Institute for Energy Economics and Financial Analysis

Briefing Note

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Amandine Denis-Ryan || CEO, IEEFA Australia
Anne Knight || Lead Analyst, Australian Coal

Australian thermal coal producers are losing their growth markets

The energy transition is reaching a turning point in China and Southeast Asia

- *China has been the major growth market for thermal coal exporters, and alongside Southeast Asian markets has more than offset declining demand in more mature markets.*
- *However, China's energy transition has reached a major turning point, achieving a net decrease in emissions in the last year and a likely peak in coal use for power generation.*
- *Thermal coal demand is facing many headwinds in China and Southeast Asia as renewable energy and battery costs continue to plummet, and investments in gas and nuclear increase. Increases in coal generation capacity will not necessarily lead to increases in coal demand.*
- *Amid increasing domestic production, China's national coal industry association expects that, compared with 2024, thermal coal imports will drop by 22% in 2025, and by more than one third by 2030. Australia will face increasing competition for those declining imports from closer suppliers.*

China, and in particular its power sector, have become the largest single driver of global coal demand, but shifts in its energy mix and supply patterns could have worrying implications for Australia's thermal coal producers.

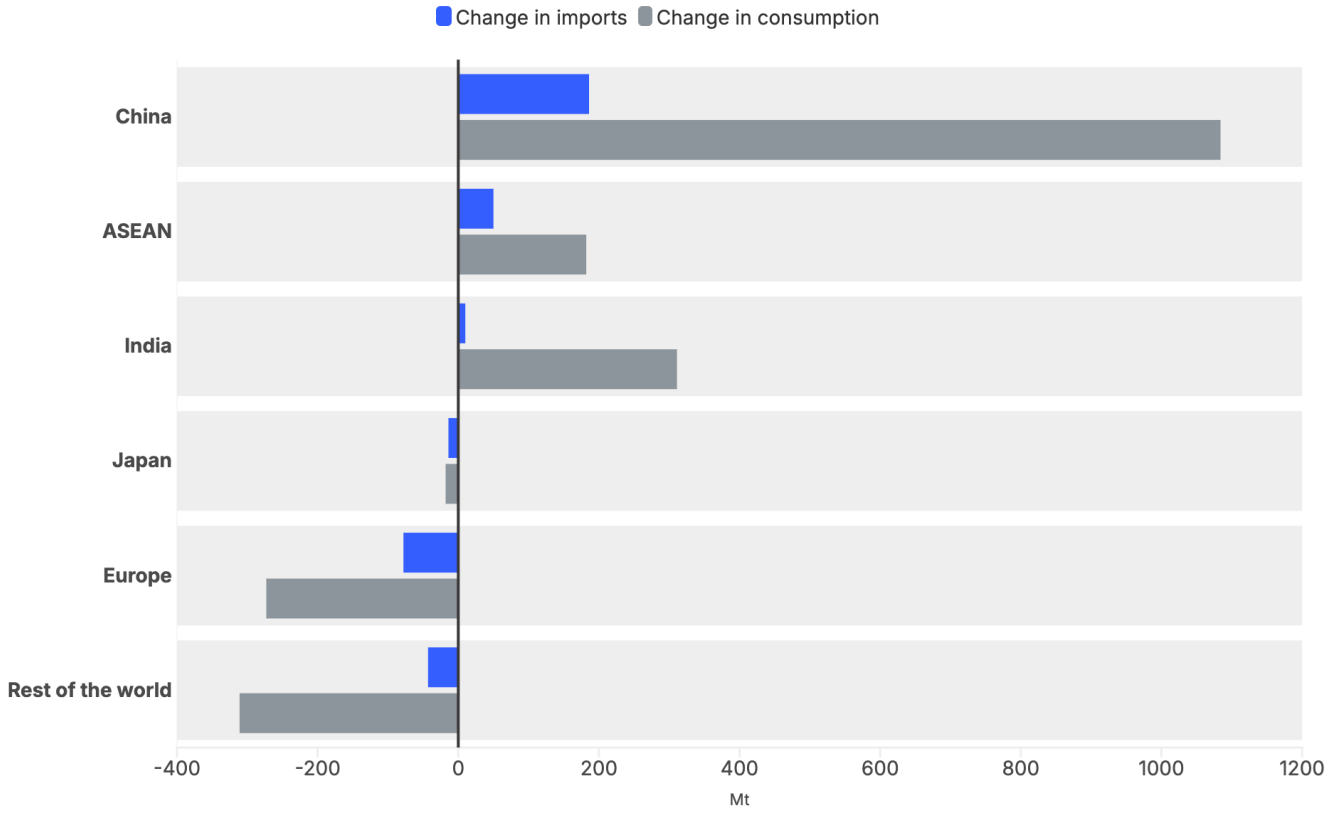
Asian markets have been steadily increasing their share of global thermal coal imports (including lignite), reaching 85% of total volumes in 2024. China was by far the largest market with 32% of global imports in 2024, followed by India at 15%, and markets within the Association of Southeast Asian Nations (ASEAN) at 13%. One third of all coal consumed globally is used in Chinese power plants.

While Japan, South Korea, Taiwan and European markets have been experiencing a structural decline in coal demand, demand in China and some ASEAN markets grew markedly between

2018 and 2024. China's thermal coal imports are estimated to have grown by 186 million tonnes (Mt) between 2018 and 2024, and ASEAN imports by 50Mt. Meanwhile, the rest of the world reduced thermal coal imports by 125Mt during the same period.

The change in import volumes has mostly reflected changes in thermal coal consumption (Figure 1), albeit at a much lower magnitude, reflecting matching changes in domestic production. The notable exception is India: while its coal consumption grew materially, coal imports only grew by 10Mt. This is due to India's rapid ramp-up of domestic coal production. Most recent data shows that imports decreased by 8% in the last financial year, following a 12% increase in production. This reflects India's goal of achieving economic self-reliance.

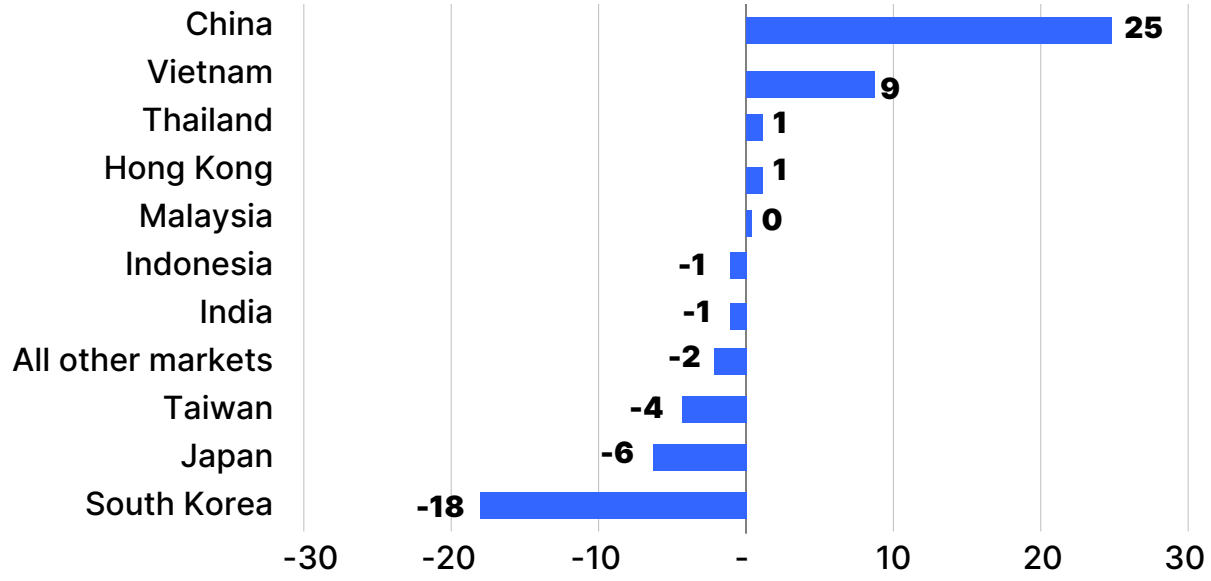
Figure 1: Change in thermal coal consumption and total imports between 2018 and 2024 (estimates), Mt



Source: International Energy Agency (IEA), Coal 2020 and Coal 2024.

For Australian thermal coal exporters, the largest destination markets in 2024 were Japan (36% of exports) and China (35%), followed by Taiwan (9%) and South Korea (6%). Demand for thermal coal in all three mature markets of Japan, South Korea and Taiwan is in structural decline. The growth in exports to China nearly offset those declines, with the unofficial ban on Australian coal imports into China ending in 2023. Australian thermal coal exports to India have fallen, but exports to Vietnam and Thailand have been increasing.

Figure 2: Change in annual export volumes to Australia's top thermal coal markets, 2018 to 2024, Mt

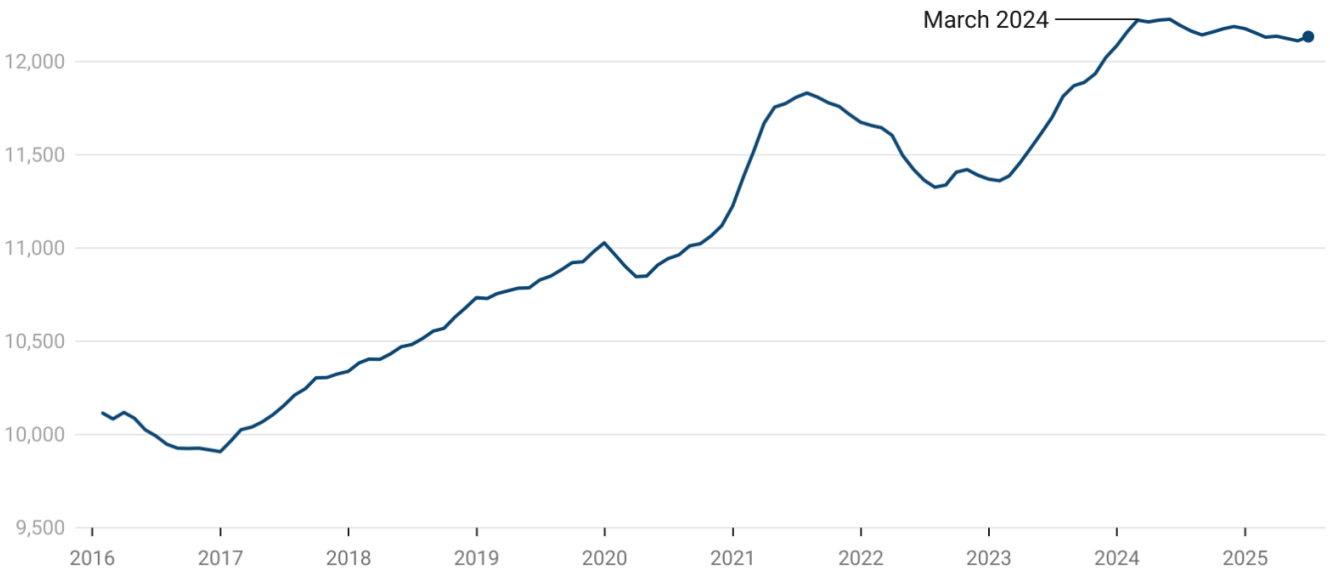


Source: UN Comtrade database.

China's energy transition at a turning point

China's power emissions fell by 3% in the first half of the year, with growth in solar generation counterbalancing the rise in electricity demand. This was the major driver behind a decline in China's total emissions. Total coal consumption also dropped despite an increase in coal use in the chemical sector. Plateaus were also observed for both final energy consumption of fossil fuels, and fossil fuels electricity generation.

Figure 3: China's carbon emissions, $MtCO_2$



Source: Carbon Brief. Note: $MtCO_2$ = million tonnes (Mt) of carbon dioxide (CO_2).

Looking to the future, this trend is likely to continue. The IEA expects total electricity demand growth to slow in line with declining GDP growth, despite the increasing uptake of air conditioning and electric vehicles, and growing demand from data centres and artificial intelligence.

At the CT Asia 2025 conference in September, the chief coal analyst of China's national coal industry association shared that they expect thermal coal use for power generation to be 0.5% lower in 2030 than in 2024, and total coal use 2% higher than in 2024. China also recently made its first pledge to cut its greenhouse gas emissions in absolute terms, reducing them to 7-10% below peak levels by 2035.

Multiple alternatives threaten thermal coal

Plummeting costs for renewables and batteries

Renewable energy technologies have seen dramatic cost declines since 2010. On a levelised cost of electricity (LCOE) basis, renewables are now the most cost-competitive option for new electricity generation globally, offering costs about 40-50% lower than the least-cost fossil fuel option. China has particularly low costs for solar thanks to its vast, integrated supply chains.

China is deploying renewables at an astonishing speed, meeting their 2030 targets for wind and solar six years early in 2024. China installed more than 350 gigawatts (GW) of solar and wind in 2024; this is about 3.5 times the total amount of generation capacity in Australia's National Electricity Market. China also has nearly 1,500GW of renewables in construction and pre-construction.

In Southeast Asia, Vietnam experienced extraordinary solar development between 2019 and 2021, which grew from zero to 10% of generation in just two years. ASEAN countries now have a very large pipeline of renewable power plants, with 20GW under construction, more than 200GW in pre-construction, and nearly 100GW more announced.

Battery storage costs have also been plummeting – they declined by 93% from 2010 to 2024. Significantly, those price decreases mean that intermittent renewables combined with batteries can now deliver power at a low cost for a much larger share of the time. Ember analysis released in June indicated that a solar and battery system that can provide electricity 97% of the time is competitive with new coal generation.

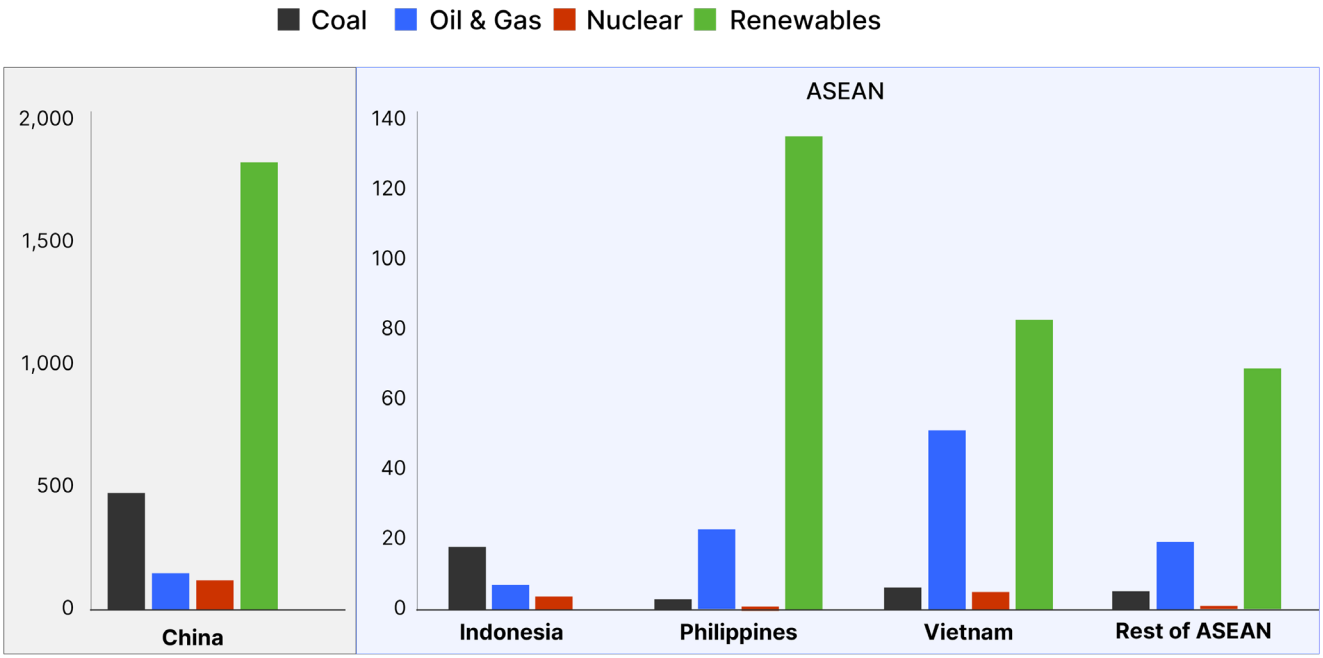
Increasing investment in nuclear and gas generation

About 75% of nuclear reactors under construction globally are in Asia, and 50% in China. Between January 2014 and January 2024, 37 new reactors were connected to the grid in China.

While liquified natural gas (LNG) is likely to be too costly to replace coal at a large scale in China and Asia more broadly, domestic or pipeline gas could be a more serious threat to coal-fired power generation. China has been growing its domestic gas supply, which now represents about 60% of domestic use. China also recently made a deal with Russia to more than double its imports of pipeline gas, and it is expected to come at a lower price than its existing contract. This will bring Russian pipeline gas imports to about 100 billion cubic metres (bcm), which is about one quarter of Chinese gas demand today. Gas could present a particular threat to coal in sectors such as in industry and buildings, where it can deliver significant benefits over coal such as reduced air pollutants and maintenance costs.

Southeast Asia is also investing heavily in developing new gas resources. Regional gas power capacity is expected to double, with consumption projected to rise by approximately 90% from 2025 to 2050. The gas power pipeline is much larger than the coal power pipeline in Southeast Asia, with gas expected to outpace coal. Vietnam and the Philippines have particularly large volumes of gas power plants in planning, while they have very few coal plants in planning stages (Figure 4).

Figure 4: Power plants in construction, pre-construction and announced, GW



Source: Global Energy Monitor, Global Integrated Power Tracker data set.

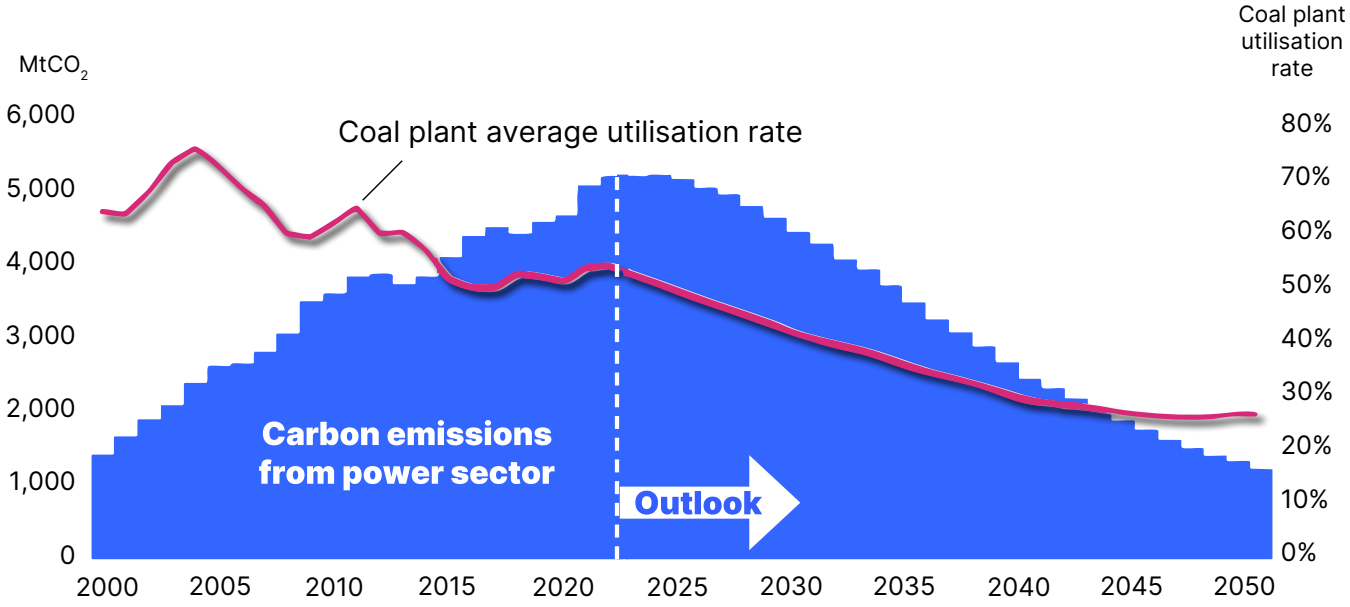
Increased coal generation capacity does not necessarily mean higher coal demand

There is still a large pipeline of new coal power plants in Asia, especially China. China has nearly 400GW of coal plants in construction or pre-construction phases and ASEAN countries have nearly 20GW.

However, the pipeline of coal plants does not seem to reflect a need for additional coal generation, and will not necessarily translate into new coal demand in China. It is likely that coal generation volumes will become decoupled from total coal capacity in the coming years in China, with utilisation rates dropping. China's average utilisation rate of coal power plants has been dropping over the last 15 years to around just 50% in 2024. The IEA expects this fall in utilisation rates to continue, with coal power generation in China "on course to experience a slow structural decline". By 2050, S&P Global expects the average utilisation rate will drop further to 26% (Figure 5).

The retirement of older less efficient plants and the shift towards high-efficiency plants is also going to contribute to a reduction in coal use per gigawatt-hour generated. Some factors may complicate the shift from baseload to mid-merit operators, including long-term power purchase agreements, the dual purpose of some plants that also provide district heating in winter, and other incentives to continue investing.

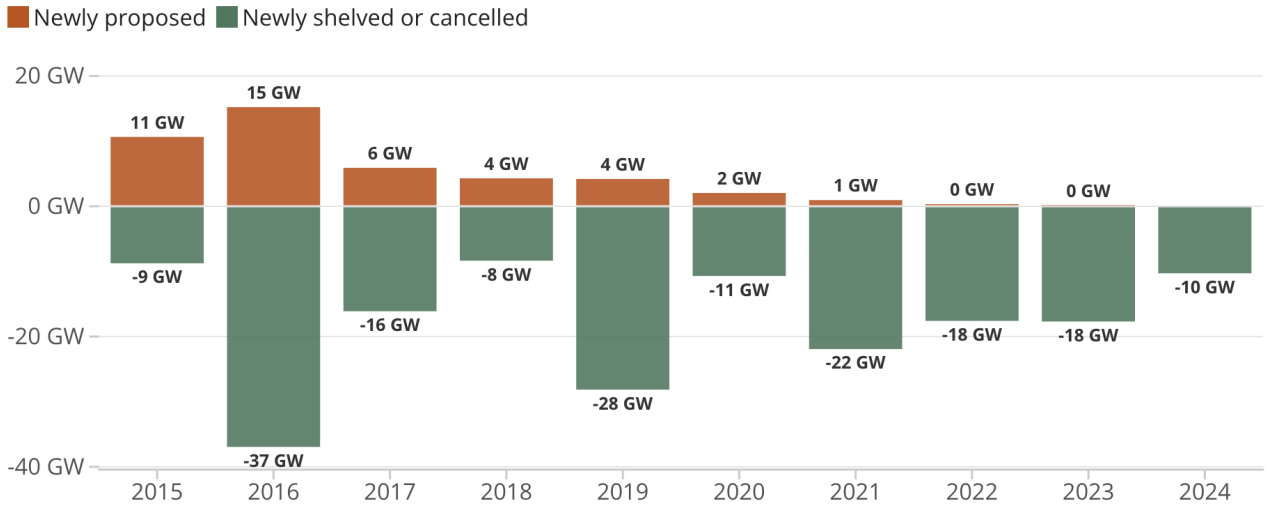
Figure 5: China's coal-fired power utilisation rate and total power sector emissions



Source: S&P Global (2023).

The outlook for Southeast Asia's pipeline of coal-fired power projects is also uncertain. Since 2016, there have been significantly more stalled projects than new proposals in the region (Figure 6). Malaysia has committed to phasing out coal, and the Philippines is planning to stop permitting new coal plants. Meanwhile, Vietnam, Australia's second largest growth market in recent years, cancelled over 10GW of new coal plant capacity in 2023 and committed to stop building and permitting new unabated coal plants.

Figure 6: Annual coal-fired capacity in Southeast Asia (excluding Indonesia) by status change, GW



Source: Global Energy Monitor.

CCS unlikely to save coal-based generation

Carbon capture and storage (CCS) is still in its infancy in Asia. China is most advanced in deploying CCS, with a range of pilot/demonstration plants in operation. In total, operational CCS projects had a capture capacity of about 4MtCO$_2$ as of 2024, less than 0.03% of China's emissions, with only one of those projects capturing more than 1MtCO$_2$. There are no other operating CCS facilities in Asia.

IEEFA has done a lot of research on CCS that calls into question its effectiveness and ability to be deployed at scale.

In 2022, IEEFA reviewed 13 flagship CCS projects across a range of sectors and countries, representing more than half of operating capacity worldwide. The review found that the majority of projects failed or underperformed. Only three projects were successful against their own targets. The failure rate was particularly high in the power sector, with one project never even commencing carbon capture, one underperforming by about 50%, and one being suspended after four years of operation.

IEEFA subsequently analysed two of those "successful" CCS projects in detail – Sleipner and Snøhvit, both in Norway – and found that they both faced significant challenges, intrinsically linked to local geology. This indicates there are still significant technological problems limiting the capability of CCS, and it is unlikely to see large economies of scale.

The cost is also far from competitive. The cheapest application of CCS is expected to be in the gas processing sector. However, the world's largest commercial-scale CCS project, at the Gorgon LNG plant in Australia, has faced technical challenges that have led to cost overruns and underperformance. The project captured only 30% of the carbon removed from its reservoir, despite the project targeting an 80% capture rate, and has experienced increased costs of A$222 per tonne (t) of CO_2 in 2024, after initial estimates it would only cost A$70/t$CO_2$.

Carbon capture is much more complex for coal power plants than for gas processing. Costs just for capturing the carbon are expected to be about A$75-100/t$CO_2$ for a coal power plant compared with less than A$15 for gas processing. A conservative total cost of about A$200/t$CO_2$ would translate to about A$150-200 per megawatt-hour (MWh), just for the CCS component (based on an emissions intensity range of 0.75 to 1 tCO_2 per MWh). Therefore, implementing CCS in existing coal power plants is likely to be more costly than building new renewable and storage assets.

China shifts supply closer to home

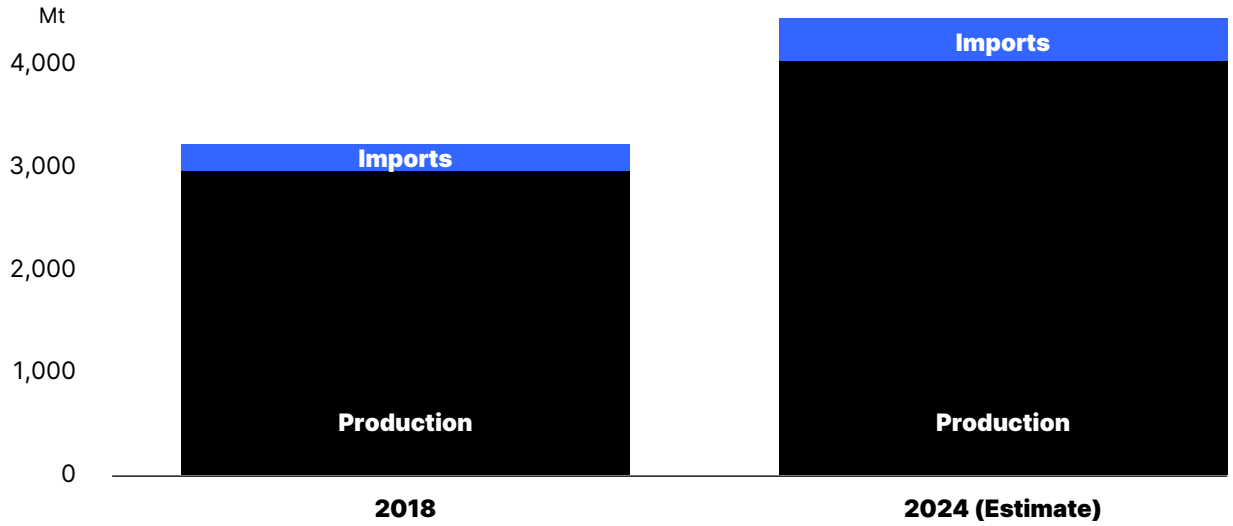
In addition to shifts in demand, shifts in supply also represent a growing threat for Australian producers.

China's growing focus on domestic production

On the back of the Ukraine crisis, the world has seen high price volatility for fossil fuels, which has driven an increased focus on energy security. China in particular has been making very large investments in its domestic coal production.

China has continuously increased its production for the last seven years, growing domestic production by an estimated 36% between 2018 and 2024 (Figure 7). In recent years, the growth in coal demand outstripped the growth in coal production, which drove a large increase in imports. However, it seems that this situation has changed this year, with imports slumping to levels not seen since 2023 in June.

Figure 7: Chinese thermal coal production and imports in 2018 and 2024 , Mt



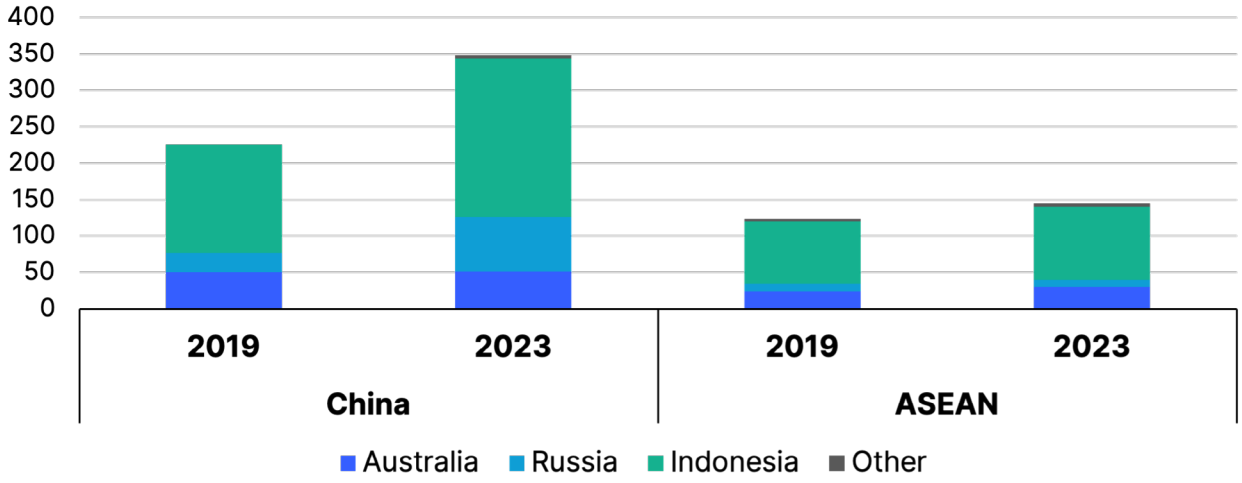
Source: IEA, Coal 2020 and Coal 2024.

The government is now looking at constraining domestic mine production to rein in oversupply and prop up domestic prices. This seemed to drive a rebound in coal imports in August. At the CT Asia 2025 conference, China's coal industry association forecast that thermal coal imports would drop to just 350Mt for 2025 as a whole, and to below 300Mt by 2030, compared with about 450Mt in 2024.

Increasing supply competition

Indonesia is the leading supplier of thermal coal to China and ASEAN, and has captured the majority of the growth in thermal coal imports into both markets between 2019 and 2023 (Figure 8).

Figure 8: Main suppliers of thermal coal to China and ASEAN, Mt



Source: IEA, Coal 2020 and Coal 2024.

Typically, Japan and South Korea require higher-grade, lower-sulphur coal, of which Australia is a key supplier. In contrast, the growing markets of China and ASEAN tend to be more focused on low- and mid-rank coal quality, which Indonesia can provide at a low cost.

While it is often assumed that a shift to more advanced and efficient coal plants (such as ultra-supercritical plants) will lead to more demand for higher-grade coal, they can actually be built for any type of coal. Building ultra-supercritical plants adapted to lower-grade coal requires additional capital costs, but those are often "relatively small compared to current pricing differentials". Indonesia grew its production by nearly 50% between 2018 and 2024, so much so that the global lower-grade coal market is now materially oversupplied, pushing prices down.

The EU and a number of G7 countries, including Japan, implemented restrictions on the import of Russian fossil fuels following the invasion of Ukraine. This has led to a redirection of Russian exports of fossil fuels, including coal, towards other Asian markets.

China has been the main purchaser of Russian coal, representing 44% of all of Russia's coal exports. Between 2019 and 2023, Russia's share of Chinese thermal coal imports grew from 12% to 22%, making it the second largest supplier to China behind Indonesia.

One of the key elements of uncertainty in terms of future Asian imports from Russia is what happens to the eastbound rail lines, which have been facing extreme congestion and labour and locomotive shortages. This drove a decline in total cargo volumes in 2024, which was also reflected in lower coal imports into China. However, Russia is currently working on developing new infrastructure to expand its energy exports to Asia, including the Pacific Railway, a new railway line for coal transport to a port connected to Asian markets. We may also see increased collaboration on energy infrastructure between China and Russia, as per the recent legally binding memorandum to develop a new gas pipeline between the two countries.

China and Southeast Asian countries have also been increasing their supply via overland supply routes. Between 2022 and 2024, Mongolia increased its coal exports to China from 30Mt to 80Mt thanks to new railway infrastructure. While the majority of Mongolian coal shipments to China have been metallurgical coal, thermal coal export volumes are increasing as well. Vietnam is also looking at developing land-based supply from neighbours. The IEA reports plans to boost coal imports from Laos via a 6-kilometre conveyor belt. Vietnam has a reported target of 20Mt, which would imply trade between the two markets increasing tenfold.

Conclusion

Overall, thermal coal demand in Asia is facing mounting headwinds from structural shifts in energy markets, technological advancements and policy transitions. While China and parts of Southeast Asia have driven recent growth in coal imports and consumption, several indicators suggest that the region is approaching a major turning point.

Renewable energy and battery storage have rapidly become more cost-competitive than coal-fired power generation, while investments in alternative energy sources like pipeline gas and nuclear could partially displace coal-fired power capacity.

Although new coal generation capacity is still being added, its utilisation in some markets is declining, and a decoupling of capacity from actual demand suggests coal's dominance in Asia's energy mix may soon plateau or decline. Its current failure rates, challenges and high costs mean that CCS is unlikely to present a feasible or economic decarbonisation pathway in the region.

Ultimately, the changing landscape of energy generation in Asia – combined with increasing domestic production in major importing markets China and India, and increasing exports via overland supply routes – present a bleak outlook for the future of seaborne thermal coal exporters like Australia.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

About the Authors

Amandine Denis-Ryan

Amandine is IEEFA Australia's CEO. She is a recognised expert in net-zero emissions transitions across the economy. She led the development of the first domestic net-zero emissions pathway for Australia and subsequent updates, which are considered to be the reference for Paris-aligned pathways and used by business, finance and government organisations. She has worked with and advised many organisations on the strategy, investment and risk implications of the energy transition. adenisryan@ieefa.org

Anne-Louise Knight

Anne-Louise is IEEFA's Lead Coal Analyst for Australia. Her work examines the long-term outlooks for coal in Australia and major thermal and coking coal markets. Before joining IEEFA, Anne-Louise worked with the Australian Trade and Investment Commission as a senior economist, conducting in-depth research on Australia's international trade and investment landscape. Prior to this she worked with the NSW government on water policy and energy programs, and with the Stockholm Environment Institute in Bangkok on the gender and social equity dimensions of disaster risk reduction and climate change adaptation in Southeast Asia. aknight@ieefa.org