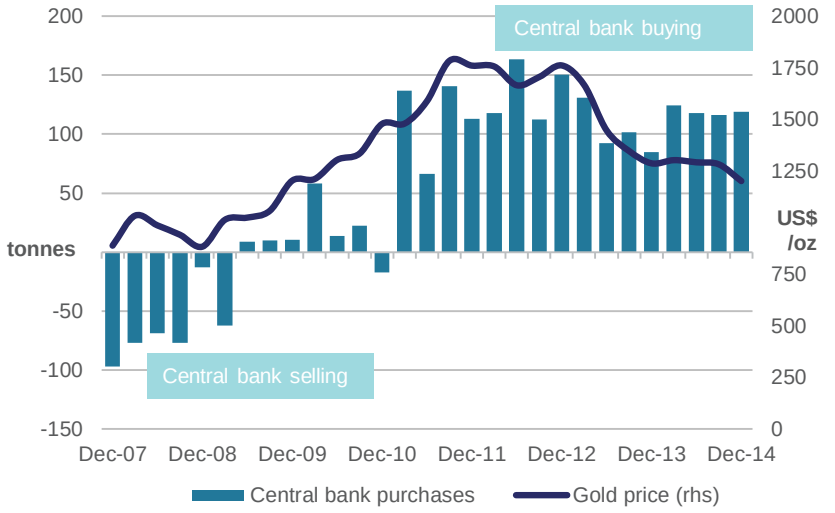
Production

According to the World Gold Council gold mine production increased 2 per cent to 3115 tonnes in 2014 compared to 2013. Canada's production grew 20 per cent to 151 tonnes because of increased production at the Detour Lake and Goldex mines. The World Gold Council reported that gold recycling across emerging and advanced economies was at its lowest in seven years in 2014, declining by 11 per cent to 1122 tonnes.

World gold mine production is forecast to increase 1.0 per cent to 3136 tonnes in 2015 as producers benefit from production efficiencies gained through cost cutting exercises in 2014 that aimed to minimise losses due to the lower gold price. South Africa's gold production is forecast to increase by 3 per cent owing to the ramp up in production at the South Deep, Bambanani, Phakisa and Tshepong mines. However output may be adversely affected by ongoing labour disputes which have affected South African gold mines in the past. Production at Grasberg mine in Indonesia, the world's largest gold mine, is expected to decline as Freeport-McMoRan reconsiders production plans in the environment of lower gold prices.

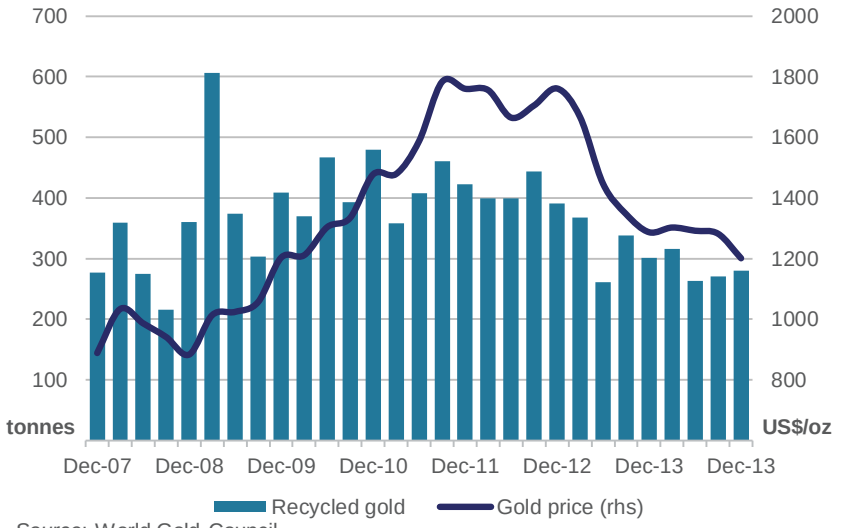
Over the outlook period, gold production is projected to increase at an average annual rate of 1.5 per cent and total 3386 tonnes in 2020. While gold production is projected to increase in most countries due to ramp ups in production at existing mines and new developments, production growth in China, the world's largest gold producer, is projected to slow to an annual average rate of 1.4 per cent to 505 tonnes in 2020.

Figure 9.7: Central bank purchases



Source: World Gold Council.

Figure 9.8: Recycled gold supply



Source: World Gold Council.

China's production is expected to be affected by depleting reserves, declining ore grades and difficulty in attracting investment. Similarly, South Africa's production is unlikely to return to the previous highs recorded during the twentieth century because of depleting reserves, declining ore grades and increasing difficulties in securing finance for large projects.

There are a number of large gold mine projects under development around the world that can support higher production in the right price environment. One of the new large projects expected to expand capacity over the outlook period is Goldcorp's Cerro Negro mine in Santa Cruz Argentina (capacity of 475 000 ounces of ore), which is scheduled to be completed in 2015.

Chesapeake Gold Corporation's Metates gold mine in Mexico is expected to be commissioned around 2016. The Metates gold deposit is one of the largest undeveloped gold and silver projects in the world with proven and probable reserves of 18.5 million ounces of gold and the potential to become one of the world's largest gold mines.

Polyus Gold International's (one of the ten largest gold producing companies in the world) Natalka mine in far east Russia is expected to start production in 2018. The Natalka mine is expected to produce 500 thousand ounces a year. Output from the mine will contribute to a substantial increase in gold production from Russia even with the scheduled closure of the Kupol mine (one of Russia's largest gold mines) in 2019.

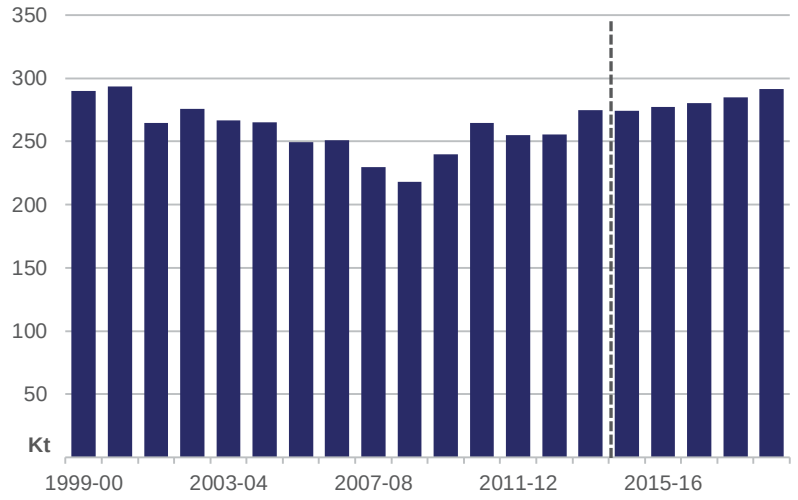
America is also likely to substantially increase gold production over the medium term. Barrick Gold's Donlin Gold is scheduled to begin in 2018 with projected production averaging 1.4 million ounces over the outlook period to 2020.

Australia's production and exports

Exploration

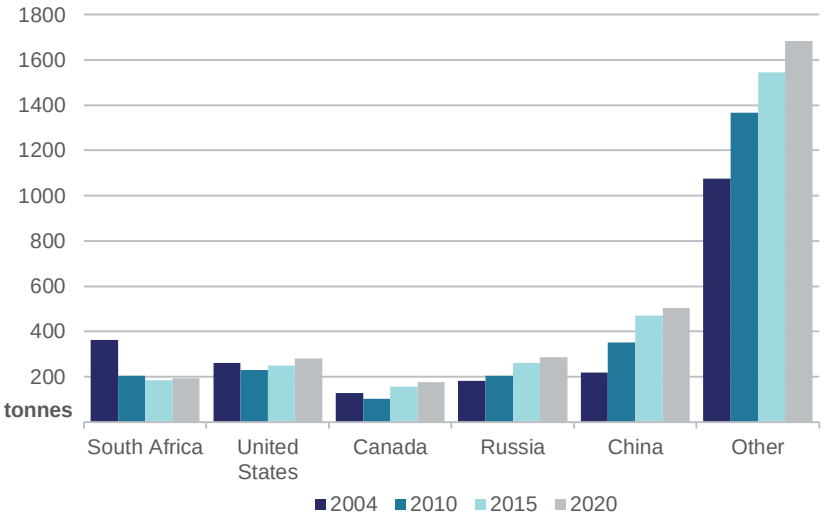
Exploration expenditure in 2014 totalled $377.3 million, down 32 per cent year-on-year reflecting the decline in gold prices.

Figure 9.9: Australia's gold production



Source: company reports.

Figure 9.10: World gold mine production



Sources: GFMS; Thomson Reuters.

Expenditure on gold exploration in the December quarter 2014 was $101.7 million, 13 per cent higher compared to the September quarter but 13 per cent lower relative to 2013 December quarter.

Production

Australia's gold production in 2014-15 is forecast to remain relatively steady at 274 tonnes as higher output at most operations is offset by the closure of the Murchison mine in December 2014. Cost cutting exercises due to the drop in gold prices allowed Australia's gold industry to continue its high performance and remain profitable.

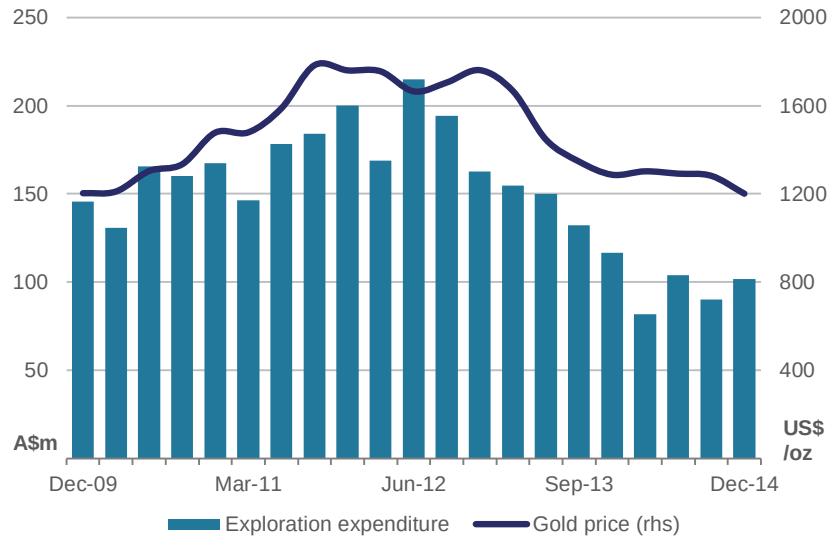
Interest in Australia's gold deposits and mines remains strong despite the sale of a number of assets including the Barrick Gold's South Yilgarn assets to Goldfields and Rio Tinto's sale of the Northparkes gold and copper mine to Molybdenum Co. in 2013. In 2014 Northern Star Resources transformed from a junior to major miner after acquiring Barrick Gold's Plutonic, Kanowna Belle and Kundana gold mines as well as Newmont's Jundee mine, resulting in a more than doubling of its share price since these acquisitions. It was announced in early 2015 that American company Newcrest mining was considering the sale of its Telfer mine, one of the largest in Australia; however a decision is likely to be made in late 2015.

Australia's gold production over the outlook period is projected to increase by an annual average of 1.3 per cent to 293 tonnes in 2019-20. Despite declining ore grades and the closure of some capacity, increased production at existing mines such as Cadia Valley and the possibility of Vista Gold Corp's Mt Todd development (expected annual production of around 369 thousand ounces) from 2016 will contribute to strong production growth. The depreciation of the Australian dollar, which has allowed some producers to increase margins, and increased efficiencies gained through cost cutting exercises are anticipated to be drivers of increased production over the outlook period.

Exports

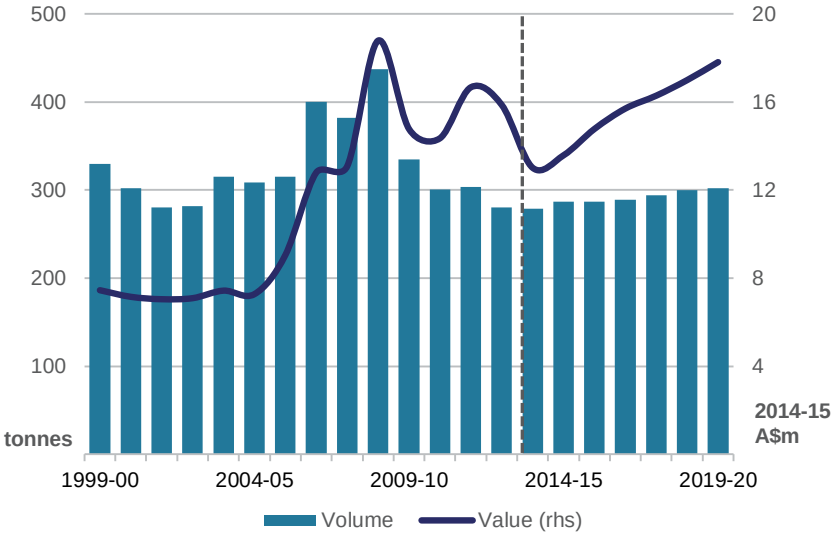
Australia's gold exports in 2014-15 are forecast to increase by 2 per cent to 285 tonnes relative to 2013-14.

Figure 9.11: Australia's gold exploration



Sources: Bloomberg, ABS.

Figure 9.12: Australia's gold exports



Source: ABS.

Gold export values are forecast to be $13.6 billion in 2014-15, 4.2 per cent higher than 2013-14 supported by higher volumes and a depreciating Australian dollar.

Over the outlook period to 2019-20 Australia's gold exports are projected to increase at an annual average rate of 1 per cent to 300 tonnes in 2019-20. Export values are projected to increase at an annual average rate of 3 per cent to $15.8 billion (in 2014-15 dollar terms) in 2019-20, driven by higher export volumes, prices and a depreciating Australian dollar. China is expected to remain the largest importer of Australian gold and it is likely that India will also become a major consumer now that import restrictions have been relaxed. Given Australia's close proximity to South East Asia it may be able to benefit from increasing incomes leading to higher purchases of gold jewellery in these economies.

Table 9.1: Gold outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Fabrication consumption b	t	2 542	2 638	2 708	2 805	2 921	3 078	3 269
Mine production	t	3 115	3 136	3 165	3 296	3 332	3 378	3 386
Price c								
– nominal	US$/oz	1 266	1 231	1 255	1 309	1 324	1 365	1 400
– real d	US$/oz	1 295	1 231	1 227	1 251	1 236	1 246	1 250
		2013–14	**2014–15 f**	**2015–16 f**	**2016–17 z**	**2017–18 z**	**2018–19 z**	**2019–20 z**
Australia								
Mine production	t	275	274	277	280	285	291	293
Export volume	t	279	285	285	288	292	298	300
– nominal value	A$m	13 010	13 569	14 676	15 602	16 180	16 885	17 696
– real value e	A$m	13 361	13 569	14 318	14 894	15 113	15 432	15 825
Price								
– nominal	A$/oz	1 410	1 479	1 603	1 685	1 722	1 760	1 834
– real e	A$/oz	1 448	1 479	1 564	1 608	1 608	1 608	1 640

b Includes jewellery sales and industrial applications. **c** London Bullion Market Association AM price. **d** In current calendar year US dollars. **e** In current financial year Australian dollars. **f** forecast. **z** projection.
Sources: ABS; London Bullion Market Association; World Gold Council.

Aluminium

Kate Martin

The aluminium market is continuing a period of surplus. Although improved economic conditions are promoting consumption in the infrastructure and automotive industries, continued growth in new capacity in emerging economies will increase supply and limit significant price increases.

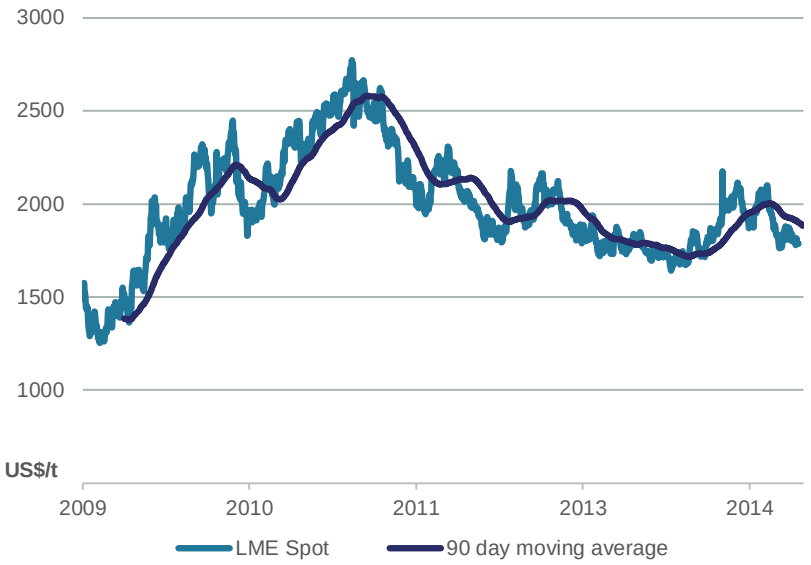
Prices

In 2014 growth in aluminium consumption was higher than growth in production, which led to higher prices as the year progressed. Consumption demand was higher than anticipated in industrial uses and automotive manufacturing, particularly in the US, meanwhile production decreases occurred in other parts of the world. In 2014 the average aluminium spot price was US$1866 a tonne, marginally higher than 2013 average prices. However, the LME spot price was volatile in the second half of the year, averaging US$1979 in the third and fourth quarters. The price receded towards the end of the year as higher prices encouraged the restart of previously curtailed production and new capacity was commissioned.

At the end of 2014 aluminium stocks were around 6.4 million tonnes, or 6.6 weeks of consumption. Stocks declined by 11 per cent over the year, as a tight physical market encouraged a draw-down in stocks.

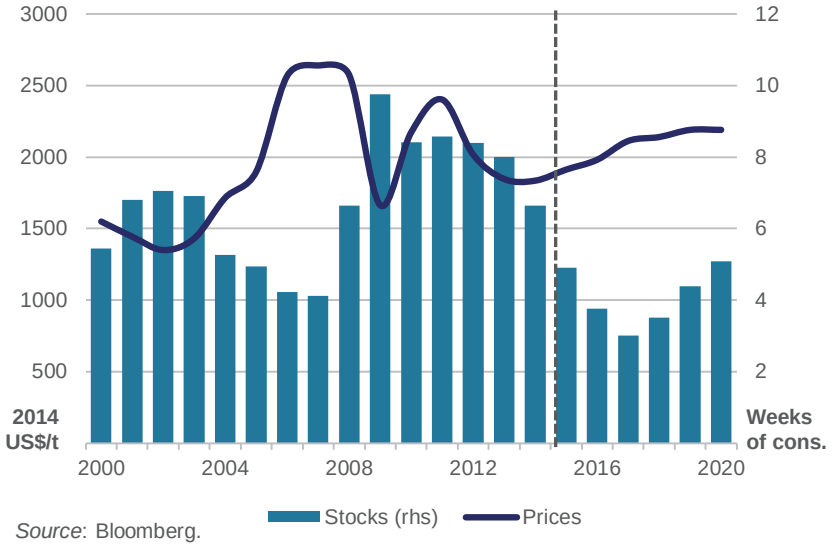
In early 2015 aluminium prices have remained subdued, averaging around US$1813 in the first quarter. Increased smelter output, particularly in emerging economies, is expected to moderate price growth despite rising input costs and growing consumption. In 2015, the average aluminium price is forecast to be $1913, around 2 per cent higher than 2014.

Figure 10.1: Aluminium daily price



Source: Bloomberg.

Figure 10.2: Annual aluminium prices and stocks



Source: Bloomberg.

Over the next five years, real production costs are likely to fall as new larger and more energy efficient smelters displace outdated facilities. Production in emerging economies, particularly China, is also expected to continue shifting to areas with lower energy prices that will keep production costs down. This will occur in an environment of growing consumption, and the overall effect is projected to moderate price growth to average US$1955 a tonne in 2020 (in 2014-15 dollars).

Over the short term stocks are projected to be depleted, until the start of new production restores stocks by the end of the outlook period.

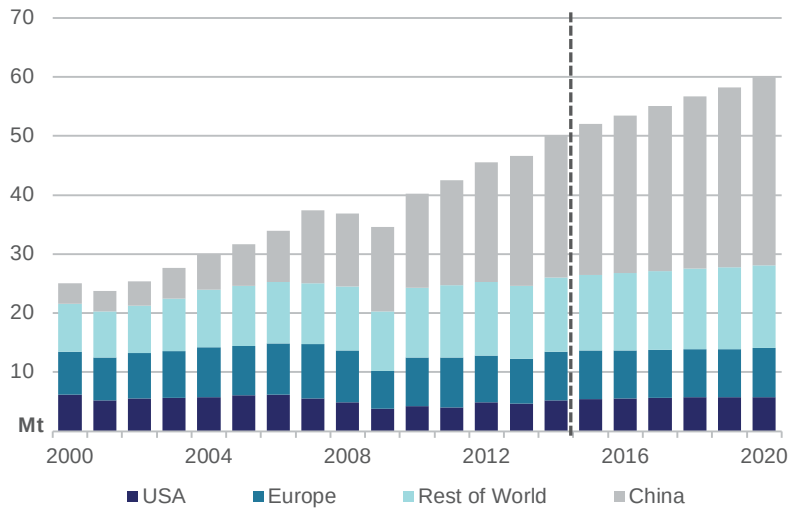
Consumption

World aluminium consumption is estimated at 50 million tonnes in 2014, 7.4 per cent higher than 2013. This was driven by China's ongoing consumption growth, as well as increased output in the US and European automotive manufacturing sectors.

China accounted for 48 per cent of world consumption in 2014, and grew 10 per cent to 24 million tonnes. China's growing middle class continued to support the purchase of new motor vehicles (up 6.9 per cent in 2014) and other aluminium intensive consumer durables.

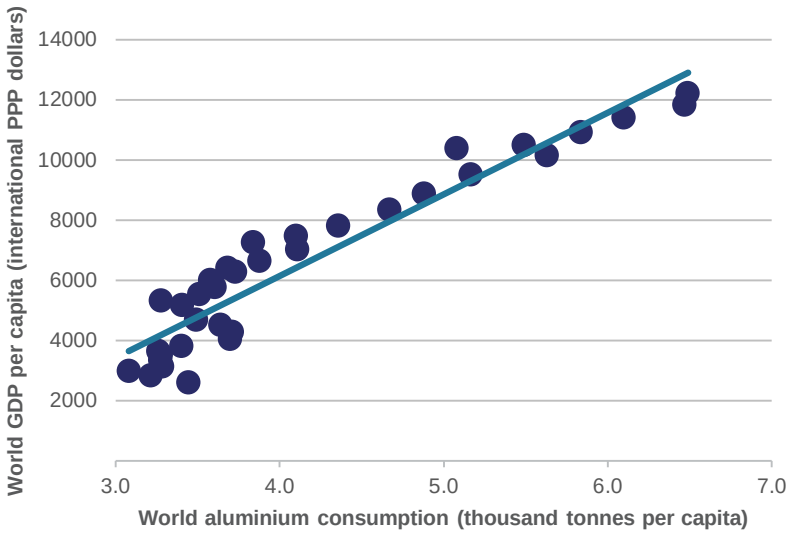
European aluminium consumption grew 7 per cent to 8.2 million tonnes in 2014, with higher consumption in Germany, Italy and Spain as automotive manufacturing increased across the region. Consumption growth in other major markets in 2014 also increased considerably, after particularly low aluminium consumption in 2013. Consumption in the US was 5.3 million tonnes in 2014, 13 per cent higher than 2013. In Japan aluminium consumption grew 15 per cent to 2 million tonnes. Automotive manufacturing and sales growth was positive in both countries, despite stagnant economic conditions in Japan.

Figure 10.3: World aluminium consumption



Source: WBMS.

Figure 10.4: World aluminium intensity



Sources: IMF; WBMS; World Bank.

World aluminium consumption in 2015 is forecast to be around 52 million tonnes, 3.9 per cent higher than 2014. China's consumption in 2015 is forecast to grow at a lower rate than previous years, at 6 per cent, facilitating 25.5 million tonnes of consumption. Demand will continue to be underpinned by consumer durables and the automotive industry. The introduction of the Clean Air Act will encourage the use of more aluminium to make fuel-efficient vehicles.

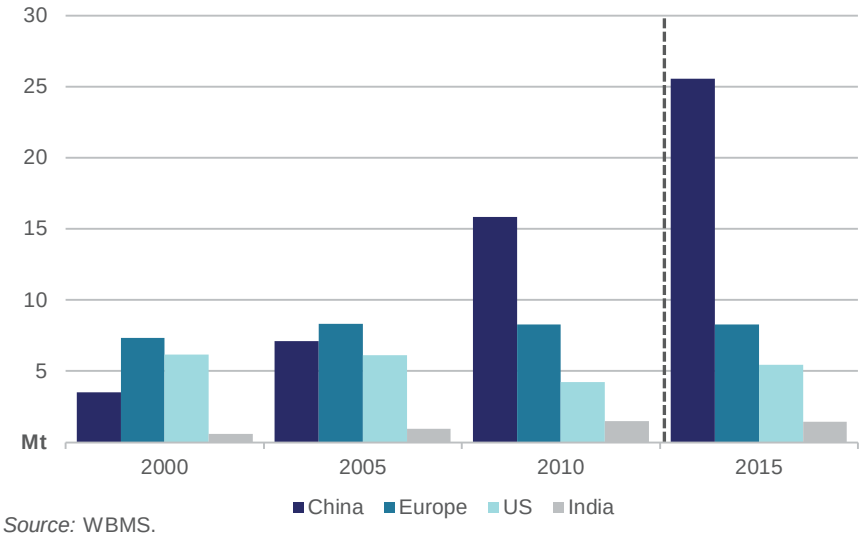
The US is forecast to increase aluminium consumption by 3.5 per cent in 2015 to 5.4 million tonnes. Growth in the US construction and automotive manufacturing industries is likely to continue, supported by low energy prices and low lending rates.

In 2015 India is forecast to increase aluminium consumption by 4.5 per cent to 1.4 million tonnes. As India's economic growth gathers pace, aluminium use in construction, automotive manufacturing and packaging will increase.

World aluminium consumption is projected to increase at an average annual rate of 3.1 per cent to total 59.9 million tonnes in 2020. Consumption growth is projected to ease in line with moderating economic growth and the passing of peak aluminium consumption in China. Despite slowing consumption growth in developed markets and China, consumption in other emerging economies is likely to grow. The aluminium intensity of manufacturing is likely to increase over the projection period in some sectors, particularly automotive manufacturing, and building and construction, as demand for energy-efficient products grows.

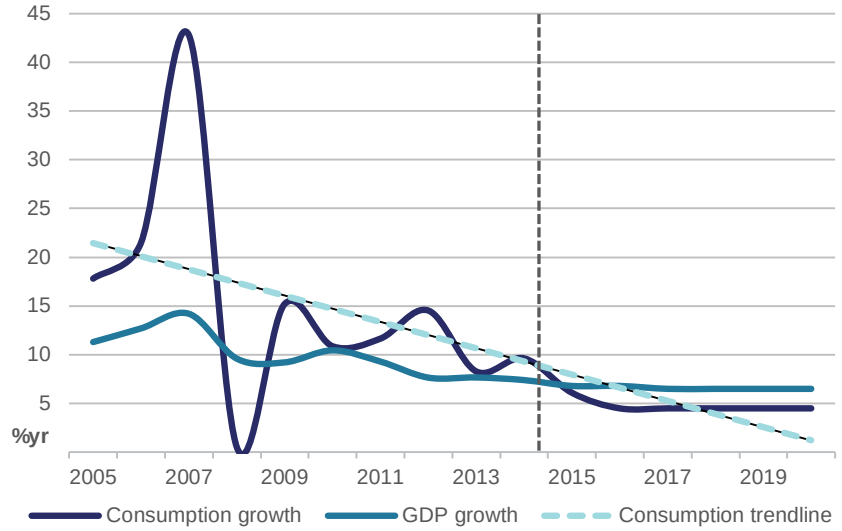
Over the outlook period China's consumption is projected to grow at an annual average rate of 4.8 per cent to total 31.8 million tonnes in 2020. As a result China is projected to account for 53 per cent of world aluminium consumption in 2020. As China's economy continues to rebalance towards a more consumption-oriented growth model, aluminium consumption in automobiles, packaging and other consumer durables will grow.

Figure 10.5: Key aluminium consumers



Source: WBMS.

Figure 10.6: China's aluminium consumption



Sources: WBMS; IMF.

US aluminium consumption is projected grow at an average annual rate of 1.7 per cent to 5.8 million tonnes by the end of the outlook period. A positive economic outlook, driven by lower energy prices, growing employment and increasing consumer confidence, is expected to support greater consumption of aluminium-intensive items such as cars and white goods, with demand for aluminium packaging increasing as well.

Consumption growth in the rest of Asia, excluding China, is projected to be positive, increasing at an average annual rate of 3.8 per cent to 41.8 million tonnes in 2020. A number of these countries are characterised with high populations and rising incomes. As economic growth continues in these countries, aluminium consumption per capita will increase. Substantial consumption growth is projected in Indonesia and Malaysia, with average annual growth rates of 5.9 and 4.5 per cent respectively.

Over the projection period, India's consumption is expected to increase supported by continuing urbanisation and aluminium-intensive infrastructure development. In the longer term aluminium consumption will shift toward consumer durables, as middle class wealth increases. In 2020 consumption is projected to be 1.9 million tonnes.

Production

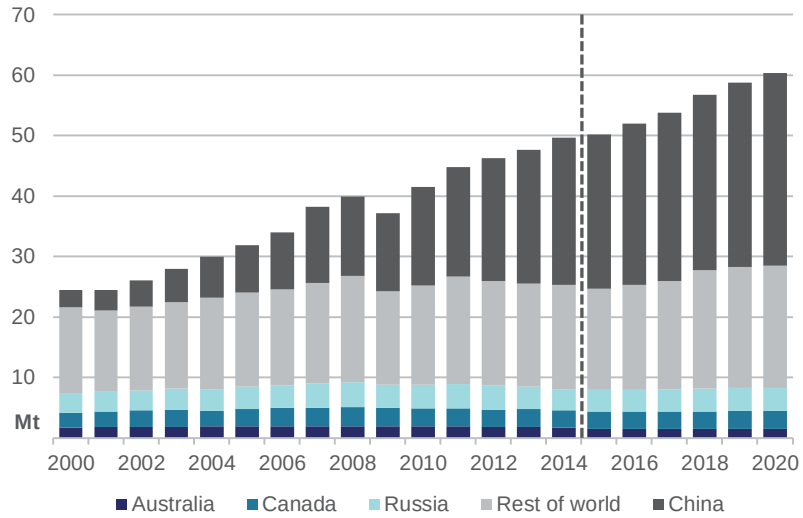
In 2014 world aluminium production is estimated to have grown 4.4 per cent to 49.7 million tonnes. New production and expansions in China underpinned most of this growth, despite there being a number of closures and temporary cut-backs around the world.

Despite closures and curtailments, production in China grew 11 per cent in 2014, to 24.4 million tonnes. This was supported by new smelters and expansion projects in Inner Mongolia and Xinjiang. In reaction to new cost-efficient capacity, as well as factors like poor market conditions and efforts to reduce local government subsidies, a number of smelters were temporarily closed throughout the year. Around 2.4 million tonnes of capacity was cut, with 1.2 million tonnes restored before the end of the year. Overall, these closures were outweighed by increased production at existing smelters.

Aluminium production in Europe declined 3.6 per cent to 7.6 million tonnes, with cost pressure and energy supply issues forcing production cuts in Russia and the Netherlands. Production also decreased by 12.2 per cent in the US to 1.7 million tonnes, as uncompetitive production was closed down. Higher energy costs and dated technology are increasing financial pressure on smelters in these countries and may encourage further closures going forward.

India's aluminium production in 2014 increased 0.7 per cent, relative to 2013, and totalled 1.6 million tonnes. Around 1 million tonnes of new capacity was commissioned in 2014. In 2015 these new smelters should increase production rates and support higher output. As a result, India's total aluminium output is forecast to increase 26 per cent to around 1.9 million tonnes in 2015.

Figure 10.7: World aluminium production



Source: WBMS.

World aluminium production is forecast to increase in 2015, as new smelter capacity introduced in 2014 and 2015 outweighs less-efficient smelters being taken off-line. The net increase is forecast to bring production to 50.5 million tonnes, 1.6 per cent higher than 2014. Most production will be in China (51 per cent), with India, Canada and Russia also contributing to higher world production.

China's aluminium production is forecast to grow 6 per cent to 25.8 million tonnes in 2015. Four new smelters are expected to be completed in 2015, providing 1.5 million tonnes of new capacity, including the 800 thousand tonne East Hope Group smelter in Shanxi. Domestic prices will determine how much of this new capacity and existing capacity will be utilised, and whether curtailments will continue at older, high-cost smelters. An additional 2.3 million tonnes of capacity are scheduled to be completed in 2015, the majority of which (1.3 million tonnes) will be in Xinjiang. To date, 2015 conditions have been slow, with the aluminium market in China facing tight financing conditions and uncertainty related to current low prices.

In 2015 US aluminium production is forecast to remain at around 1.7 million tonnes. Despite positive market conditions, the restart of idled capacity is unlikely. Aluminium production in Europe is forecast to grow slightly in 2015 and increase to 7.6 million tonnes, 0.5 per cent higher than 2014.

Over the outlook period, increased aluminium production is expected from new, larger smelters as companies invest in countries with lower cost energy sources and close proximity to input or final markets, shifting production away from traditional smelting countries like Europe, Australia and North America. Increasing environmental pressure will impact smelter activity going forward, securing the position of hydro-powered smelters and smelters with in-house energy sources. World aluminium production is projected to grow at an average annual rate of 3.4 per cent and to total 60.9 million tonnes in 2020.

China's aluminium production is projected to grow at a faster pace than world production to 2020, growing at an average annual rate of 4.8 per cent to around 32.3 million tonnes. Due to high operating costs and low global prices, a number of China's smelters are currently operating in unsustainable financial positions. Through the projection period considerations around refurbishments and upgrades, or closures, will need to be considered. Most new capacity in China will come from capacity improvements in current plants, although new sizeable investments are expected, including an 800 thousand tonne smelter in Xinjiang in 2017.

Provided good market conditions continue and commercial barriers are not significant, India's production is projected to grow at an annual average rate of 17 per cent to 4.2 million tonnes in 2020. A number of projects are planned to increase India's capacity over the outlook period, although previous delays, including issues around land use and electricity allocation, may mean these projects are postponed or sidelined.

New production and expansion plans will continue in the Middle East, where facilities with internal power generation capability are being designed to take advantage of favourable energy supply conditions and to meet local consumption needs. The rate of capacity increase in the Middle East experienced in recent years has been considerable. However, the rate of expansion will steadily decrease as production aligns with international consumption demand. Projects currently announced for the projection period include 855 thousand tonnes of new and expanded capacity to be built in Iran and Bahrain, by 2017.

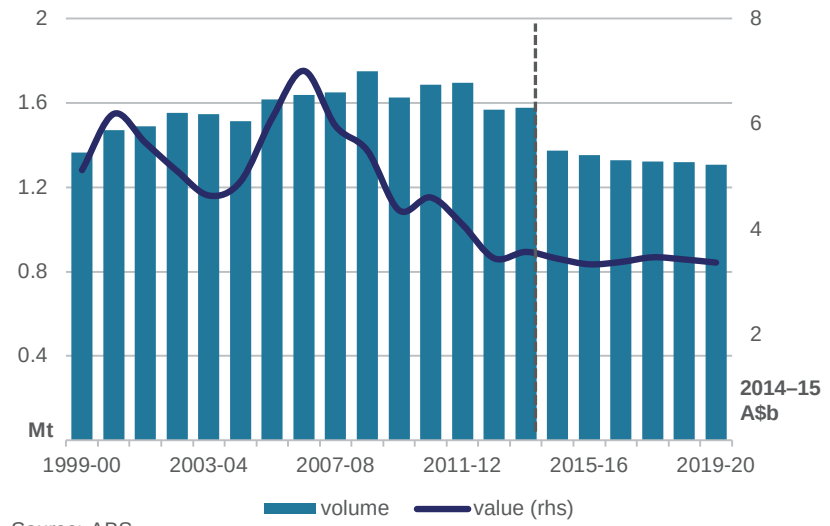
Australia's production and exports

Australia's production of aluminium in 2014-15 is forecast to be 1.6 million tonnes, around 9 per cent lower than 2013-14. Lower output was a result of the Point Henry smelter closure in July 2014, while production at other smelters continued at rates broadly unchanged from 2013-14 levels.

The market for Australian aluminium exports will continue to grow, but in an increasingly competitive environment, as cost pressures increase and new, efficient smelters start operating. Australia's exports are forecast to be 1.4 million tonnes in 2014-15, 13 per cent lower than 2013-14, due to lower production. In 2014-15 export values are forecast to decline to $3.5 billion, as a result of higher prices.

Australia's production over the outlook period is projected to decrease, as production comes under pressure with rising energy costs and lower domestic demand as automotive manufacturing is shut-down in 2016 and 2017. In 2019-20 Australia's production is projected to be 1.5 million tonnes, decreasing at an average annual rate of 3.1 per cent. Exports will decrease in line with lower production, to around 1.3 million tonnes earning $3.8 billion (2014-15 dollars).

Figure 10.8: Australia's aluminium exports



Source: ABS.

Alumina

Prices

In 2014 alumina prices averaged US$331 per tonne, 1 per cent higher than 2013. Low prices in June and July were followed with a 16 per cent increase in the third quarter, with the high prices sustained until the end of the year. These price increases were supported by growing consumption in China and high bauxite prices.

Alumina prices are forecast to increase by 6 per cent in 2015, to an average price of US$349 a tonne, as consumption increases are maintained to provide alumina as an input into new and expanded aluminium smelters.

Over the outlook period prices are projected to declined to average US$323 per tonne in 2020 (2015 dollars), as new refining capacity increases supply.

Figure 10.9: World alumina price

Source: Bloomberg.

Australia's production and exports

Australia is forecast to produce almost 20 million tonnes of alumina in 2014-15, which will be 7 per cent lower than 2013-14 production. This drop is due to the closure of Rio Tinto's Gove refinery in May 2014, which produced around 2.5 million tonnes a year. Activity was also temporarily curtailed at BHP's Worsley smelter in the third quarter, although this was regained with record production in the fourth quarter.

In line with the closure of Gove, exports in 2014-15 are estimated to decrease by 8 per cent to 17.3 million tonnes. For the same period export values are forecast to increase 11 per cent to $6.6 billion, supported by higher alumina prices.

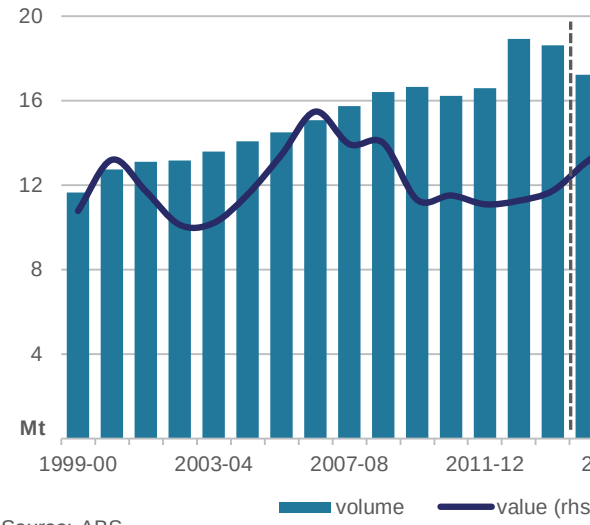
Alumina production is projected to decline at an average annual rate of 1.5 per cent to 19.7 million tonnes in 2019-20. Going forward Australian alumina refineries are likely to experience higher costs of production, including higher energy costs, that will make it more difficult to compete with new, lower cost refineries being built internationally. Future production may lower considerably if aluminium prices decline, particularly if there are significant reductions in Australian aluminium smelter production.

Over the outlook period exports are projected to decrease at an average annual rate of 1.6 per cent to around 16.9 million tonnes in 2019-20. The drop in export volumes will be negated by rises in the Australian price of alumina, contributing to export earnings increasing to $6.8 billion dollars (in 2014-15 dollars) in 2019-20.

Bauxite

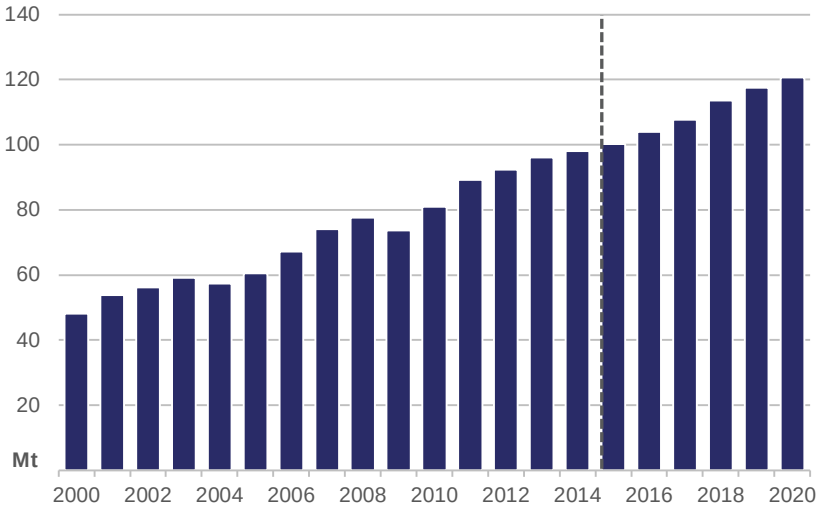
Bauxite unit values increased steadily in 2014, as a full year of the Indonesian export ban came into effect and Chinese consumption demand continued to grow.

Figure 10.10: Australia's alumina exports



Source: ABS.

Figure 10.11: World alumina production



Source: WBMS.

High-quality bauxite reserves in China are being depleted, and China continues to look for new import markets. Towards the end of 2014 there was a substantial pick-up in Malaysian bauxite exports to China, with lower-cost product being shipped based on lower freight costs.

Bauxite stockpiles have been steadily decreasing in China, having a dampening effect on potential sharp price increases. As stockpiles decline it is expected China's imports will increase, facilitating further upward movement of the bauxite unit value in 2015.

Australia's production and exports

Australia's production of bauxite in 2014-15 is forecast to be 80.8 million tonnes, which is fairly consistent with 2013-14 production (0.7 per cent increase). Production declined at a number of mines during the year, including at Gove in the second and third quarter, as processes where changed to export all bauxite production. Over 2015, capacity constraints will be addressed at the Gove mine to increase annual capacity by two million tonnes. Australia's bauxite production is projected to continue growing in the medium term, to supply growing global demand particularly in light of the Indonesian export ban.

In 2014-15 Australia's exports of bauxite are forecast to increase by 21.2 per cent to 18.4 million tonnes. The value of these exports is forecast to increase by 38 per cent to $751 million supported by high bauxite export unit values, which recorded record highs in the December quarter 2014 of $46 per tonne.

Progress is continuing with a number of new bauxite mines, including Bauxite Hills and the South of Embley project. Production from these mines is scheduled to begin in late 2016 and 2018, respectively. At the end of the outlook period bauxite production is projected to be around 99.5 million tonnes, growing at an average annual rate of 3.6 per cent. Australia's bauxite exports are projected to increase at an average annual rate of 12 per cent to 29.6 million tonnes in 2019-20. Earnings from bauxite exports are projected to increase at an average annual rate of 11per cent to $1.1 billion (2014-15 dollars) in 2019-20.

Figure 10.12: Australian bauxite production

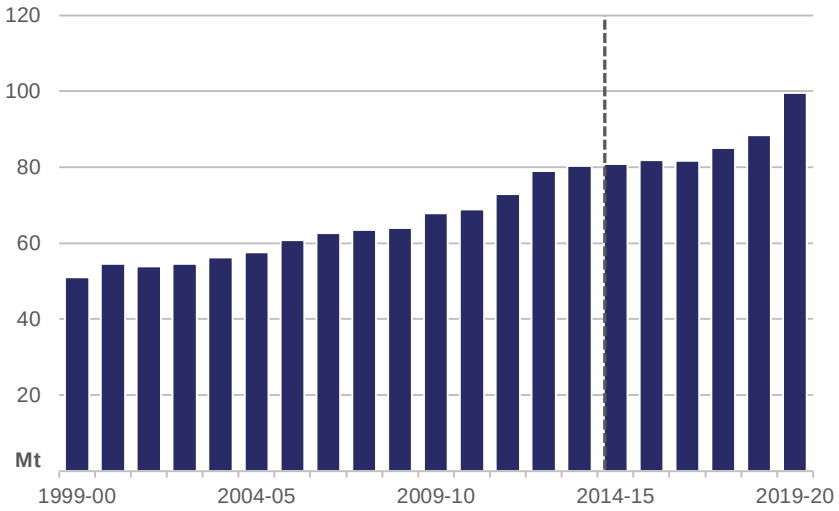
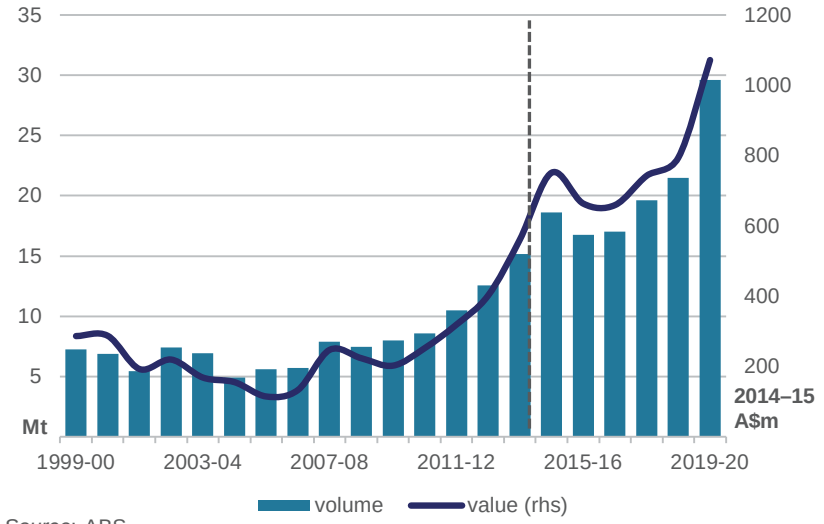


Figure 10.13: Australia's bauxite exports



Source: ABS.

Table 10.1: Aluminium outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Primary aluminium								
Production	kt	49 698	50 513	52 463	54 341	57 339	59 299	60 904
Consumption	kt	50 046	51 998	53 499	55 031	56 701	58 218	59 943
Closing stocks b	kt	6 397	4 911	3 876	3 186	3 824	4 906	5 867
– weeks of consumption		6.6	4.9	3.8	3.0	3.5	4.4	5.1
Prices								
World aluminium c								
– nominal	US$/t	1 866	1 913	1 981	2 113	2 140	2 190	2 190
– real d	US$/t	1 909	1 913	1 937	2 019	1 999	2 000	1 955
Alumina spot								
– nominal	US$/t	330.6	348.8	345.0	351.0	359.0	361.0	361.8
– real d	US$/t	338.2	348.8	337.2	335.4	335.3	329.6	322.9

		2013–14	2014–15 f	2015–16 f	2016–17 z	2017–18 z	2018–19 z	2019–20 z
Australia								
Production								
Primary aluminium	kt	1 773	1 613	1 519	1 492	1 486	1 480	1 469
Alumina	kt	21 532	19 987	19 975	19 700	19 700	19 700	19 700
Bauxite	Mt	80.3	80.8	81.8	81.7	85.1	88.3	99.5
Consumption								
Primary aluminium	kt	197	239	167	164	163	163	162
Exports								
Primary aluminium	kt	1 576	1 373	1 352	1 328	1 323	1 317	1 307
– nominal value	A$m	3 479	3 448	3 422	3 543	3 716	3 753	3 768
– real value e	A$m	3 573	3 448	3 339	3 383	3 471	3 430	3 369
Alumina	kt	18 614	17 227	17 090	16 865	16 876	16 887	16 909
– nominal value	A$m	5 711	6 614	7 355	7 391	7 594	7 706	7 753
– real value e	A$m	5 865	6 614	7 175	7 056	7 093	7 043	6 933
Bauxite	kt	15 146	18 364	16 748	17 041	19 629	21 460	29 581
– nominal value	A$m	546	751	680	691	795	869	1 198
– real value e	A$m	561	751	663	659	743	794	1 071
Total value								
– nominal	A$m	9 737	10 814	11 457	11 625	12 104	12 328	12 719
– real e	A$m	9 999	10 814	11 178	11 097	11 306	11 267	11 374

b Producer and LME stocks. **c** LME cash prices for primary aluminium. **d** In current calendar year US dollars. **e** In current financial year Australian dollars. **f** forecast. **z** projection.
Sources: ABS; LME; World Bureau of Metal Statistics.

Copper

Gayathiri Bragatheswaran

Despite production downgrades in key producing regions, the copper market is forecast to move into surplus in 2015. Over the medium term, consumption growth will be driven by emerging economies as a result of economic development. Consumption growth is forecast to absorb new production capacity in the short term. However, the pace of production growth is projected to outpace consumption growth towards the end of the outlook period and contribute to a build-up in stocks.

Prices

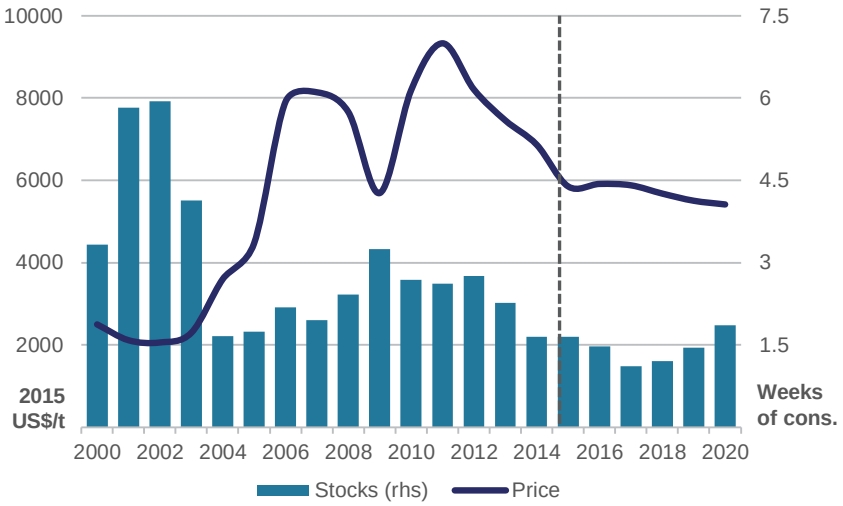
The anticipated copper surplus failed to materialise again in 2014 as new production capacity continued to take longer than expected to reach promised rates. Although the market was in deficit, the LME copper price averaged US$6863 a tonne, 6 per cent lower than 2013, because of increased stock availability. During 2014, financial sector reforms in China increased the availability of material by reducing the demand for copper to be used as collateral in loans; and warehouses released stocks. The Chinese Government is seeking to reduce the use of metals in finance agreements in the shadow-banking sector.

In 2015, copper prices are forecast to decline 13 per cent to US$5968 a tonne as the market moves into a long expected surplus and stocks increase. The market is forecast to remain tight as refined production growth is adversely affected by reduced ore availability because of mine production target downgrades across the world. These include an up to 30 per cent downgrade of production targets for Olympic Dam in Australia; declining ore grades at Escondida in Chile, the world's largest mine; and the continued clean-up of the Bingham Canyon mine in the United States following a landslide in 2013.

Figure 11.1: Monthly LME copper price

Sources: LME; Bloomberg.

Figure 11.2: Annual copper prices and stocks



Source: Bloomberg.

From 2016, copper prices are projected to rebound as consumption growth in emerging economies absorbs the new capacity being developed. Prices are projected to peak at US$6012 (in 2015 dollar terms) in 2016 before declining gradually to US$5400 (in 2015 dollar terms) by 2020 as the development of new projects eventually results in production growth exceeding consumption growth, contributing to a build-up in stocks.

The supply–demand balance is projected to remain tight over the medium term. As such, declining ore grades and the risk of large production disruptions, such as labour disruptions and electricity outages, in key producing regions may push the market back into deficit and put upward pressure on prices.

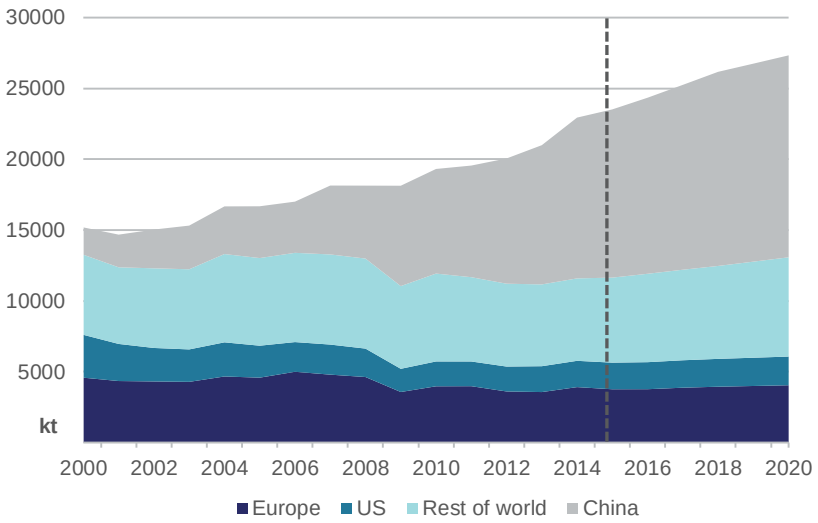
Consumption

According to the World Bureau of Metal Statistics, world copper consumption is estimated to have increased 9 per cent to 22.9 million tonnes in 2014. China remained the largest consumer of copper in 2014 at 11.4 million tonnes. Despite declining economic growth and a weak property sector, China's refined copper consumption increased by an estimated 15.5 per cent between 2013 and 2014, underpinned by increased infrastructure spending, particularly on rail and electricity networks, and higher manufacturing output of copper intensive products. In contrast to expectations of lower copper consumption growth as China's economic growth slows, copper consumption growth in 2014 was the highest since 2009.

The United States was the second largest consumer of copper in 2014, and was estimated to have consumed 1.9 million tonnes, 1.6 per cent higher than 2013. US copper consumption growth was supported by higher economic growth; an increase in manufacturing output; and a stronger residential and commercial sector, which accounts for around half of US copper consumption.

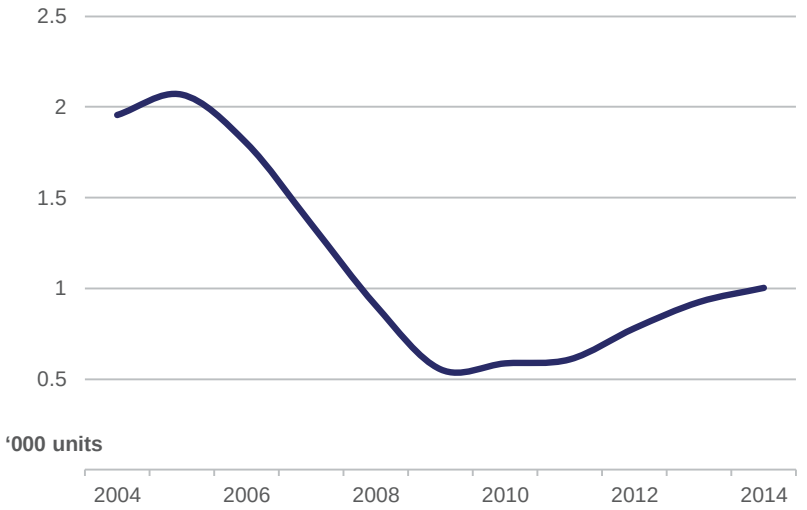
In 2015 world refined copper consumption is forecast to total 23.5 million tonnes, a 2.5 per cent increase from 2014. Growth in copper consumption will continue to be driven by China despite forecast slower economic growth as they continue to invest in developing their electricity network.

Figure 11.3: World copper consumption



Source: WBMS.

Figure 11.4: US privately owned housing units started



Source: United States Census Bureau.

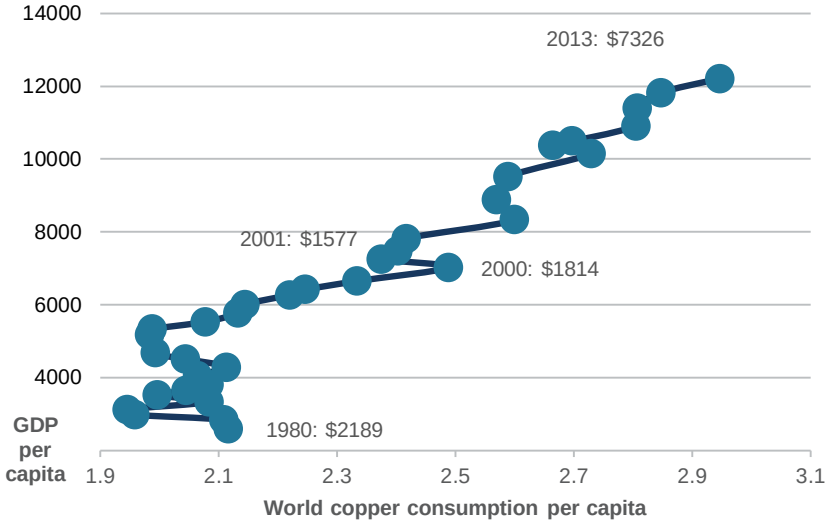
Over the medium term, world refined copper consumption is projected to increase by an average 3 per cent a year to 27.3 million tonnes in 2020. Global copper intensity is projected to continue to increase as consumption in China and other emerging economies expands in response to investment in electricity and telecommunication networks; new homes; and the development of manufacturing capacity.

China is projected to remain the largest copper consumer, accounting for 52 per cent of the total market in 2020. China's copper consumption is projected to increase at an average annual rate of 3.7 per cent to 14.3 million tonnes in 2020, underpinned by growth in construction activity, ongoing urbanisation and the expansion of electricity networks. A shift in China's manufacturing base towards the production of copper-intensive high value-add and advanced technology products, such as cars and consumer electronics, will also support growing copper use in China.

While not currently a large consumer, India is projected to become an important consumer of copper over the medium term. India's copper consumption is projected to increase at an average annual rate of 8.4 per cent to 802 thousand tonnes in 2020 underpinned by rapidly increasing investment in electricity generation capacity and distribution networks. The Modi government has signalled its intentions to address electricity supply shortages as a priority by investing heavily in the development of generation capacity to ensure that all citizens will have access to electricity over the medium term.

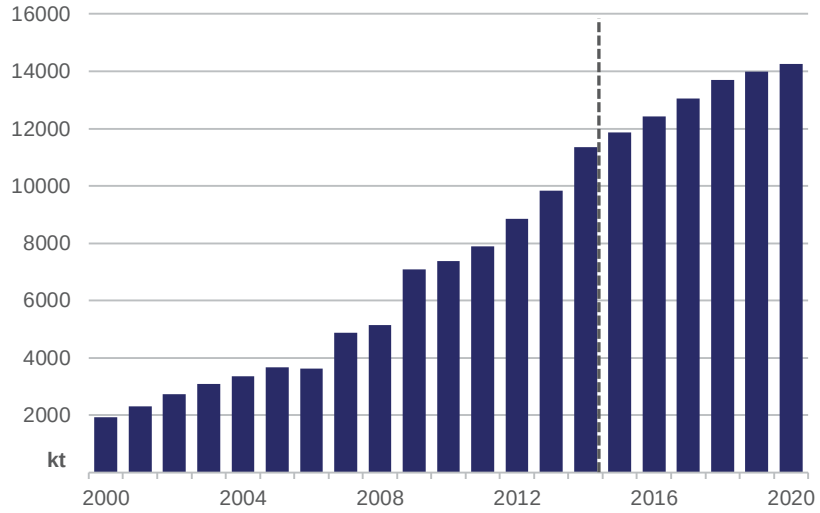
Copper consumption in South East Asian, Latin American and African countries is also projected to increase over the medium term. These regions have relatively low copper consumption per person and large populations. As such, even small increases in consumption per person may translate into large absolute increases in total consumption. Copper plays an important role in the development of infrastructure in emerging economies in the form of construction and use in electricity distribution networks as populations become more urbanised and wealthy. In addition, low business costs in these areas are likely to encourage the development of manufacturing sectors that use copper.

Figure 11.5: World copper intensity



Sources: World Bank; IMF; WBMS.

Figure 11.6: China's copper consumption



Source: WBMS.

Growth in copper consumption in these regions are projected to offset declining use in advanced economies where electricity networks are well developed and manufacturing activities are moving abroad.

Production

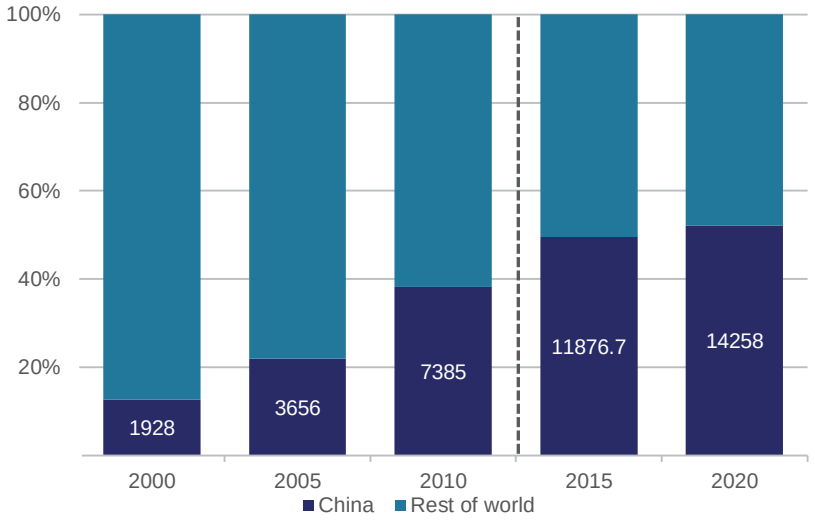
Mined

World mined copper production is estimated by the World Bureau of Metal Statistics to have increased by 0.8 per cent in 2014 to 18.4 million tonnes, driven by increased production in all key producing regions except China (4.4 per cent decrease to 1.6 million tonnes). Production in Indonesia is also estimated to have decreased 27 per cent in 2014 to 353 thousand tonnes following the implementation of restrictions on copper exports which have since been lifted after project proponents agreed to develop processing capacity. US production increased by 7 per cent between 2013 and 2014 to 1.3 million tonnes reflecting increased production from the Morenci mine.

Chile's copper production was relatively stable in 2014 at 5.8 million tonnes as production at the world's largest mine, Escondida, declined following labour disruptions in September. Africa's copper production grew by 10 per cent in 2014 because of a 42 per cent increase in production from the Kanasanshi mine in Zambia and a 14 per cent increase in production at the Mutoshi mine in the Democratic Republic of Congo. Production at the Oyu Tolgoi mine in Mongolia, in its second year of production, increased by 75 per cent relative to 2013.

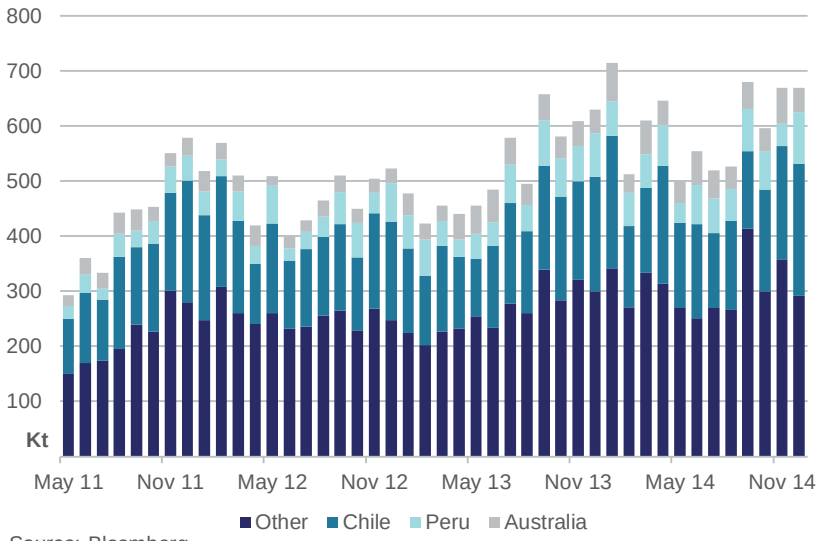
Mined production is forecast to increase 6 per cent in 2015 relative to 2014 to 19.5 million tonnes supported by increased output in Indonesia, Africa, Peru and Chile. Production in Indonesia is forecast to increase after export restrictions at the Grasberg mine have been removed. Higher output is forecast from the Konkola project in Zambia, Toromocho and Constancia mines in Peru and Escondida in Chile. However, given the history of labour disputes and strikes in the key producing region of South America there is a risk that there could be further production disruptions during 2015.

Figure 11.7: China's share of world copper consumption



Source: WBMS.

Figure 11.8: China's monthly copper imports



Source: Bloomberg.

Over the outlook period, production is projected to increase at an average annual rate of 3.1 per cent to 22.7 million tonnes by 2020.

This will be underpinned by the completion of a number of new mines around the world. This output will be partly offset by the expected decline in production from the Escondida mine from 2016 due to rapidly decreasing ore grades. BHP Billiton plans to minimise the loss of output due through productivity initiatives such as supply savings and labour improvements.

Large developments scheduled to be commissioned over the outlook period include Petaquilla Minerals' Cobre Panama in 2017. The mine has estimated total resources of 14.8 million tonnes of copper metal content and is expected to produce up to 357 thousand tonnes a year.

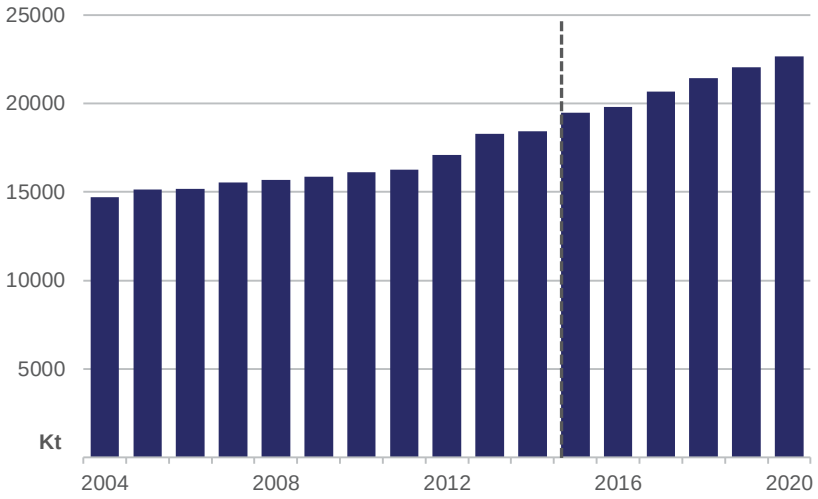
The transfer of ownership of the Las Bambas mine in Peru to MMG has been completed and is expected to commence production in the first quarter of 2016. The project is projected to produce around 361 thousand tonnes over the first ten years of operation.

Refined

The World Bureau of Metal Statistics estimated global production of refined copper increased by 8 per cent in 2014, compared to 2013, and totalled 23 million tonnes. Several projects increased refined copper production over 2014 including emerging producers such as the Democratic Republic of Congo. The country's Luilu solvent extraction-electrowinning (SX-EW) smelter is estimated to have produced 147 000 tonnes of refined copper in 2014, a 69 per cent increase from 2013. Refined copper production is forecast to increase by 23.5 million tonnes in 2015, a 2.4 per cent increase from 2014.

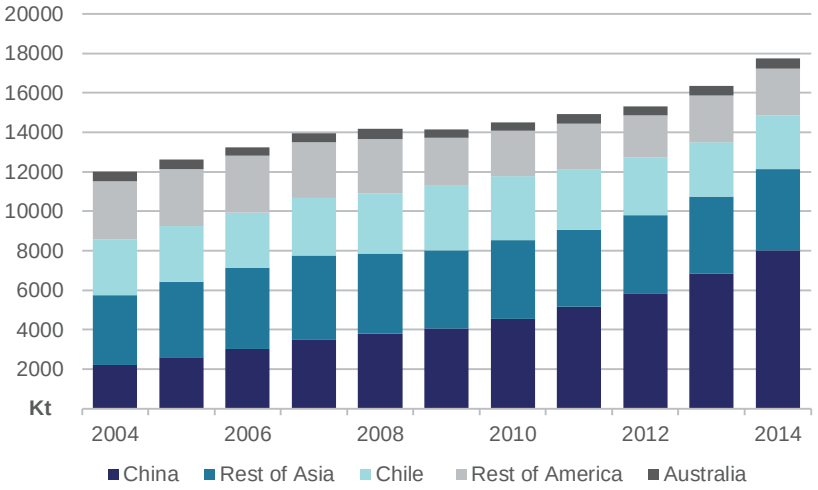
China was a major driver of growth, production increased by 17 per cent in 2014 (8 million tonnes) relative to 2013. China's production is forecast to remain similar to 2014 as the closure of older out-dated refineries and minor smelters is offset by the use of idle capacity. Increases in refined production in countries such as South Africa and Zambia are forecast for 2015.

Figure 11.9: World copper mine production



Sources: Bloomberg.

Figure 11.10: World refined copper production



Source: Bloomberg.

Despite cost pressures posing a risk to the industry as prices remain low, production is forecast to increase to 27.6 million tonnes by 2020.

Many large scale refinery developments are scheduled to come online over the outlook period such as the Chongzuo refinery in China which is scheduled to commence production in 2016 with a capacity of 150 000 tonnes a year. Expansion of existing capacities and a ramp up in output are also expected from the Camacari refinery in Brazil, the Sar Chesmeh refinery in Iran and the Kanasanshi smelter in Zambia.

Australia's production and exports

Exploration

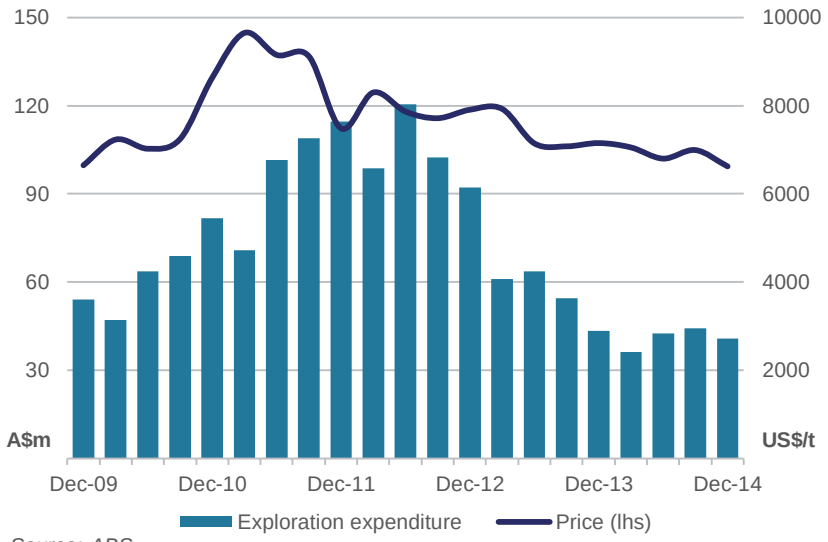
Investment in copper exploration decreased by 8 per cent between the September and December 2014 quarters to $40.8 million. Exploration expenditure in the December quarter fell 6 per cent relative to the December quarter 2013 reflecting the substantial drop in average LME copper prices over the period.

Mined production

Australia's copper mine production is forecast to decrease 4 per cent to 948 thousand tonnes in 2014-15, compared to 2013-14 due to mill disruptions at Olympic Dam, Australia's largest copper mine. The mill is expected to be offline for approximately six months due to an electrical failure, which caused an outage in February 2015. BHP Billiton are expecting production from the mine to decline by up to 30 per cent (60 000 – 70 000 tonnes) in 2014-15. This will by partly offset by increased production from Aditya Birla's Nifty mine in the second half of 2014-15. The Nifty mine temporarily closed in July 2014 for safety reasons after a sinkhole opened.

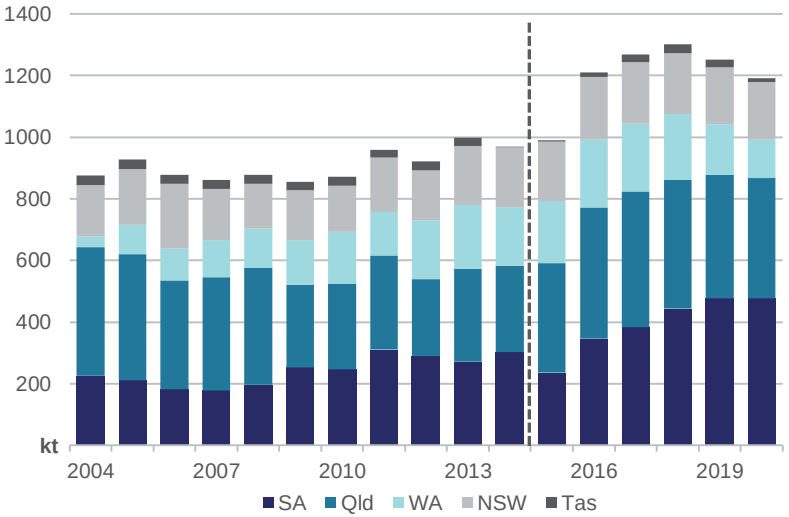
Over the outlook period, production is projected to increase on average by 6.4 per cent a year before declining in 2019-20 to 1.2 million tonnes following the scheduled closure of the Golden Grove (capacity of 1.75 million tonnes of ore a year) mine in Western

Figure 11.11: Australia's copper exploration



Source: ABS.

Figure 11.12: Australia's copper mine production



Source: ABS.

Australia and the Leichardt mine in Queensland as their reserves are exhausted. Prior to that, increased mine production will be underpinned by the ramp up in production at the Cadia Valley and Prominent Hill mines. A few small-scale mines are also scheduled to be commissioned over the outlook period including Cudeco's Rocklands mine in Queensland in 2016.

Refined production

Australia's refined copper production in 2014-15 is forecast to decline 8 per cent compared to 2013-14 to 461 thousand tonnes. Refined output from Olympic Dam is forecast to decline because of reduced feed availability in the second half of 2014-15 due to mine production disruptions. Small increases in production are expected from the recommencement of the smelter at the Nifty mine in Western Australia.

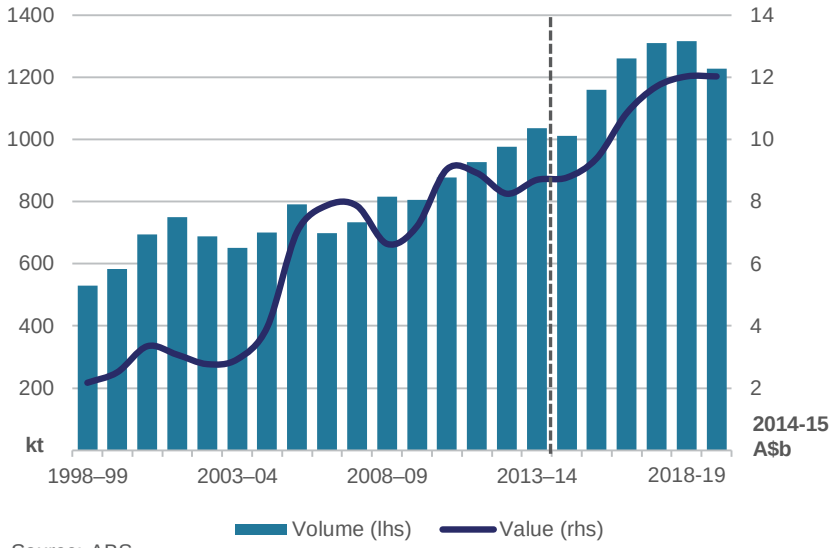
Over the outlook period refined copper production is forecast to decline by 13 per cent a year to around 233 thousand tonnes in 2019- 20. The large reduction in refined production is the result of the expected closure of Glencore's Townsville refinery (300 thousand tonnes a year) in 2016.

Exports

Australia's total copper exports (metal content) are forecast to decline 2 per cent in 2014-15 to around 1 million tonnes, reflecting lower production at Olympic Dam. Export values are forecast to decline by 2 per cent to $8.9 billion because of lower volumes and copper prices.

Over the outlook period to 2019-20 Australia's copper exports are projected to increase at an average annual rate of 2.2 per cent between 2015-16 and 2018-19 to 13.3 million tonnes before declining 7 per cent between 2018-19 and 2019-20 to 12.4 million tonnes. China and India will remain key export markets as industrial development increases and is likely to signal to producers to increase output.

Figure 11.13: Australia's copper exports



Source: ABS.

Export values are projected to increase in line with higher volumes, prices and a lower Australian dollar to reach $11.7 billion (in 2014-15 dollar terms) in 2017-18 before declining to $10.2 billion (in 2014-15 dollar terms) by 2019-20 reflecting lower volumes and prices.

Table 11.1: Copper outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Production								
– mine	kt	18 433	19 485	19 803	20 665	21 422	22 039	22 682
– refined	kt	22 996	23 538	24 291	25 098	26 240	26 891	27 562
Consumption	kt	22 941	23 520	24 344	25 252	26 172	26 749	27 334
Closing stocks	kt	725	744	690	536	605	747	975
– weeks of consumption		1.6	1.6	1.5	1.1	1.2	1.5	1.9
Price LME								
– nominal	US$/t	6 863	5 968	6 150	6 238	6 144	6 075	6 050
	USc/lb	311	271	279	283	279	276	274
– real b	US$/t	7 021	5 968	6 012	5 960	5 739	5 547	5 400
	USc/lb	318	271	273	270	260	252	245
		2013–14	**2014–15 f**	**2015–16 f**	**2016–17 z**	**2017–18 z**	**2018–19 z**	**2019–20 z**
Australia								
Mine output	kt	988	948	1 122	1 247	1 288	1 295	1 207
Refined output	kt	500	461	486	311	230	232	233
Exports								
– ores and conc. c	kt	2 122	2 187	2 636	3 635	4 109	4 128	3 782
– refined	kt	456	450	474	303	224	226	227
Export value								
– nominal	A$m	8 707	8 875	10 393	11 883	12 563	12 441	11 437
– real d	A$m	8 942	8 875	10 139	11 344	11 735	11 370	10 228

b In current calendar year US dollars. **c** Quantities refer to gross weight of all ores and concentrates. **d** In current financial year Australian dollars. **f** forecast. **z** projection.
Sources: ABS; International Copper Study Group; LME; World Bureau of Metal Statistics.

Nickel

Thomas Redmond

Nickel prices traded within a broad range in 2014 in response to supply concerns and record LME stocks. Prices are forecast to remain subdued in the short term as the supply overhang is slowly absorbed. Over the medium term prices are projected to increase gradually to reflect the rising cost of raw materials.

Nickel prices and stocks

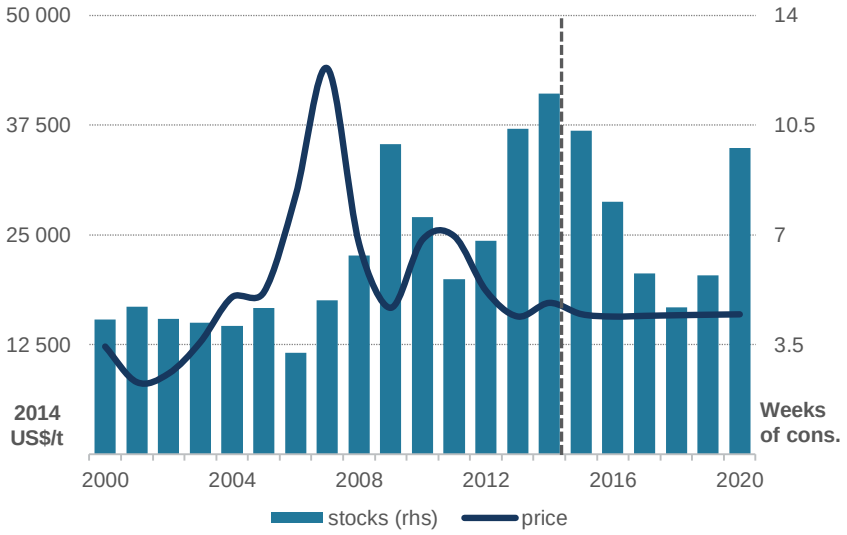
LME nickel spot prices averaged US$16 872 a tonne in 2014, 12 per cent higher than 2013. Prices increased by 42 per cent in the first nine months of the year following the implementation of Indonesia's ban on unprocessed ore, which stimulated concerns about the effect of reduced nickel ore supply on refined production. Despite these concerns, refined production continued to grow and contributed to a sustained accumulation of stocks. LME stocks were given a further boost in mid-2014 after the Qingdao port scandal when stocks from bonded warehouses in China were transferred to LME warehouses in other parts of Asia; around 24 000 tonnes of refined nickel entered LME warehouses in June alone. LME nickel prices declined sharply towards the end of the year as stocks continued to rise and concerns about supply availability were alleviated.

Nickel prices are expected to remain subdued in the short term as it will take some time before the large supply overhang is absorbed by the market. In 2015, world nickel prices are forecast to decline by 5 per cent to average $15 980 a tonne as stocks remain elevated at around 10 weeks of consumption.

Figure 12.1: Nickel daily price

Source: Bloomberg.

Figure 12.2: Nickel prices and stocks



Source: LME.

Over the medium term nickel prices are projected to increase gradually as the higher cost of mine production filters through to refined output. Nickel refining capacity is expected to increase further in emerging economies and moderate prospects for substantial price gains over the next five years. Projected higher prices are more likely to be underpinned by moderate increases in raw material costs—unlike other commodity markets where cost-cutting drives have resulted in substantial reductions in operating costs, the cost of nickel mine production is expected to increase as nickel sulphide deposits are depleted. Most new nickel projects being developed around the world will target nickel laterite ores, which typically are lower grade than sulphide ores and require more complex processing. LME nickel prices are projected to increase to around US$15 950 a tonne (in 2015 dollar terms) by 2020.

Consumption

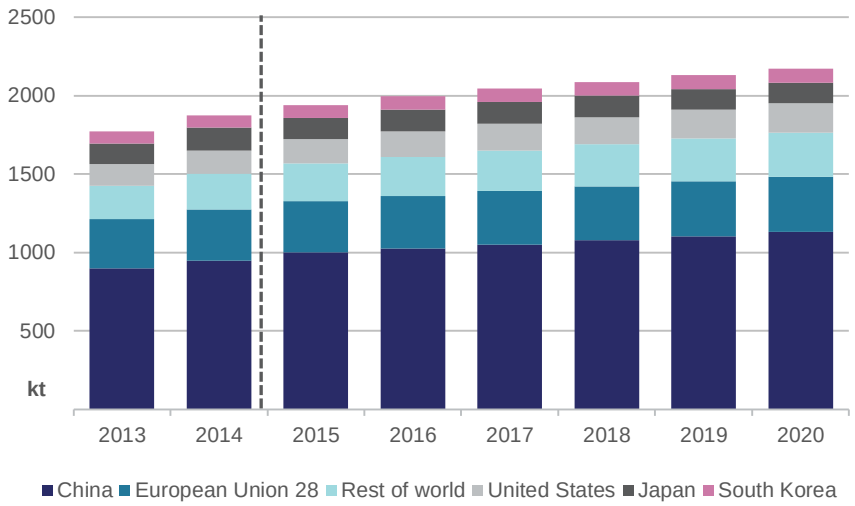
In 2014, world refined nickel consumption increased by an estimated 6 per cent to 1.9 million tonnes, driven largely by China which consumed 948 000 tonnes of nickel, 6 per cent higher than 2013.

Stainless steel accounts for a large proportion of world nickel consumption. As such, the demand for nickel will be directly linked to the consumption and production of stainless steel. Over the medium term, growth in nickel consumption will be driven by emerging economies as they invest in infrastructure development to enable industrialisation and urbanisation. From 2015 to 2020, world nickel consumption is projected to increase at an average annual rate of 2 per cent to total 2.2 million tonnes in 2020. China is projected to remain the principal source of nickel demand over the outlook period, supported by the production of stainless steel for infrastructure development.

Mine production

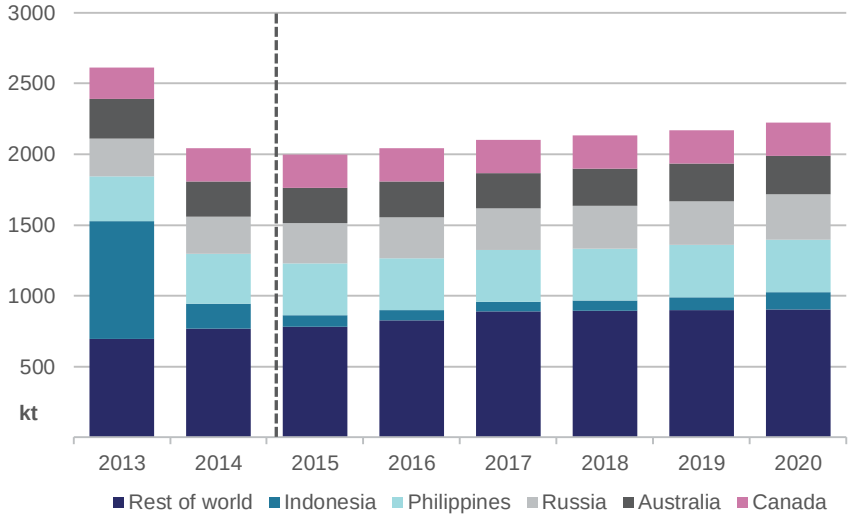
In 2014, world nickel mine production is estimated to have decreased by 22 per cent to 2.04 million tonnes.

Figure 12.3: World nickel consumption



Source: International Nickel Study Group.

Figure 12.4: World nickel mine production



Source: International Nickel Study Group.

Mine production was adversely affected by the implementation of the unprocessed ore ban in Indonesia. Producers that did not have refining capacity in Indonesia were unable to export their product and were forced to cut production. Indonesia's mine production declined by almost 80 per cent in 2014 to 177 thousand tonnes. The loss in supply from Indonesia was partially offset by increased output in the Philippines, which increased by 11 per cent to 351 thousand tonnes.

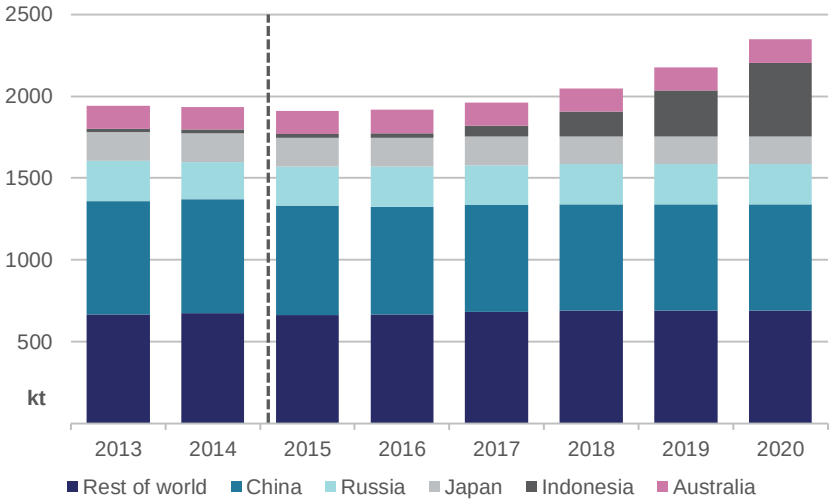
Over the medium term, world mine production is projected to increase at an average annual rate of 2 per cent to 2.2 million tonnes in 2020, supported by increased production from recently completed mines in Brazil; the development of new mines in Australia; and the resumption of mine production in Indonesia as refining capacity is developed. Most new nickel mine projects will target nickel laterite ores which are more challenging and costly to develop. As such, world mine production is unlikely to return to 2013 levels within the next five years.

Refined production

World refined nickel production is estimated to have declined by 0.4 per cent in 2014 to 1.9 million tonnes. Concerns about the effect of the Indonesian ore ban on China's refined output failed to materialise, with China's output increasing marginally by 0.4 per cent to 397 000 tonnes.

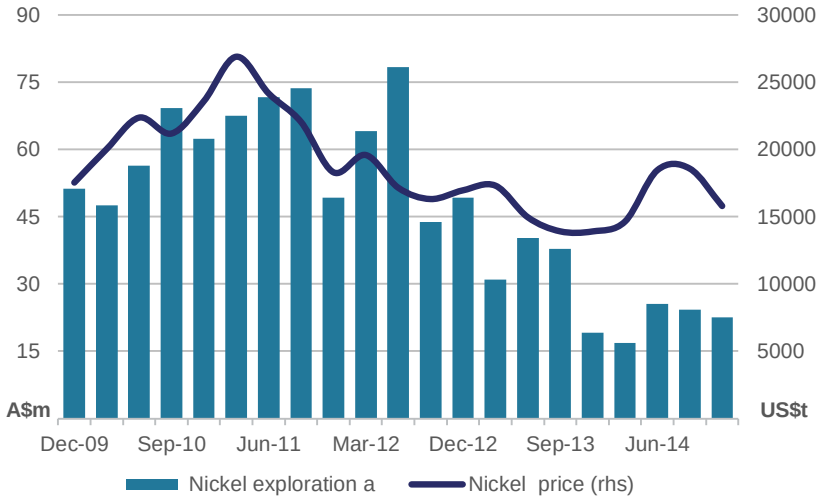
While lower nickel prices are expected to force the closure of some high-cost capacity, refined nickel production is projected to increase by 4 per cent a year from 2015 to 2020 to around 2.4 million tonnes, driven by emerging economies. A number of emerging economies have signalled their intention to increase value-adding activities to boost their economic growth and are expected to develop new refining capacity to export refined nickel rather than sell nickel ores. Refining capacity is now being developed in Indonesia and is likely to become operational towards the end of the outlook period.

Figure 12.5: World refined nickel production



Source: International Nickel Study Group.

Figure 12.6: Australia's nickel exploration expenditure



a. Includes cobalt.
Sources: ABS; LME.

Australia

Exploration

Australia's expenditure on nickel and cobalt exploration in the December quarter increased 17 per cent year-on-year to $22.5 million. Although prices were higher for much of 2014, this did not translate into increased exploration expenditure. Expenditure on nickel and cobalt exploration was $89 million in 2014, 30 per cent lower than 2013.

Mine production

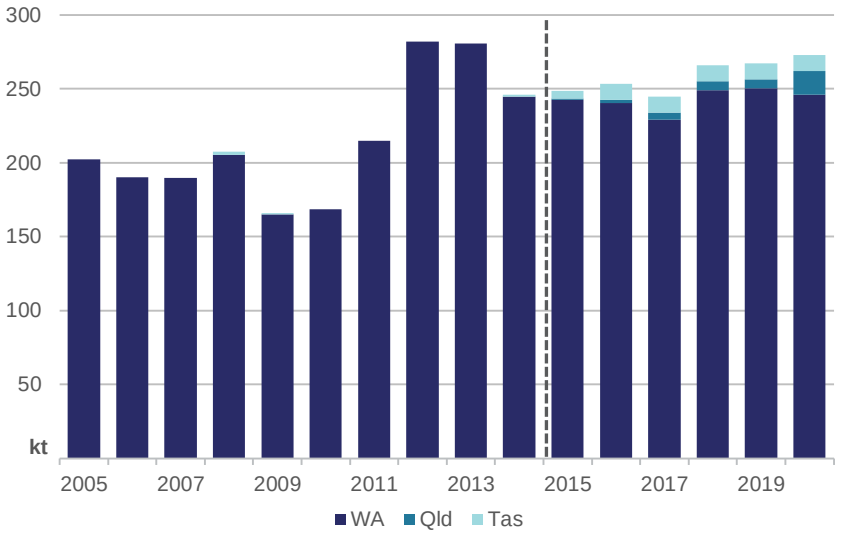
In 2014-15, Australia's nickel mine production is forecast to decrease by 5 per cent to 243 000 tonnes as the commissioning of new capacity is more than offset by the loss in production from the closure of the Perseverance mine at Leinster in late 2013. New capacity is expected to come from Metallica's Lucky Break mine, Poseidon Nickel Limited's Mt Windarra and QCG's Avebury.

Over the medium term, Australia's nickel mine production is projected to increase to 268 000 tonnes in 2019-20. While several new projects are scheduled to be developed, this will be partially offset by the expected reduction in output from some older, large laterite operations such as Ravensthorpe. New capacity is expected to come from the resumption of mining activities at Lake Johnston in Western Australia and the commissioning of the Nova-Bollinger mine in Western Australia.

Refined production

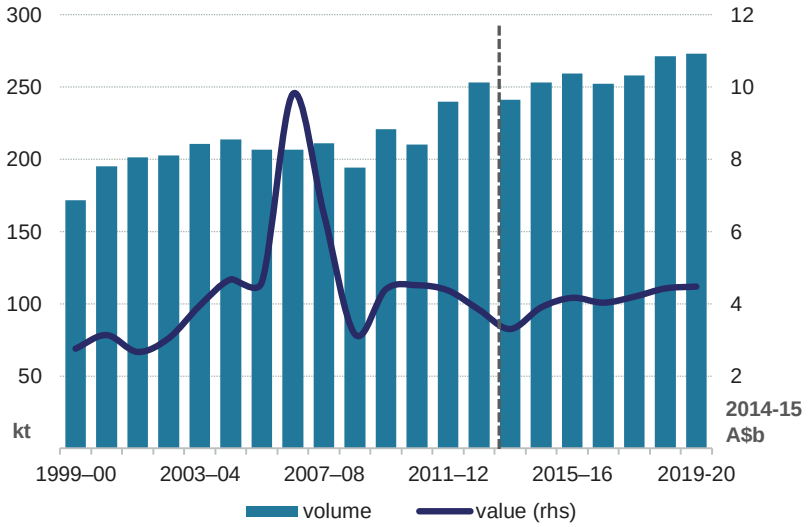
Australia's refined production is forecast to increase by 3 per cent to 142 000 tonnes in 2014-15. Over the medium term, Australia's refined nickel production is projected to remain relatively stable at around 142 000 tonnes to 2019-20. No new refined nickel capacity is expected to be developed over the outlook period as energy costs are high relative to competitors developing new capacity in Asia.

Figure 12.7:Australia mine production



Source: ABS.

Figure 12.8: Volume and value of Australia's nickel exports



Source: ABS.

Exports

In 2014-15 Australia's nickel export volumes (by metal content) are forecast to increase by 2 per cent to 259 000 tonnes. From 2014-15, Australia's nickel export volumes are projected to increase at an average annual rate of 2 per cent to around 273 000 tonnes in 2019-20. Reflecting higher volumes, higher prices and an assumed depreciation of the Australian dollar, earnings from Australia's nickel exports are projected to increase at an average annual rate of 1 per cent to $4.5 billion (in 2014-15 dollar terms) in 2019-20. With refined nickel capacity in emerging economies expected to increase in the outlook period, it is likely that ores and concentrates will account for an increasing proportion of Australia's nickel exports.

Table 12.1: Nickel outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Production								
– mine	kt	2 041	1 997	2 042	2 100	2 135	2 171	2 223
– refined	kt	1 934	1 912	1 918	1 962	2 047	2 177	2 347
Consumption	kt	1 873	1 941	1 994	2 043	2 086	2 131	2 173
Stocks	kt	413	384	308	226	187	233	407
– weeks of consumption		11.5	10.3	8.0	5.8	4.7	5.7	9.7
Price LME								
– nominal	US$/t	16 872	15 974	16 062	16 515	16 969	17 422	17 875
	Usc/lb	765	725	729	749	770	790	811
– real b	US$/t	17 260	15 974	15 701	15 781	15 850	15 907	15 954
	Usc/lb	783	725	712	716	719	722	724
		2013–14	**2014–15 f**	**2015–16 f**	**2016–17 z**	**2017–18 z**	**2018–19 z**	**2019-20 z**
Australia								
Production								
– mine cs	kt	262	243	255	248	254	267	268
– refined	kt	138	142	143	142	142	142	142
– intermediate	kt	64	66	66	58	52	51	51
Export volume ds	kt	241	253	259	252	258	271	273
– nominal value s	A$m	3 216	3 903	4 275	4 229	4 499	4 850	5 015
– real value es	A$m	3 303	3 903	4 171	4 037	4 202	4 433	4 484

b In current calendar year US dollars. **c** Nickel content of domestic mine production. **d** Includes metal content of ores and concentrates, intermediate products and nickel metal. **e** In current financial year Australian dollars. **f** forecast. **s** estimate. **z** projection.
Sources: ABS; International Nickel Study Group; LME; World Bureau of Metal Statistics.

Zinc

Ben Witteveen and Thomas Redmond

Reduced supply and strong demand drove an increase in zinc prices through 2014. Tight supply and demand conditions are projected to remain key features of the zinc market until 2017 when new projects begin operations.

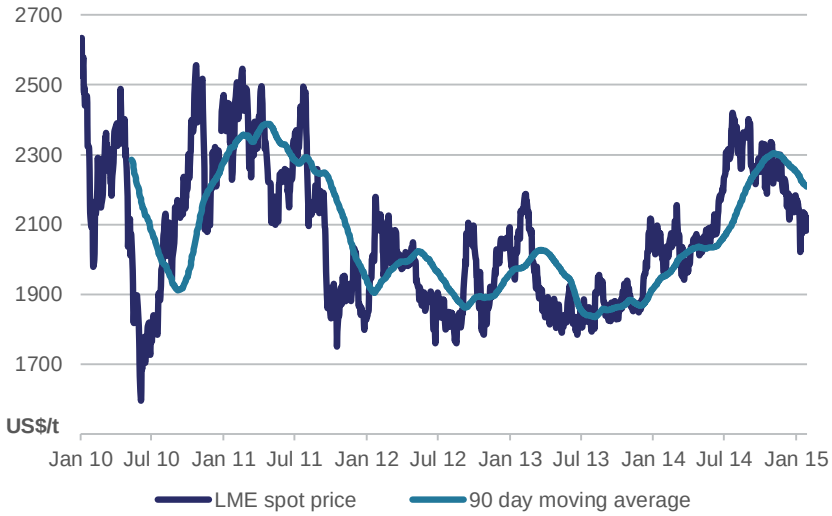
Zinc prices and stocks

Reduced supply and an associated draw-down in stocks resulted in the LME zinc spot price increasing 13 per cent to average US$2159 a tonne in 2014. LME stocks declined 24 per cent during the year, from 903 000 tonnes in January to 690 000 tonnes at the end of December.

In conjunction with reduced supply, changes to LME warehouse rules are expected to provide an incentive to reduce stocks. From February 2015, LME warehouses with queues above 50 days are now required to ship out a greater amount of metal than is added. This new rule is anticipated to assist in keeping stocks low over the outlook period.

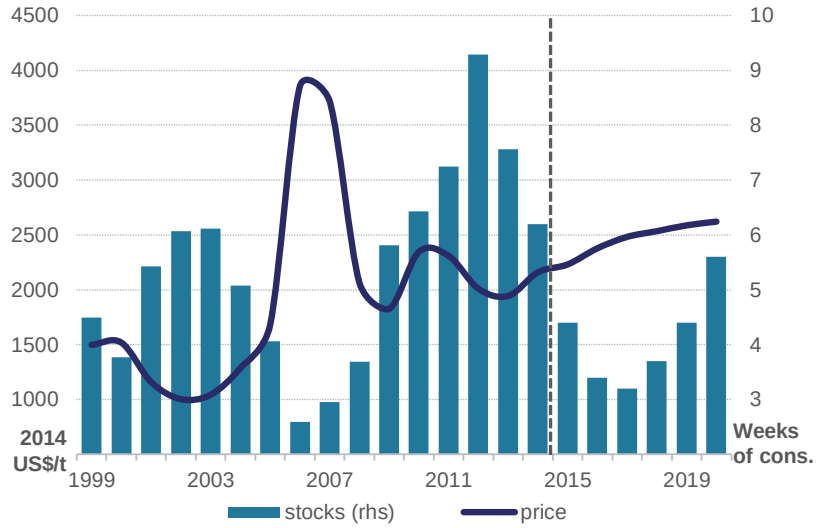
Over the short to medium term, zinc consumption growth is projected to outpace production growth, supporting a steady increase in prices. LME zinc prices are projected to increase at an average annual rate of 3 per cent to US$2340 (in 2015 dollar terms) in 2020. Increased use of galvanised steel, particularly in China, is projected to drive strong consumption growth over the outlook period while several large mines are expected to close, resulting in a tighter demand-supply balance. Projected mine closures are unlikely to be offset by new production capacity until the end of the outlook period when projected higher prices support the development of new projects. However, new projects are anticipated to develop lower grade ore deposits, which may increase the cost of production and place further upward pressure on the price.

Figure 13.1: Zinc daily price



Source: Bloomberg.

Figure 13.2: Annual zinc prices and stocks



Source: LME.

World zinc consumption in 2014 is estimated to have increased by 6.5 per cent to 13.8 million tonnes. Despite a weaker property sector, China was the primary driver of world zinc consumption growth, increasing by 12 per cent to 6.4 million tonnes (approximately 46 per cent of world consumption).

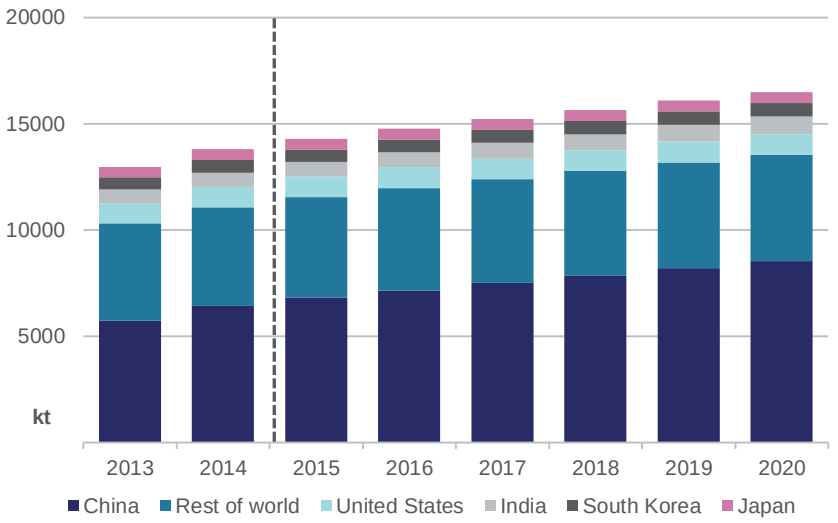
Over the outlook period zinc consumption is projected to increase at an average annual rate of 3 per cent a year and total 16.5 million tonnes in 2020. Growth is anticipated to be driven by increased utilisation of galvanized steel in infrastructure and automobiles, particularly in emerging economies.

China is projected to remain the main driver of world zinc consumption over the outlook period. In 2014 China's sales of galvanised steel grew 9 per cent (year-on-year) to 17 million tonnes, with approximately half of this used for consumer products and automobiles. China's automobile production has increased on average by 20 per cent a year since 2008 (to 2013) and by a further 7 per cent in 2014. While growth in automobile production is expected to taper over the outlook period, the automobile industry is still projected to support growth in China's zinc consumption. China's zinc consumption is projected to increase by 5 per cent a year to 8.5 million tonnes in 2020.

Relatively low zinc prices over the last couple of years reduced the incentive to invest in new capacity and contributed to subdued world mine production growth in 2014. World zinc mine production is estimated to have increased by 1 per cent to 13.3 million tonnes in 2014. While capacity cuts, principally in Canada and India, resulted in approximately 223 thousand tonnes of mined zinc production leaving the market in 2014; this was more than offset by a 6 per cent increase (298 thousand tonnes) in China's production to 5 million tonnes.

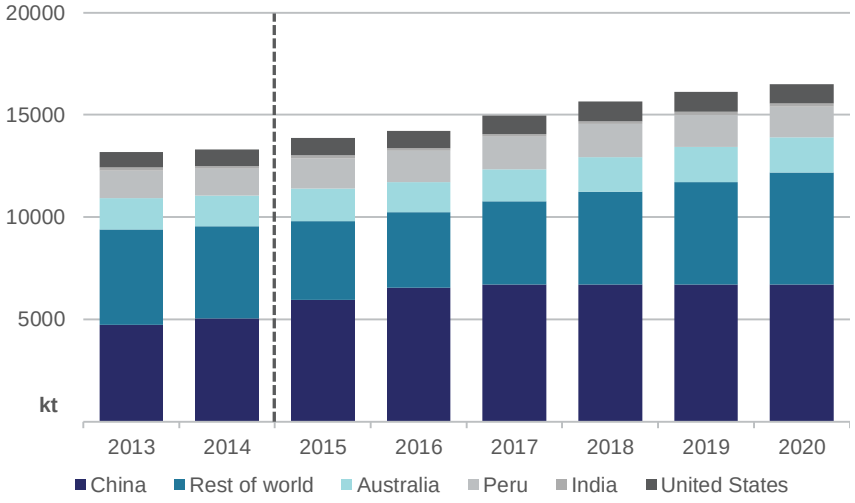
Over the outlook period zinc mine production is projected to increase by 3.7 per cent a year and total 16.5 million tonnes in 2020. Additional supply is expected to be provided by new mines in Australia, Sweden, Canada, Indonesia and Russia. These include the McArthur River expansion and the Dugald River mine in Australia; the Dairi project in Indonesia; Prairie Creek in Canada; and the Ozernoye project in Russia.

Figure 13.3: World zinc consumption



Sources: World Metal Statistics; International Lead and Zinc study Group.

Figure 13.4: World zinc mine production



Sources: World Metal Statistics; International Lead and Zinc Study Group.

The larger mines scheduled to close over the outlook period include the Century mine in Australia and the Lisheen mine in Ireland. While China's zinc mine output is not projected to grow considerably, China is projected to remain the primary supplier of mine zinc to world markets (China accounted for 38 per cent of world mine zinc production in 2014).

In 2014 world refined zinc production is estimated to have increased by 3 per cent to 13.5 million tonnes supported by an increase in China's production. A number of China's refineries were reported to have delayed maintenance to take advantage of higher prices. Over the outlook period world refined zinc output is projected to grow by 4 per cent a year and total 16.9 million tonnes in 2020. New refining capacity in China (through new refineries in Inner Mongolia, Sichuan, Yunnan and Fujian) and India (through expansions in existing capacity) is projected to support this growth.

Australia

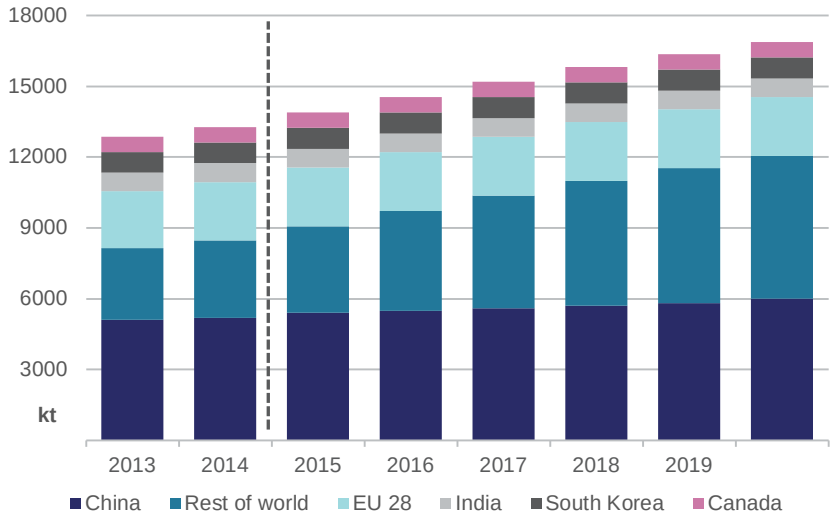
Exploration

In the December quarter Australia's zinc, lead and silver exploration expenditure increased 37 per cent year-on-year to $16.9 million. Higher prices and relatively under-developed reserves helped drive this increase. For 2014 as a whole, exploration in zinc, lead and silver declined by 22 per cent to $50.4 million.

Production

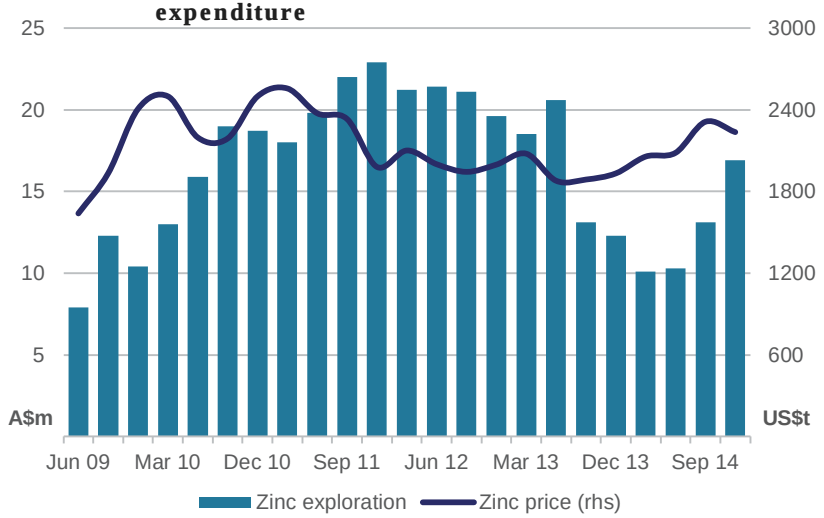
In 2014-15 Australia's zinc mine production is forecast to increase by 12 per cent to 1.7 million tonnes (in metallic content) supported by new capacity at the McArthur River mine. Century mine in Queensland is Australia's largest zinc mine (490 000 tonnes a year) and is scheduled to close in mid-2015. While MMG is expecting to continue mining on a smaller scale at Century and reprocess ore located in tailings ponds, its output is not expected to make a large contribution to Australia's zinc production.

Figure 13.5: World refined zinc production



Source: World Metal Statistics.

Figure 13.6: Australia's zinc, lead and silver exploration expenditure



Sources: ABS; LME.

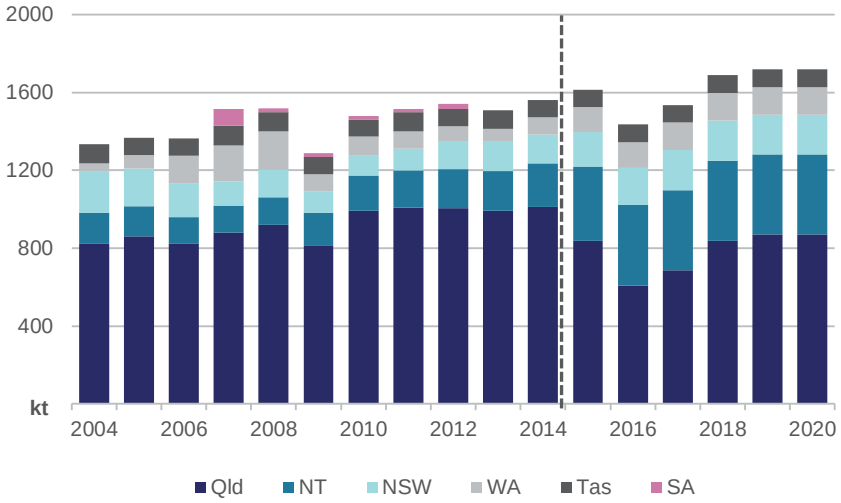
Over the outlook period Australia's zinc mine production is projected to fluctuate as existing mines exhaust their resources and new mines are commissioned. The net effect of these fluctuations is a projected 1 per cent average annual increase in production through to 2019-20 to 1.7 million tonnes. Additional capacity will come from the McArthur river expansion (380 000 tonnes) and the start of production at the Dugald River mine (220 000 tonnes).

Exports

In 2014-15 Australia's zinc exports (total metal content) are forecast to increase by 7 per cent to 1.6 billion tonnes supported by the opening of new capacity at McArthur River and a surge in sales from the Century mine (prior to closing). Over the outlook period Australia's zinc exports are anticipated to fluctuate in line with mine production. Exports are projected to increase at an average rate of 1.9 per cent a year to 1.8 million tonnes (total metal content) in 2019-20.

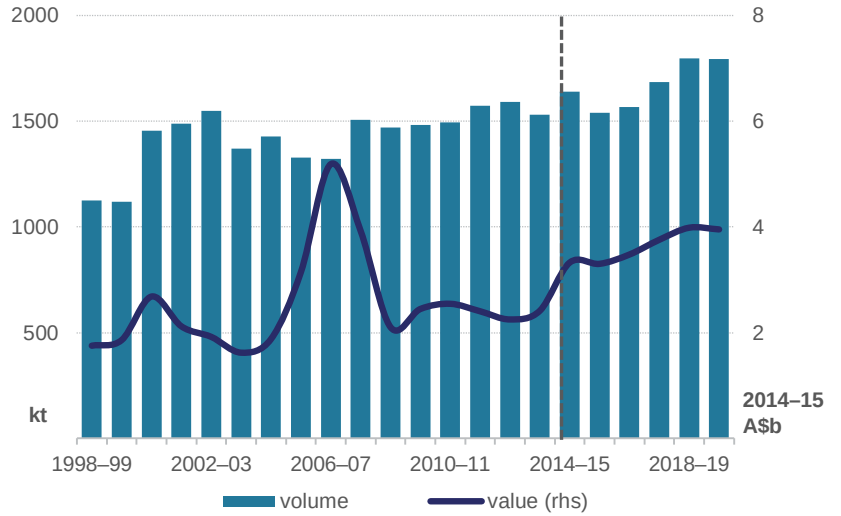
In 2014-15 export earnings are forecast to increase by 38 per cent to $3.3 billion supported by higher prices and a lower Australian dollar. Over the outlook period export earnings are projected increase and total $4 billion (in 2014-15 dollars) in 2019-20 supported by higher prices.

Figure 13.7: Australian mine production



Source: ABS.

Figure 13.8: Australia's zinc exports



Source: ABS.

Table 13.1: Zinc outlook

	unit	2014	2015 f	2016 f	2017 z	2018 z	2019 z	2020 z
World								
Production								
– mine	kt	13 319	13 857	14 217	14 954	15 654	16 114	16 514
– refined	kt	13 513	13 882	14 537	15 192	15 812	16 357	16 868
Consumption	kt	13 809	14 300	14 780	15 222	15 641	16 100	16 482
Closing stocks	kt	1 640	1 222	979	948	1 119	1 376	1 762
– weeks of consumption		6.2	4.4	3.4	3.2	3.7	4.4	5.6
Price								
– nominal	US$/t	2 159	2 231	2 378	2 482	2 534	2 587	2 621
	USc/lb	98	101	108	113	115	117	119
– real b	US$/t	2 209	2 231	2 324	2 372	2 367	2 362	2 340
	USc/lb	100	101	105	108	107	107	106

		2013–14	2014–15 f	2015–16 f	2016–17 z	2017–18 z	2018–19 z	2019-20z
Australia								
Mine output	kt	1 499	1 683	1 486	1 511	1 630	1 741	1 739
Refined output	kt	492	494	473	468	468	468	468
Export volume								
– ore and conc. c	kt	2 329	2 885	2 409	2 474	2 729	2 967	2 963
– refined	kt	438	418	416	412	411	411	411
– total metallic content	kt	1 532	1 640	1 541	1 566	1 685	1 796	1 794
Export value								
– nominal	A$m	2 366	3 328	3 383	3 644	4 023	4 360	4 420
– real d	A$m	2 430	3 328	3 300	3 478	3 758	3 985	3 952

Trade Summary Charts and Tables

Figure 14.1: Contribution to GDP, 2013-14 dollars

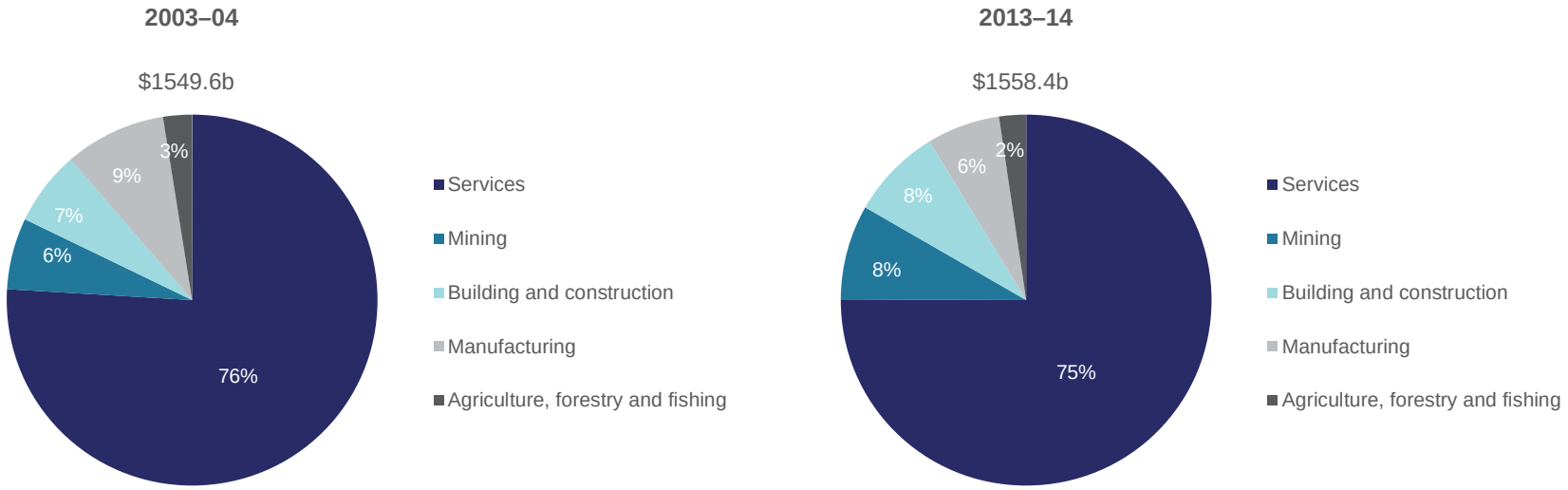


Figure 14.2: Principal markets for Australia's total imports 2013-14 dollars

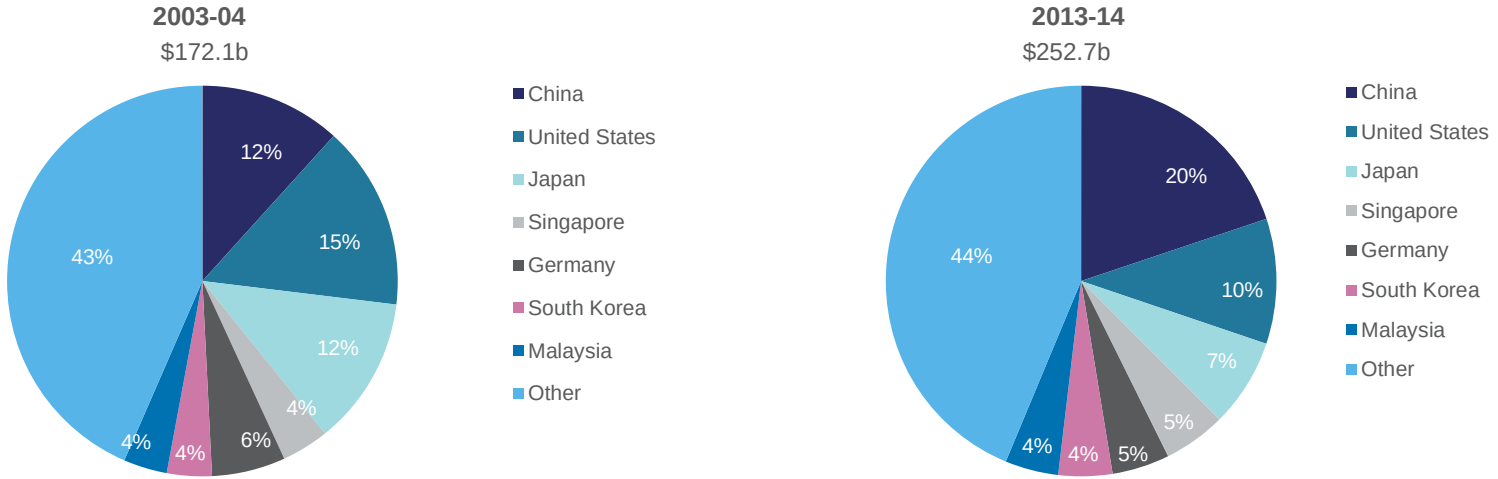


Figure 14.3: Principal markets for Australia's resources and energy imports, 2013-14 dollars

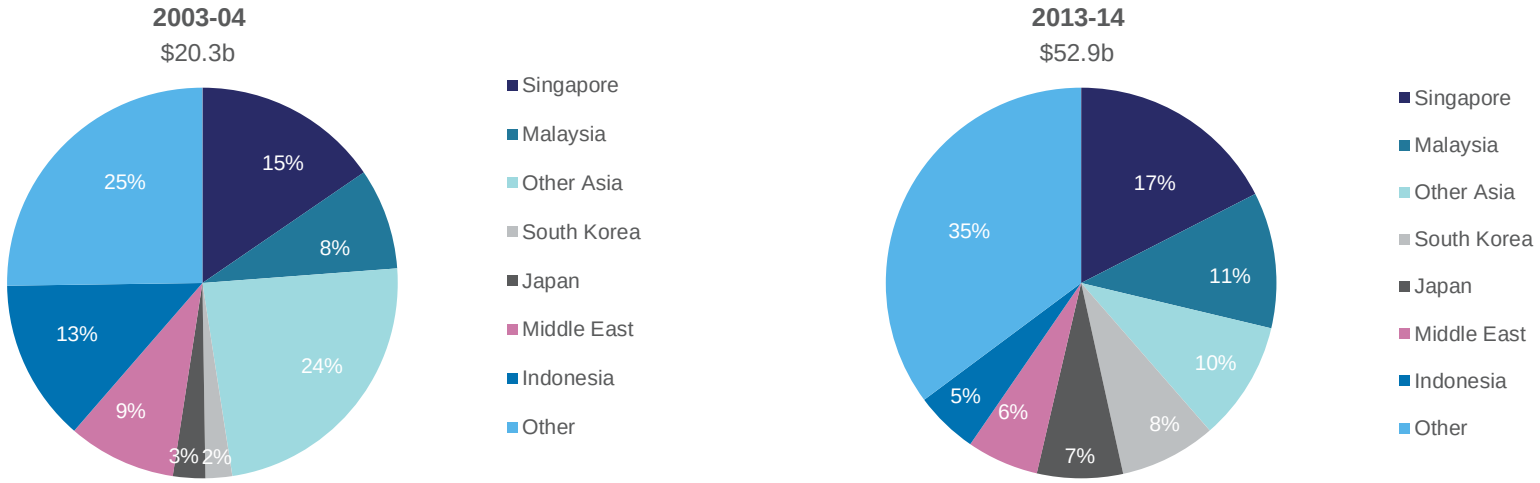


Figure 14.4: Principal markets for Australia's total exports 2013-14 dollars

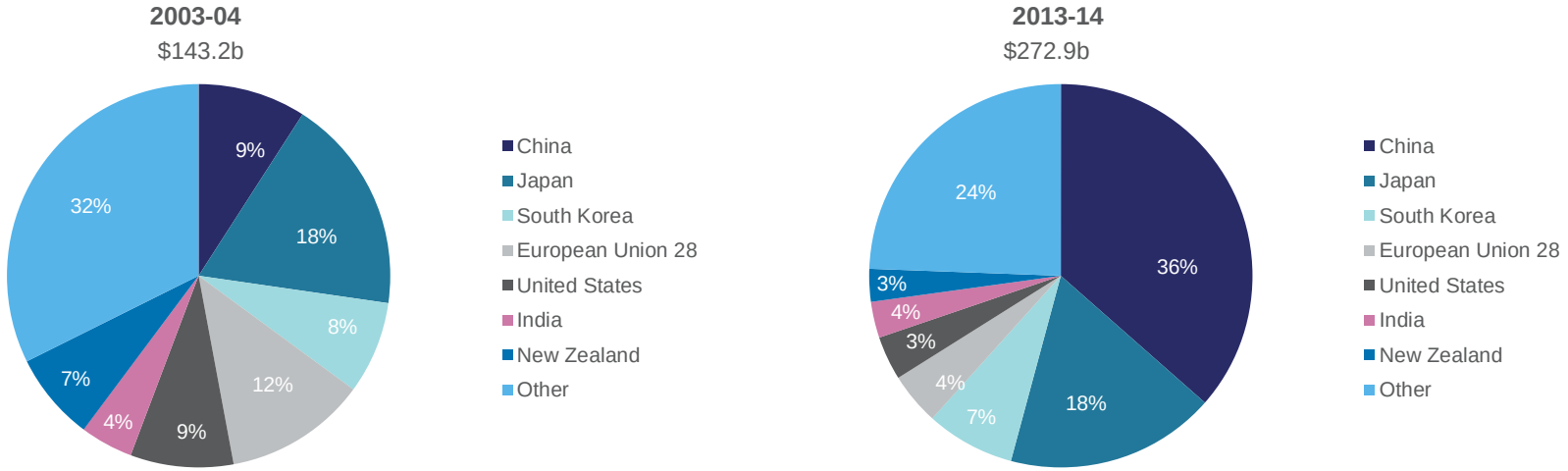


Figure 14.5: Principal markets for Australia's resources exports, 2013-14 dollars

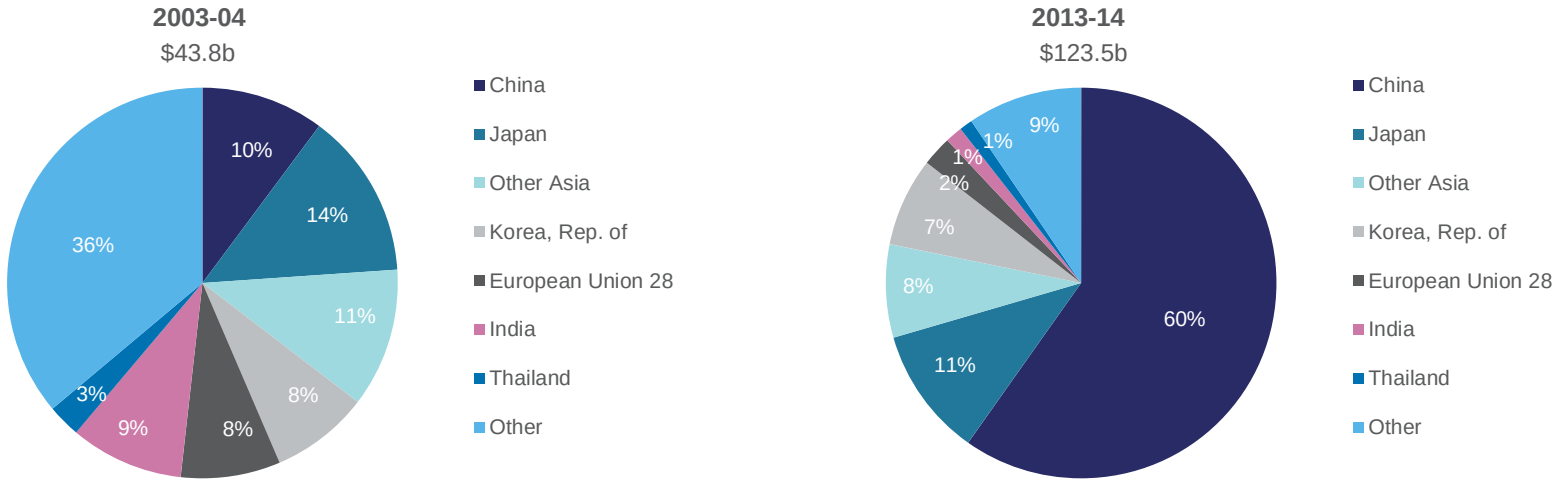


Figure 14.6: Principal markets for Australia's energy exports, 2013-14 dollars

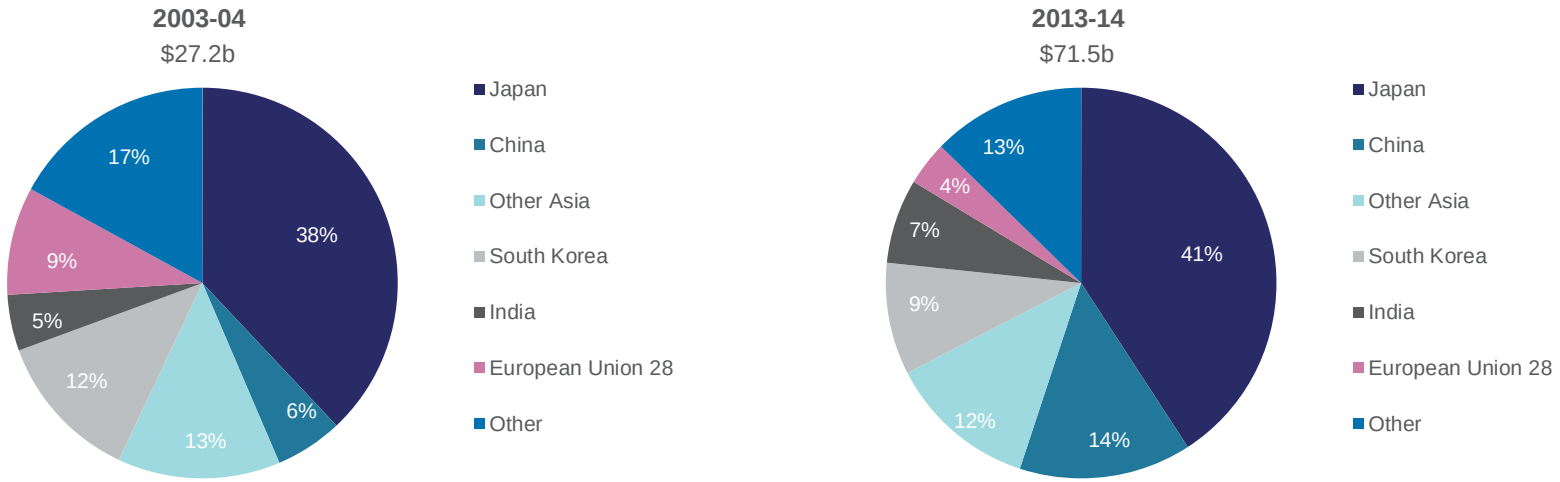


Figure 14.7: Contribution to exports by sector, 2010-11

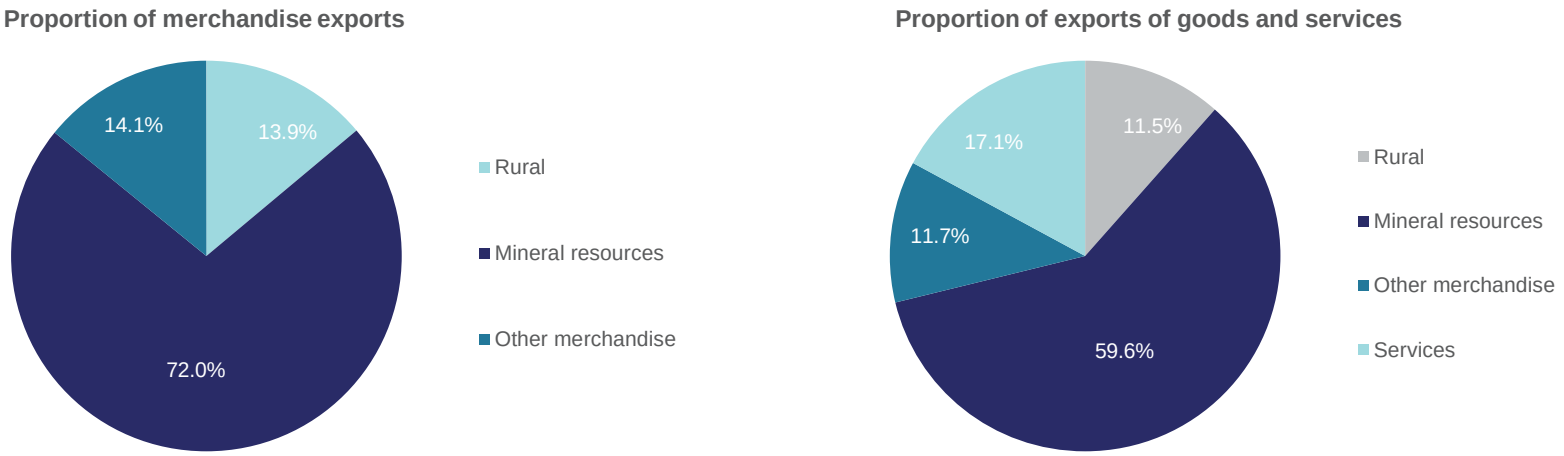


Figure 14.8: Contribution to exports by sector, 2011-12

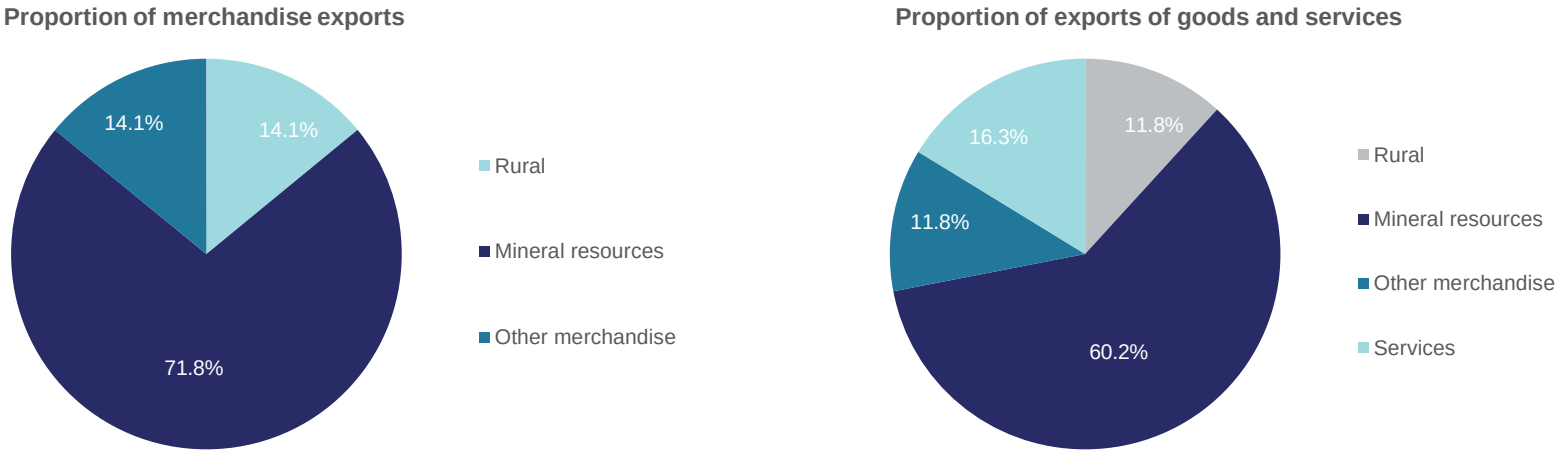


Figure 14.9: Contribution to exports by sector, 2012-13

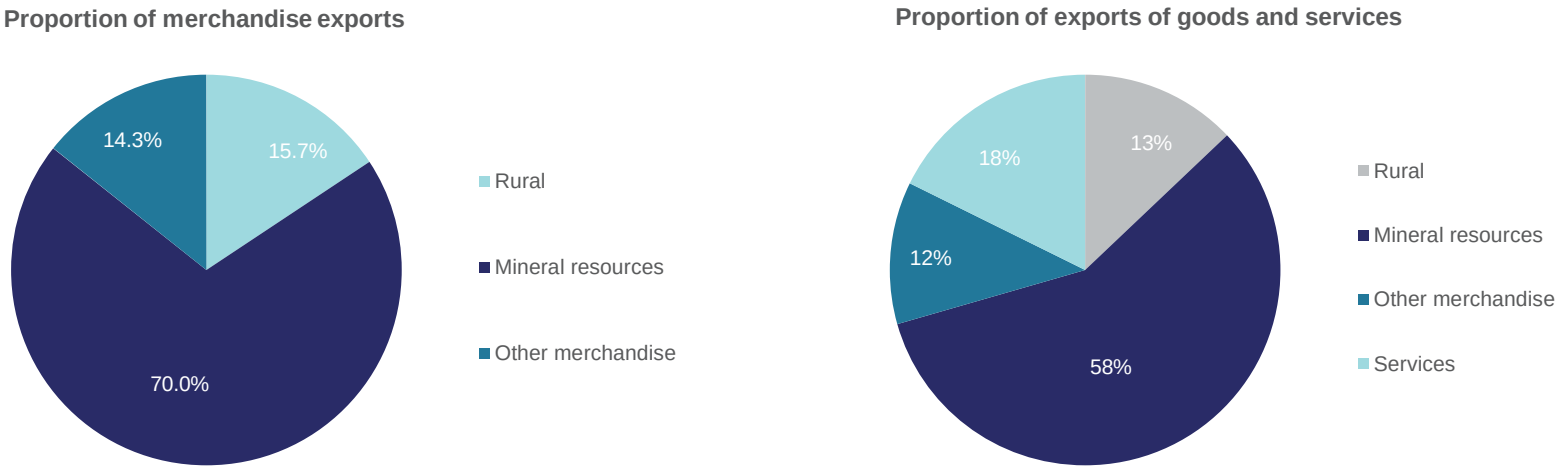
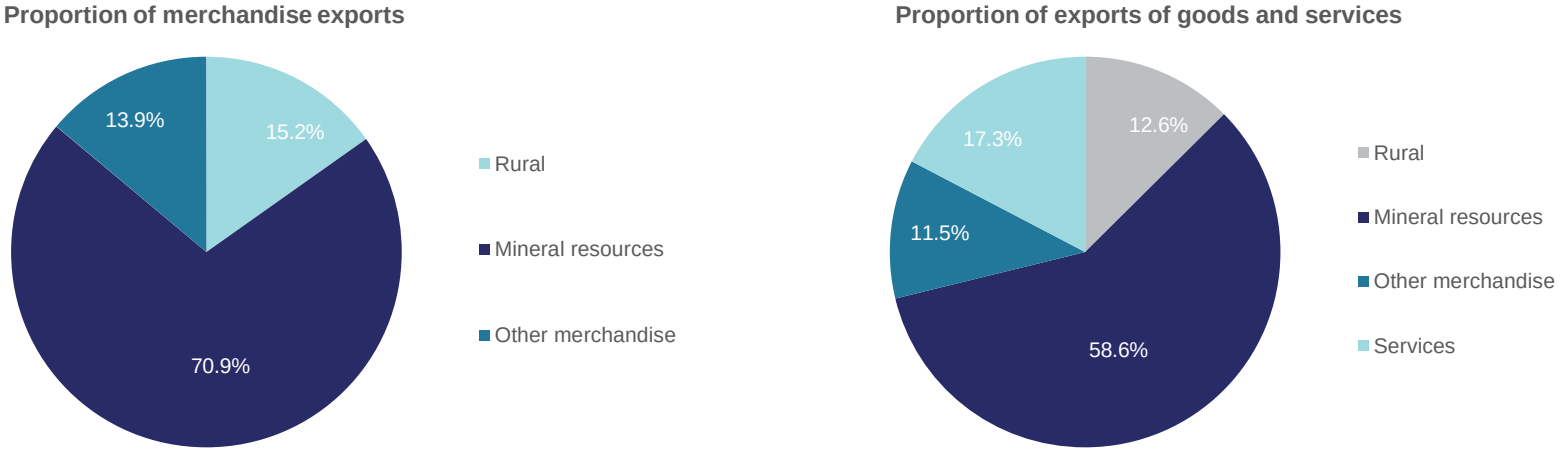


Figure 14.10: Contribution to exports by sector, 2013-14



Principal markets for Australia's thermal coal exports, 2013-14 dollars

		2009-10	2010-11	2011-12	2012-13	2013-14
Japan	A$m	6 703	7 405	8 619	7 934	7 670
China	A$m	1 185	1 702	2 851	2 932	3 455
South Korea	A$m	2 399	2 746	3 064	2 774	2 759
Chinese Taipei	A$m	1 867	1 963	1 907	1 707	1 652
Malaysia	A$m	159	338	373	278	344
Thailand	A$m	163	202	179	243	288
Total	A$m	13 155	14 979	17 960	16 587	16 705

Principal markets for Australia's metallurgical coal exports, 2013-14 dollars

		2009-10	2010-11	2011-12	2012-13	2013-14
China	A$m	4 386	3 021	3 759	4 724	5 857
Japan	A$m	7 624	9 175	9 255	6 110	5 500
India	A$m	6 052	7 597	6 779	4 706	4 811
South Korea	A$m	2 754	4 010	4 019	2 492	2 458
Chinese Taipei	A$m	1 007	1 812	1 928	1 184	1 165
Netherlands	A$m	722	1 021	1 330	997	1 004
Total	A$m	27 143	31 977	32 210	23 014	23 254

Principal markets for Australia's oil and gas exports, 2013-14 dollars

		2009-10	2010-11	2011-12	2012-13	2013-14
Japan	A$m	9 609	11 311	13 531	14 803	17 818
China	A$m	1 963	3 202	3 809	2 781	3 823
South Korea	A$m	2 650	2 815	1 828	2 224	3 118
Singapore	A$m	2 402	2 017	2 862	2 760	2 297
Thailand	A$m	1 290	1 883	1 025	844	1 641
India	A$m	554	987	310	181	127
Total	A$m	21 021	25 386	27 018	27 144	29 231

Principal markets for Australia's gold exports, 2013-14 dollars

		2009-10	2010-11	2011-12	2012-13	2013-14
China	A$m	0	679	4 472	6 140	8 110
Singapore	A$m	191	1 197	1 177	969	2 273
United Kingdom	A$m	4 607	3 758	4 745	2 684	640
Turkey	A$m	0	0	67	479	537
Thailand	A$m	1 454	2 540	1 686	1 304	445
Switzerland	A$m	13	9	35	294	345
Total	A$m	14 383	13 970	16 222	15 445	13 009

Principal markets for Australia's iron ore exports, 2013-14 dollars

		2009-10	2010-11	2011-12	2012-13	2013-14
China	A$m	27 856	42 887	45 602	43 021	57 039
Japan	A$m	6 640	11 098	11 410	8 838	9 664
South Korea	A$m	3 181	6 495	6 785	5 055	6 097
Chinese Taipei	A$m	1 002	2 079	1 883	1 535	1 710
Indonesia	A$m	0	0	0	0	110
India	A$m	16	0	0	49	41
Total	A$m	38 818	62 667	65 778	58 549	74 681

Principal markets for Australia's aluminium exports, 2013-14 dollars

		2009-10	2010-11	2011-12	2012-13	2013-14
Japan	A$m	1 442	1 506	1 387	1 030	1 114
South Korea	A$m	860	933	614	695	680
Chinese Taipei	A$m	501	558	390	468	443
Thailand	A$m	428	348	344	374	303
China	A$m	133	147	199	153	233
Indonesia	A$m	265	279	317	255	195
Total	A$m	4 247	4 484	3 984	3 361	3 477

Principal markets for Australia's copper exports, 2013-14 dollars

		2009-10	2010-11	2011-12	2012-13	2013-14
China	A$m	2 269	2 637	2 619	3 115	3 939
Japan	A$m	1 309	1 467	1 559	1 657	1 621
India	A$m	1 306	1 446	1 523	1 138	945
Malaysia	A$m	321	696	736	694	611
South Korea	A$m	893	1 083	903	450	580
Philippines	A$m	185	197	20	144	285
Total	A$m	7 200	9 039	8 919	8 251	8 697

Principal markets for Australia's iron and steel exports, 2013-14 dollars

		2009-10	2010-11	2011-12	2012-13	2013-14
United States	A$m	299	288	172	132	105
New Zealand	A$m	107	95	89	81	94
Thailand	A$m	119	153	116	103	36
Indonesia	A$m	44	56	52	45	36
Philippines	A$m	1	2	2	3	19
Brazil	A$m	73	39	87	16	18
Total	A$m	1 240	1 399	1 032	842	724