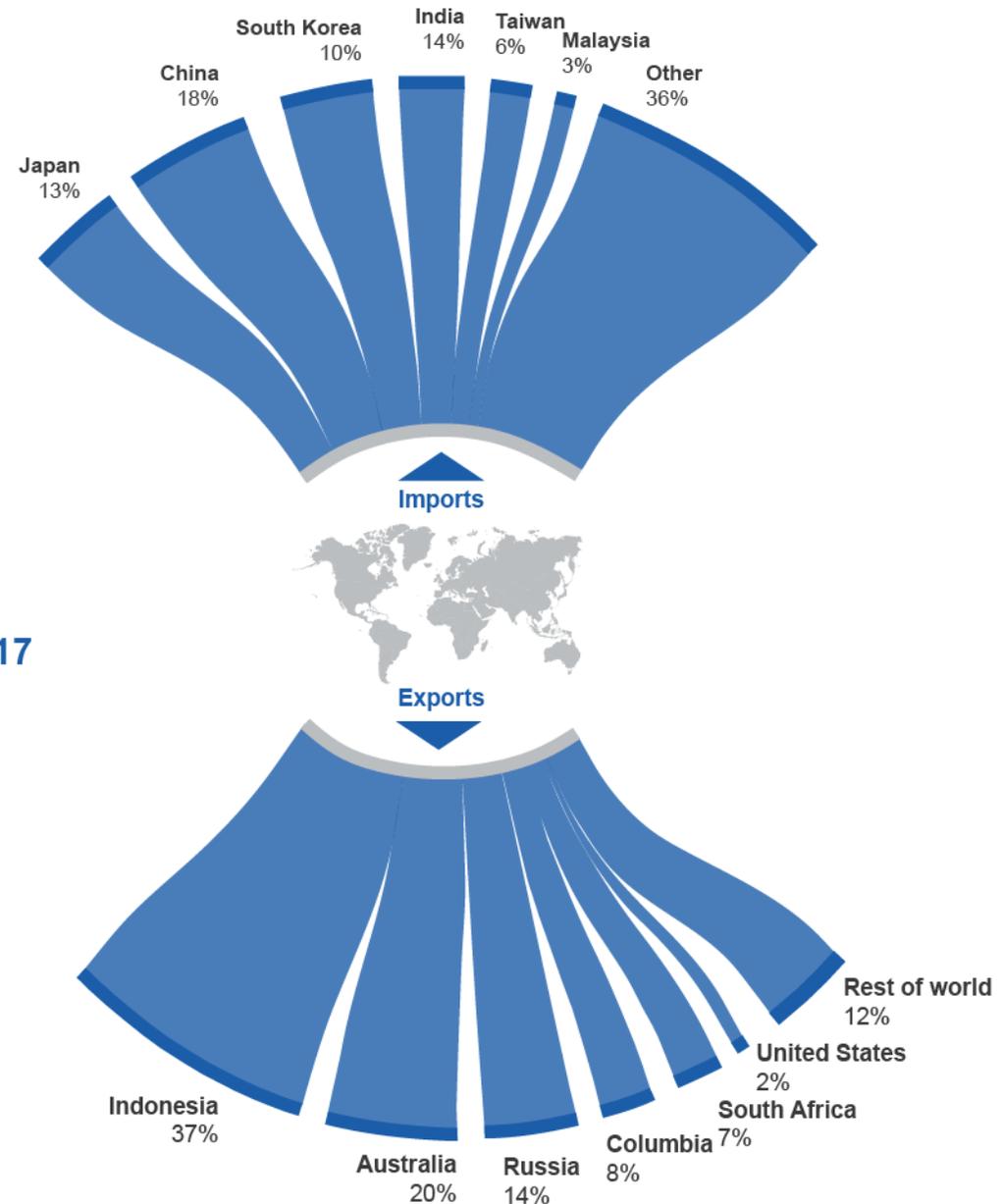
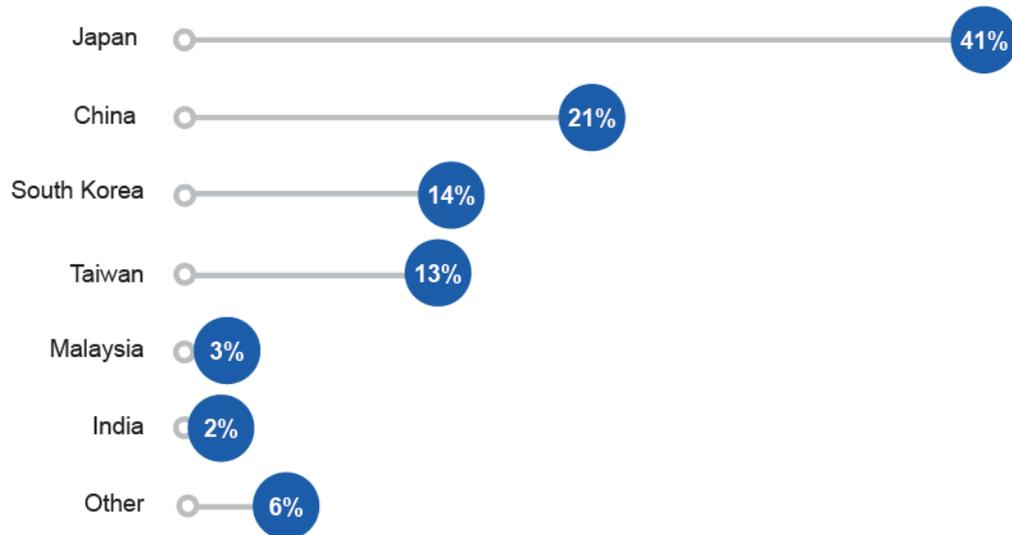


Thermal coal

Resources and Energy Quarterly March 2018



Key importers of Australian thermal coal (million tonnes), 2016–17



6.1 Summary

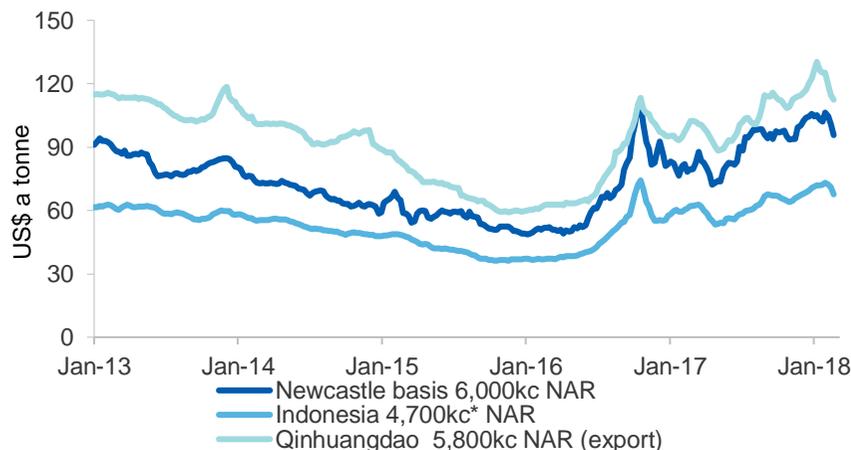
- Thermal coal prices have edged up further in recent months, as supply concerns and strong demand keep buyers keen to snap up cargoes.
- Going forward, strong growth in demand in Emerging Asia will largely offset softer demand in the OECD. Western nations appear likely to continue to push to phase down their thermal coal use in favour of renewables and gas, the latter both for heating and power generation.
- Supply growth will be dominated by Australia, Russia and the United States, but investors will only reluctantly fund new capacity.
- Australian export earnings are expected to hit a record \$22.9 billion dollars in 2017–18 before declining to \$17.1 billion in 2022–23.

6.2 Prices

Prices have pushed higher, as strong demand dominates the market

The Newcastle benchmark price has edged above US\$100 a tonne in recent weeks, as strong seasonal demand combines with supply problems. Indonesian producers of higher quality coal have been struggling to put together cargoes because of monsoonal rains.

Figure 6.1: Thermal coal prices



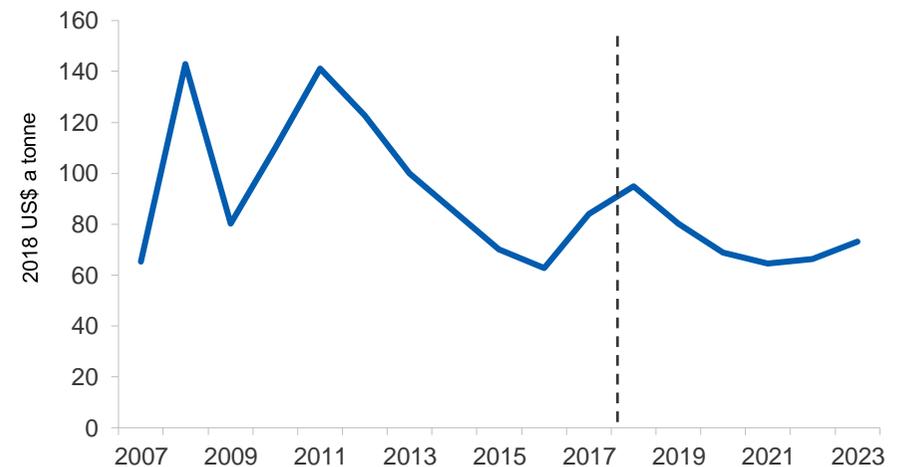
Source: IHS Markit (2018)

The Japanese Fiscal Year (JFY) benchmark price for 2018 (April 2018 to March 2019) will likely settle at US\$100 a tonne but drift down steadily over the next few years, as demand steadily deteriorates relative to supply. In the medium to long term, the lack of large new developments in major exporting nations will tend to sustain prices above the US\$60 a tonne mark. The JFY 2023 contract price is projected to fall to US\$75 (JFY 2018 dollars) a tonne, as gains in exports/production in nations such as Australia and Russia steadily overwhelm modest gains in world demand. Non-OECD Asia will drive growth in world demand, with the OECD consuming less as governments push away from coal. The real Newcastle FOB spot price is projected to be US\$71 a tonne by 2023.

6.3 World demand and trade

A feature of 2017 was a sharp rise in thermal coal imports outside of the main five Asian importing countries (China, India, Japan, Taiwan and South Korea). Higher imports to Europe from both Russia and the United States drove most of the gains, and led to less competitive pressure on Australian and Indonesian miners trying to make sales into Asia.

Figure 6.2: Benchmark contract price for Australian thermal coal



Source: Department of Industry, Innovation and Science (2018)

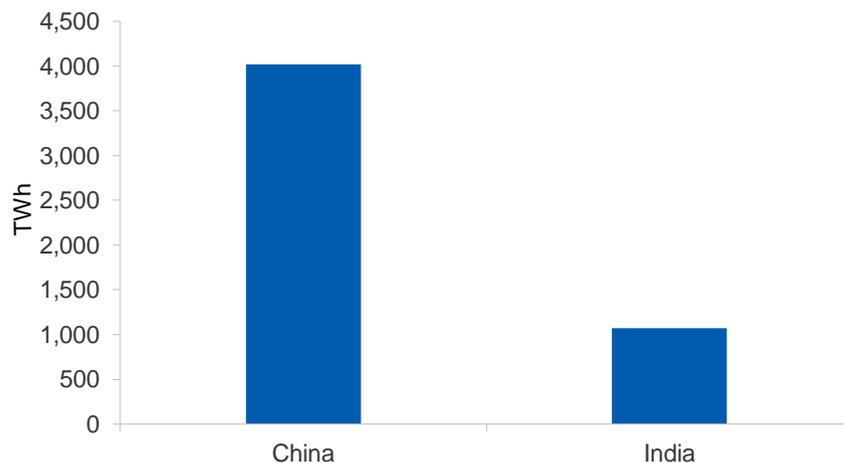
World imports

Imports of thermal coal are likely to weaken over the forecast period, as China and the major industrialised nations seek to reduce carbon emissions intensity in order to meet climate change commitments and pollution targets. Based on the usage of China — a nation with the same population as India — Figure 6.3 suggests that Indian coal usage has the potential to rise sharply over the next twenty years. However, it does not automatically follow that higher imports will be needed. India has aspirations to be self-sufficient in coal, but also wants coal to account for a much lower proportion of total electricity generation than in China currently. Apart from Indonesia, other developing Asian nations do not have the coal reserves needed to generate their own rising power needs.

China cutting coal usage

After a gain of 15 per cent in 2016, Chinese thermal coal imports fell by 4.4 per cent in 2017. The 2017 decline owed much to the easing in domestic production restrictions throughout the year. It appears likely that imports will stay strong in 2018, as government fiat constrains domestic

Figure 6.3: Coal-based power generation in China and India, 2016



Source: IEA (2017)

production. (Beijing is to carry out a ‘special action’ on illegal coal mines that fail to meet safety measures or operational standards will be required to close and rectify violations.)

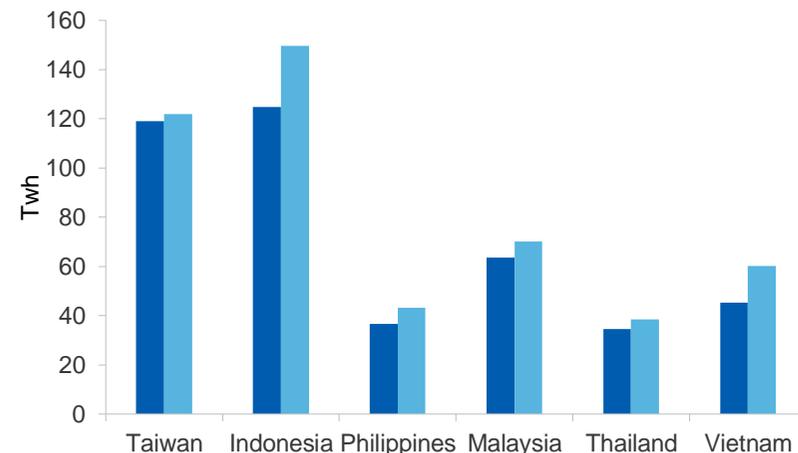
Chinese coal usage is expected to grow modestly over the forecast period. A faster than expected switch away from coal to gas and renewables in the power sector represents the main uncertainty: air pollution remains a significant problem in China, particularly in the north of the country. China plans to further reduce coal’s share in energy consumption from 60.4 per cent last year. It will do this by adding renewable power capacity, cutting oversupply in the thermal power industry (especially high-cost and loss-making operations) and improving coal efficiency in power generation.

With rising domestic output, Chinese thermal coal imports are expected to decline from 188 million tonnes in 2017 to 152 million tonnes in 2023.

India is deregulating coal production

Developments in India over the next year or so will have a crucial influence on Indian coal imports during the latter half of the forecast period.

Figure 6.4: Coal-based power generation in some Asian nations



Source: IEA (2017)

India's Modi Government has recently announced that it will allow the public auction of coal mines for commercial purposes, ending nearly forty years of monopoly held by Coal India (CIL).

Until now, private companies in India have only been allowed to mine coal to fuel captive power operations; the state-owned sector conducted all commercial mining of coal. The state-owned sector has repeatedly underperformed relative to the targets set by the Government.

If the private sector responds to the abolition of CIL's monopoly, stronger growth in coal output is possible, especially in the latter half of the forecast period. However, some of that stronger output growth may just fill a gap left by slower growth in South African and Indonesian coal exports. South Africa is suffering from a withdrawal of investment by multi-national companies. Indonesia is likely to try to make determined efforts to cap the amount of coal that leaves the country over the next few years.

Ultimately, it is likely that a significant rise in Indian coal production hinges on reform to the power sector in India. Profitability and capacity utilisation in the power generation sector is low, due to government price controls. The low level of profitability flows on to the profitability of domestic coal production.

Japan to import marginally less thermal coal

Japanese imports of thermal coal will decline modestly over the forecast period. Against a backdrop of sluggish power demand (as the population declines), with the nuclear power sector likely to continue to make only a minor contribution to the country's power generation needs, gas and the rapid deployment of renewables will more than obviate the need for more thermal coal imports.

South Korean imports expected to decline slightly

South Korea has resumed the temporary suspension of operations at five coal-fired units which are more than 30 years old. The closures affect 2.3 GW of generating capacity, run from March to June 2018, and will impact around 2.5 million tonnes of sub-bituminous coal imports.

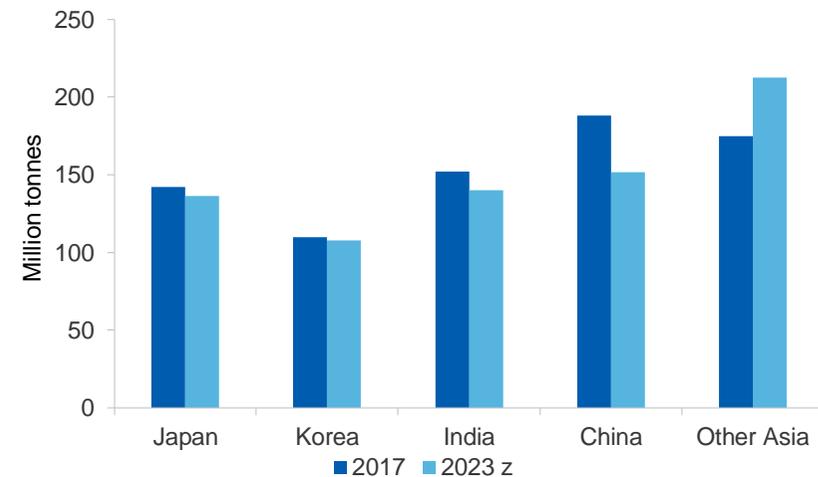
South Korean coal consumption is expected to stagnate over the forecast period, as the government attempts to reduce coal's share in the power mix. Over 5 GW of new coal capacity have just been commissioned and another 4 GW are under construction.

With coal consumption set to stall, imports are unlikely to grow. However, with air pollution becoming an increasing problem in the larger South Korean cities, there could be a move to higher grade coal.

ASEAN demand to become more important

South East Asian nations will become more important sources of demand, particularly towards the end of the forecast period. Nations such as Thailand, Vietnam, the Philippines and Malaysia are forecast to import increasing amounts of thermal coal to satisfy growing power generation needs. Pakistan will also consume more coal, as its (large) population's energy needs grow.

Figure 6.5: Asian thermal coal imports per annum



Notes: z projection

Source: International Energy Agency (2017), Department of Industry, Innovation and Science (2018)

6.4 World production and exports

Indonesia's efforts to place further price controls on coal may backfire

Indonesia's President Widodo recently signed a regulation authorising Indonesia's Energy and Mineral Resources Minister to set the price (HBA² index) of coal for the domestic market (Indonesia consumes just under one-fifth of the 460 million tonnes per annum of coal it produces and exports the rest). Indonesia is already set to hold local electricity and fuel prices at current levels for two years. Combined with a domestic reservation scheme³, the danger is that coal miners will be discouraged from producing (and exploring for) coal if their margins are held artificially low (in order to effectively subsidise electricity prices). The Indonesian Government could also raise its export tax to discourage coal exports; this would be aimed at slowing the depletion of the country's coal resources.

United States production unlikely to flood seaborne markets

United States production is expected to drift lower over the forecast period. Weaker prices in the short term, sluggish power demand growth and robust renewable expansion will limit coal demand, notwithstanding friendlier policies towards coal implemented by the US Administration. A further switch in power generation towards gas poses downside risks.

Russian exports are set to continue their recent strength

A feature of 2017 was the solid gains in Russian thermal coal exports, particularly to western Europe. The sharp depreciation in the Russian Ruble in 2013–14 helped raise the competitiveness of Russian coal miners, and as a result Russian thermal coal exports have risen at an average annual rate of 6.5 per cent since 2013.

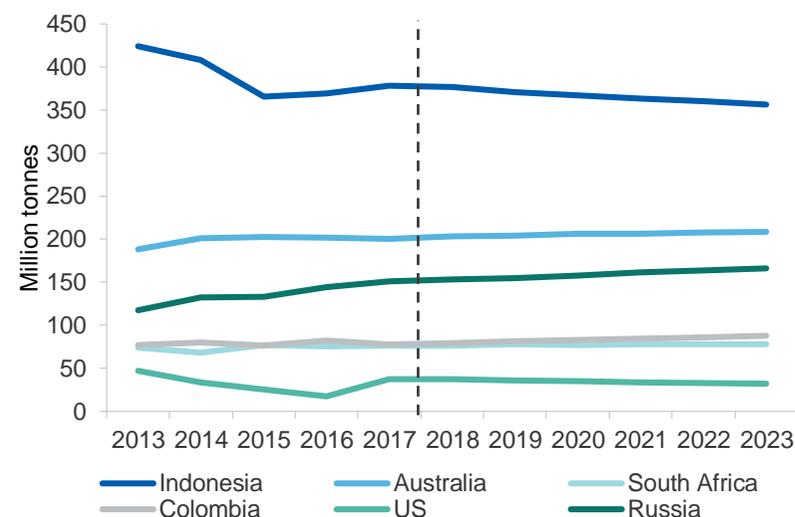
² The Harga Batubara Acuan (HBA) is a monthly average price, based 25 per cent on the Platts Kalimantan 5,900 kcal/kg GAR assessment; 25 per cent on the Argus-Indonesia Coal Index 1 (6,500 kcal/kg GAR); 25 per cent on the Newcastle Export Index and 25 per cent on the globalCOAL Newcastle (6,000 kcal/kg NAR) index.

³ To secure domestic supplies, the Indonesian Ministry of Energy and Mineral Resources can order domestic coal producers to reserve a specific amount of their production for domestic

South African exports will be held back by a lack of investment

South African exports will be limited by the lack of investment in greenfield and brownfield projects, particularly among large multi-national mining companies. Export capacity in South Africa is being held back by a lack of investment in port infrastructure; the country's rail infrastructure also desperately needs improving. South Africa is already seeing a sharp decline in high quality coal production as reserves are depleted. Only 10-15 per cent of the nation's coal exports are believed to match South Africa's benchmark grade minimum of 5,850 kc NAR.

Figure 6.6: Major thermal coal exporters



Notes: Includes thermal coal and lignite production

Source: Coal 2017, International Energy Agency (2017), Department of Industry, Innovation and Science (2018)

consumption (the *Domestic Market Obligation, or DMO*). In 2018, the DMO has been set at 25 per cent of the 485 million tonnes production target. The government aims for more domestic consumption of coal, as it wants coal to supply around 30 percent of the country's energy mix by 2025.

6.5 Australia

Thermal coal production expected to rise modestly

Production declined marginally in 2017. A number of factors explained the declines, including bad weather, industrial problems (mainly affecting Queensland output) and mine production sequencing changes at major mines in the NSW Hunter Valley. The average strip ratio rose (see Box 1).

Production is expected to rise marginally over the forecast period, from 250.0 million tonnes in 2017 to 255.2 million tonnes in 2022–23. The modest rise will come despite declining prices.

The reason for the modest rise in Australian output is the flat outlook for thermal coal usage in the nations that currently consume the vast majority of Australia's thermal coal exports. Australian exporters are likely to increase their share of a stagnant market, as countries such as China and South Korea consume higher amounts of high energy/low to medium ash coal to reduce air pollution and meet international climate commitments.

Gains in Australia's share of world seaborne trade rest on obtaining more of the (likely faster growing) Indian and ASEAN markets — the former currently being dominated by relatively low grade Indonesian and South African coal. The forecasts assume that Australia has some success in this endeavour: the higher quality of Australian coal will be needed to prevent the further build-up of air pollution, which is now a chronic problem in some of the larger Indian cities.

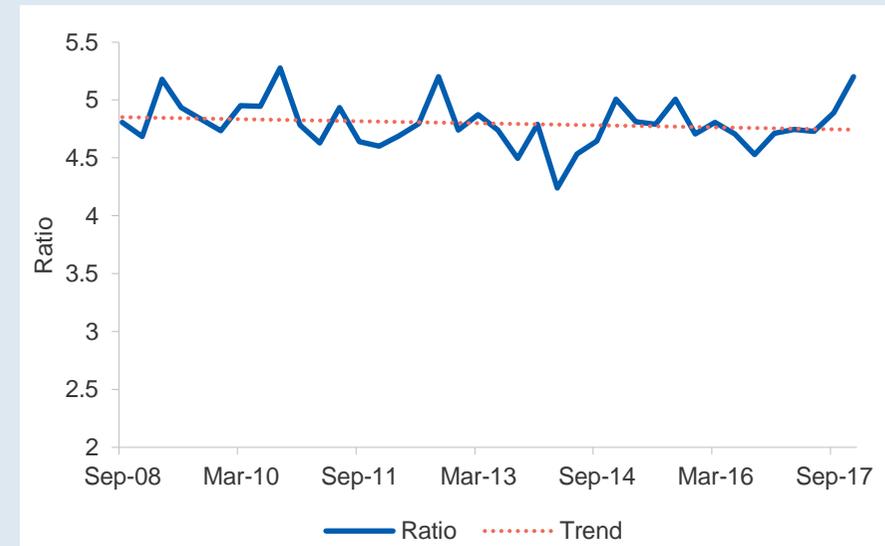
Adani has not yet reached a final investment decision (FID) on the Carmichael mine in Queensland's Galilee Basin. Public announcements by the company suggest that funding for both the mine and the rail operations (needed to take output from the mine to port) has not yet been secured. The potential additional production from Carmichael would add substantially to total Australian production in the latter half of the forecast period, but whether the project commences operations depends on a range of factors, including market conditions and access to rail infrastructure.

Box 6.1: Strip ratios in the NSW open-cut coal sector

As with the Queensland coal mining sector, 2017 saw a rise in the average strip ratio in NSW — where most coal that is mined is of the thermal variety. Here too, high thermal and metallurgical coal prices justified the extraction of coal that required increased overburden removal. By mining the areas of a tenement that have high levels of overburden, this may allow new low strip areas to be accessed and/or existing low strip areas to be preserved for when prices fall.

Over the past decade, the strip ratio in NSW has been on a very slight downward trend. The strip ratio could be expected to fall back if prices follow the (declining) path forecast over the outlook period.

Figure 6.7: NSW strip ratio*, quarterly



Notes: *Overburden removed (cubic metres) divided by raw coal output of open-cut mines
Source: Coal Services (2018); Department of Industry, Innovation and Science (2018)

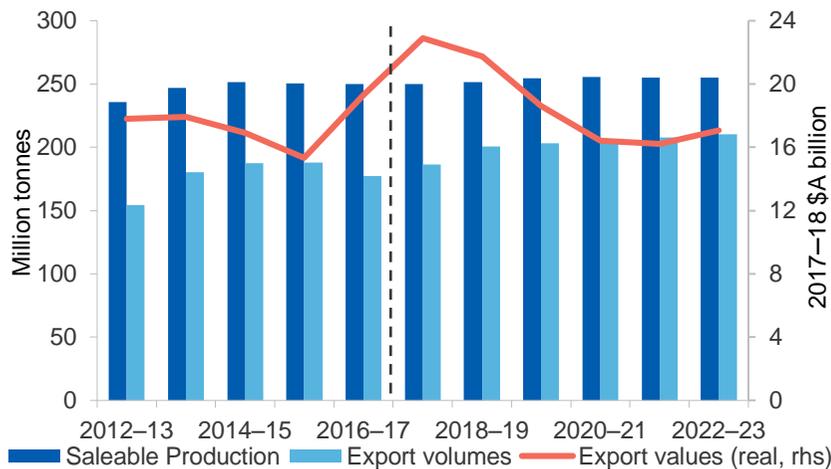
Australia's thermal coal export earnings to decline after 2017-18

Australian export earnings are set to hit a record \$22.8 billion dollars in 2017-18, as strong prices combine with increased export volumes. China's production cuts go a long way in explaining the fortuitous gains in Australian thermal coal export earnings over the past two years.

Going forward, the impact of easing thermal coal prices is expected to more than offset the impact on export earnings of minor growth in export volumes. Earnings are expected to bottom out at around \$16.2 billion in 2020-21 and 2021-22, before rebounding to \$17.1 billion in 2022-23.

If the Carmichael mine proceeds, it is highly likely that the vast majority — if not all — of the output will be exported. Moreover, it is unlikely that the output of the Adani mine will offset output from established Australian coalfields: Carmichael would mostly displace sales of lower grade Indonesian and South African coal into the important Indian market, where current Australian sales are comparatively poor.

Figure 6.8: Australia's thermal coal production and exports – fiscal year basis



Source: Australian Bureau of Statistics (2018); Department of Industry, Innovation and Science (2018)

Coal exploration

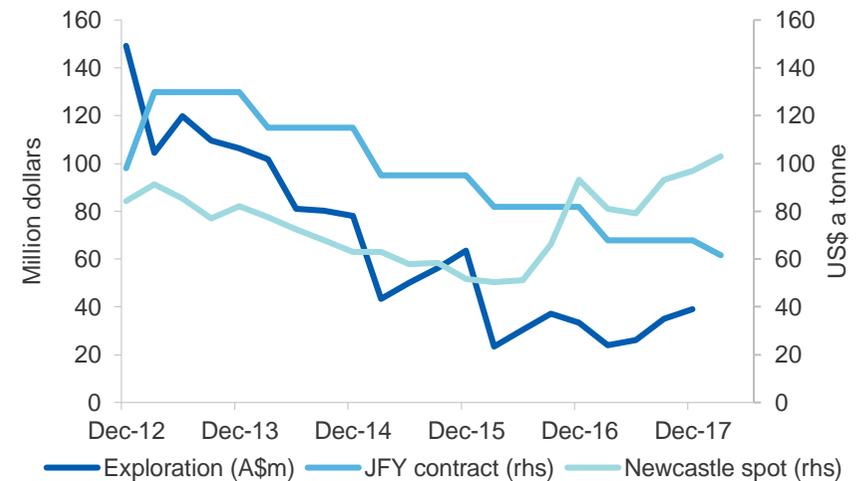
Australia's coal exploration expenditure remains relatively modest, with \$39.0 million invested in the December quarter.

Over 2017 as a whole, exploration expenditure totalled \$124.0 million. This represents little change from 2016, but remains well below the peak level of \$757 million recorded in 2011.

The downtrend in coal exploration over the past 7 years has been driven by falling coal prices and oversupply in low-grade coal markets. However, there are prospects for recovery, should the recent price lifts be sustained.

Most coal exploration now underway is taking place in Queensland, with exploration in other States having fallen away in recent years. This trend likely reflects the comparatively favourable outlook for metallurgical coal compared to thermal coal.

Figure 6.9: Australia's coal exploration expenditure, quarterly



Source: Australian Bureau of Statistics, Mineral and Petroleum Expenditure 8412.0, Table 5 (2018); IHS Markit (2018)

Table 6.1: Thermal coal outlook

World	Unit	2017	2018 f	2019 f	2020 z	2021 z	2022 z	2023 z	CAGR r
Contract price b									
– nominal	US\$/t	84	97	84	74	71	75	85	0.2
– real c	US\$/t	84	95	80	69	65	68	75	-2.1
Spot price d									
– nominal	US\$/t	87	97	84	74	71	75	79	-1.7
– real e	US\$/t	89	97	82	71	67	69	71	-3.6
Production g	Mt	5,355	5,467	5,504	5,540	5,581	5,623	5,690	1.0
Consumption g	Mt	5,673	5,722	5,763	5,803	5,851	5,899	5,949	0.8
Coal trade	Mt	1,058	1,046	1,037	1,029	1,027	1,026	1,033	-0.4
Imports									
Asia	Mt	761	760	755	746	742	739	740	-0.5
China	Mt	188	186	179	172	165	158	152	-3.5
India	Mt	152	147	146	145	143	142	140	-1.3
Japan	Mt	142	143	142	141	139	138	136	-0.7
South Korea	Mt	110	108	107	107	106	106	108	-0.3
Exports									
Colombia	Mt	82	80	81	83	84	86	88	1.2
Indonesia	Mt	374	377	371	367	364	360	356	-0.8
Russia	Mt	151	153	155	158	161	164	166	1.6
South Africa	Mt	76	76	78	77	78	78	78	0.4
United States	Mt	33	37	36	35	34	33	32	-0.7
Australia	Unit	2016–17	2017–18 f	2018–19 f	2019–20 z	2020–21 z	2021–22 z	2022–23 z	CAGR r
Production	Mt	250.0	249.1	251.4	254.6	255.6	255.2	255.2	0.3
Export volume	Mt	201.7	202.1	203.6	206.2	207.0	206.7	208.0	0.5
– nominal value	A\$m	18,902	22,904	22,249	19,506	17,627	17,836	19,232	0.3
– real value h	A\$m	19,281	22,904	21,738	18,620	16,428	16,223	17,070	-2.0

Notes: **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** fob Newcastle 6000Kcal; **e** In 2018 calendar year US dollars; **s** Estimate; **f** Forecast; **z** Projection
Sources: ABS (2017) International Trade, cat.no 5465.0; IHS Inc (2017); IEA (2017) Coal Information 2018; Coal Services Pty Ltd; Queensland Department of Natural Resources and Mines (2018); Department of Industry, Innovation and Science (2018); Company Reports