International Energy Agency

Coal 2025

Analysis and forecast to 2030

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Abstract

Coal is a cornerstone of electricity generation in many countries as well as the single largest source of carbon dioxide emissions globally, placing it at the centre of international dialogues on energy. At a time of uncertainty and change for energy systems around the world, a range of different trends could shape coal markets in the years ahead.

On the one hand, recent policy changes supporting coal could drive consumption higher, as could surging electricity demand in economies across the world, since two-thirds of global coal use today is for power generation. On the other hand, the rapid expansion of renewable energy capacity – particularly in China, the world's biggest coal consumer – has the potential to curb demand. At the same time, the coming wave of liquefied natural gas (LNG) export capacity, which is likely to bring more abundant supplies and lower prices to natural gas markets, could prompt some regions to favour gas over coal.

Coal 2025 – the latest annual market report from the International Energy Agency (IEA) – explores the implications of these key developments and more. Drawing on the latest data, it analyses recent trends and provides forecasts through 2030 for coal demand, supply and trade by grade and region.

Acknowledgements, contributors and credits

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Executive summary

Global coal demand in 2025 is set to remain close to 2024 levels amid unusual regional trends

Key factors such as weather, fuel prices and policy decisions all shaped global coal consumption in 2025, driving changes in demand that often ran counter to recent country or regional trends.

In India – one of the traditional engines of coal demand growth – an early and strong monsoon season depressed electricity demand and boosted hydropower output. As a result, the country's annual coal power generation is set to decline year-on-year for only the third time in the past five decades. In the United States, where coal demand has decreased by an average of 6% annually over the past 15 years, consumption is poised to increase by 8% in 2025 amid a combination of higher natural gas prices and a slowdown in the retirement of coal plants due to policy support led by the federal government. In the European Union (EU), lower hydropower and wind output pushed up coal power generation in the first half of the year. As a result, EU coal demand is set to decrease by only around 2% in 2025 – a much smaller decline than the double-digit drops in 2023 and 2024.

In China[1], which consumes more coal than the rest of the world combined, demand is on course to mirror its 2024 level, as expected. In turn, global coal demand in 2025 is set to be very close to our forecast published in the previous edition of this report a year ago, rising by 0.5% to 8.85 billion tonnes, a record high.

Global coal consumption has reached a plateau and may well decline slightly by 2030

Global coal demand is expected to effectively plateau over the coming years, showing a very gradual decline through to 2030 in our latest forecast. By that year, consumption is forecast to ease by 3% compared with 2025, taking it below its 2023 level. Global power generation from coal is forecast to sink below its 2021 level by the end of this decade.

Strong growth in global electricity demand could support coal consumption in the years ahead. But competition with other power sources is also set to intensify, with

[1] In this report, "China" refers to the People's Republic of China and Hong Kong (China).

renewable capacity surging, nuclear expanding steadily, and a wave of liquefied natural gas (LNG) arriving on the market.

Since coal substitution in industry is slow, coal use by the sector is forecast to decline by less than 1% per year through the end of the decade. However, this slight drop is expected be offset by an increase in coal gasification plants, mainly in China.

The most substantial growth in coal consumption between now and 2030 is expected to take place in India, where demand is forecast to rise by 3% per year on average, leading to a cumulative increase of over 200 million tonnes (Mt). Meanwhile, the fastest growth is expected to happen in Southeast Asia, where coal demand is forecast to grow by more than 4% per year to 2030.

Against a complex energy backdrop, our forecast for the next five years is subject to some significant uncertainties that could impact it materially. For example, in the event of stronger-than-expected uptake of coal gasification, notably in China – or if the integration of new renewable capacity into power systems proceeds more slowly than anticipated – global coal demand could exceed our forecast. At the same time, if the competition from other energy sources is stronger than anticipated, this could push overall coal consumption lower than our forecast.

China remains the key driver of global coal market trends

China consumes 30% more coal than the rest of the world put together. It also produces more coal than all other countries combined, and it is the world's largest importer. This dominance by a single country makes global coal markets very dependent on developments in China, notably those related to economic growth, government policies, energy markets, weather conditions and dynamics in the Chinese domestic coal sector.

While our forecast sees coal demand in China decreasing somewhat over the next five years, the decline is slow (by less than 1% annually on average) – and higher electricity demand growth, lower renewable energy dispatch or an acceleration in coal gasification projects could turn the slight drop into a small increase. The Chinese government has emphasised its ambition of reaching peak coal consumption before 2030.

New policy momentum behind coal emerges in the United States

A notable development in coal markets is the emergence of strong policy support for coal in the United States, which helped lift coal demand there in 2025. Several

measures have been adopted to support both the supply and the demand side. These include environmental exemptions allowing some coal plants to continue operating, a reduction of the royalty rate for coal mining on federal lands and support for retrofitting coal plants.

In our forecast, US coal demand declines by 6% per year on average through 2030, based on ongoing growth in renewable generation capacity and the continuation of coal plant retirements, albeit at a slower pace than previously expected. However, the rate of decline in US coal use could be slower if electricity demand is higher than expected or if coal plant retirements stall. Natural gas prices will also play a role in coal demand trends in the United States.

After reaching record high in 2024, global coal production is set to decline slightly through 2030

Global coal production is forecast to remain at similar level in 2025 to the all-time high it reached in 2024. In the first half of 2025, China's coal output grew 6% compared with the same period in 2024, but abundant stocks, low prices and safety campaigns have led to declines since July. For the whole year, we expect Chinese coal production to rise by 1%.

In India, amid weak demand and challenging working conditions due to heavy rains, the growth in coal production seen in recent years came to a halt in 2025. Meanwhile, in Indonesia, coal production is expected to decline in 2025 for the first time since the onset of the Covid-19 pandemic due to shrinking international coal trade. In the United States, coal production is set to increase, spurred by domestic demand and policy support.

Looking ahead, given healthy coal stocks in most regions and sluggish global demand, we forecast that global coal production will decline slightly through 2030. Among major producers, India is forecast to have the highest output growth, based on strong domestic demand and favourable government policies. The biggest uncertainty is in China, where even small policy changes or demand fluctuations can affect coal output sufficiently to have an impact on international markets.

China has driven global growth in imports, but this has started to change

Global imports of coal reached an all-time high in 2024, even as major importers such as Japan, Korea, Chinese Taipei and EU countries continued to reduce the volumes they brought in. Declines in those markets were more than offset by robust growth in China and, to a lesser extent, India, alongside smaller increases in countries such as Viet Nam and the Philippines. However, China and India's

coal imports declined in 2025 amid sluggish demand, sufficient domestic production and abundant stocks. As a result, global imports are on course to fall by around 5% in 2025.

Coal imports are expected to see a sharp decline globally over the forecast period. In advanced economies, they are set to keep shrinking through 2030. Meanwhile, India faces a mixed outlook, with a strong push for domestic production tempered by the need for imports due to coal quality issues.

China will ultimately shape the global trends. As it stands today, Chinese imports are forecast to decline by around 2.5% per year on average through 2030. However, the decrease will be concentrated in thermal coal. India, which has plans to expand steel production and limited domestic supply of metallurgical coal, is expected to boost metallurgical coal imports, offsetting the declines elsewhere.

International coal trade is under pressure, with prospects stronger for metallurgical coal exporters

The decline in Chinese imports in 2025 led to the first drop in the global coal trade since 2020. Indonesia, the largest exporter and supplier to China, saw the biggest decrease, reducing exports by almost 50 Mt. In percentage terms, however, Colombia led the fall, with exports dropping by around 20% in 2025. The United States also saw exports decline slightly. In Russia, exports are expected to remain at a similar level to 2024.

Looking ahead, as coal imports shrink and prices are pressured by cheaper and more abundant LNG supplies, the competition among exporters will intensify. The declines in import demand from Japan, Korea and Chinese Taipei could hurt Australia's thermal coal exports, whereas Indonesia's coal sector is set to remain tied to demand trends in China. Metallurgical coal exporters, led by Australia, appear to have the stronger prospects due to the relatively robust demand outlook in India.

Weakening demand and oversupply have pushed coal prices down

After soaring to a record high during the recent energy crisis linked to Russia's invasion of Ukraine in 2022, thermal coal prices have pulled back over the past two years. In 2025, they were around 10% lower in Europe and around 20% lower in Asia compared with 2024, though there were notable differences geographically over the course of the year.

In China, prices declined in the first half of 2025 but then started increasing once production shrank and demand rose. Meanwhile, in Europe, there was a small

price spike in the first half of the year as demand increased amid lower hydropower and wind output. Prices in Australia, which are sensitive to Japanese and Korean demand, fell below European levels in April, then rose again through August. Overall, thermal coal prices are getting closer to supply costs, with profits shrinking accordingly.

Mergers and acquisitions in the coal sector have been on pause since 2024

Large profits generated in the 2021-2023 period gave rise to an active phase of mergers and acquisitions in the international coal sector. Miners doubling down on coal had sufficient cash to purchase attractive assets, which allowed companies wishing to diversify away from coal to sell at reasonable prices. In the current lower price environment, coal mining companies are not as profitable as they were. As a result, mergers and acquisitions activity has almost ground to a halt since 2024, with very few new deals announced.

Demand

Global coal demand plateau continues, with demand at 2023 levels in 2030

Global coal demand in 2024 is estimated to have reached 8 805 Mt, an increase of 1.5% on the previous year. Growth was concentrated in Asia, while advanced economies continued their structural decline in consumption. Power sector coal use remained the dominant driver, supported by seasonal factors and hydropower variability, while non-power coal demand held broadly stable. China and India accounted for 71% of global consumption, reinforcing the eastward shift in demand.

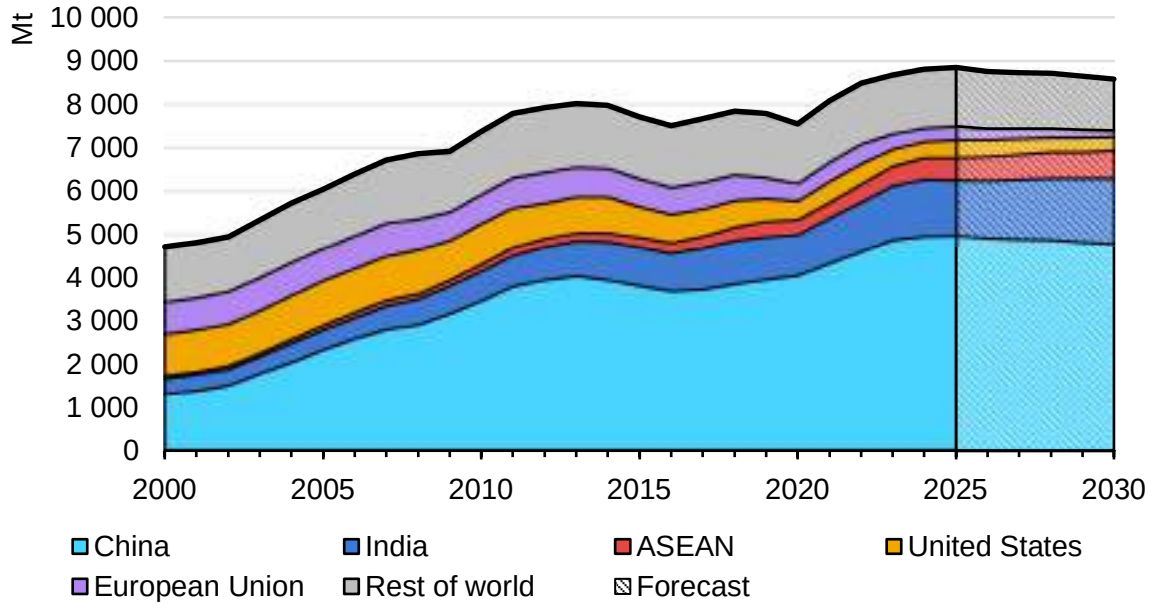
For 2025, global coal demand is projected to reach 8 845 Mt, setting a new record. The increase of around 40 Mt compared with 2024 is very similar to the forecast we made last year. While there were some unusual regional trends, they had the effect of cancelling each other out. The United States posted the largest absolute gain of about 37 Mt, supported by policy measures and higher gas prices. In the European Union (EU) the decline in coal demand slowed, mostly due to wind droughts in the first half of the year. And although India has been the engine of growth in recent years, in 2025 its coal demand has been falling.

Meanwhile, China's coal consumption held steady at 4 953 Mt, with flexible coal-fired power supporting renewables and coal demand increasing for chemical production, offsetting declines in cement and other industries. ASEAN (Association of Southeast Asian Nations) countries' demand continues to expand on the back of new power capacity and metals processing activity. Overall, the picture is a complex interplay between expansion in emerging markets and the phase-out challenges in mature systems.

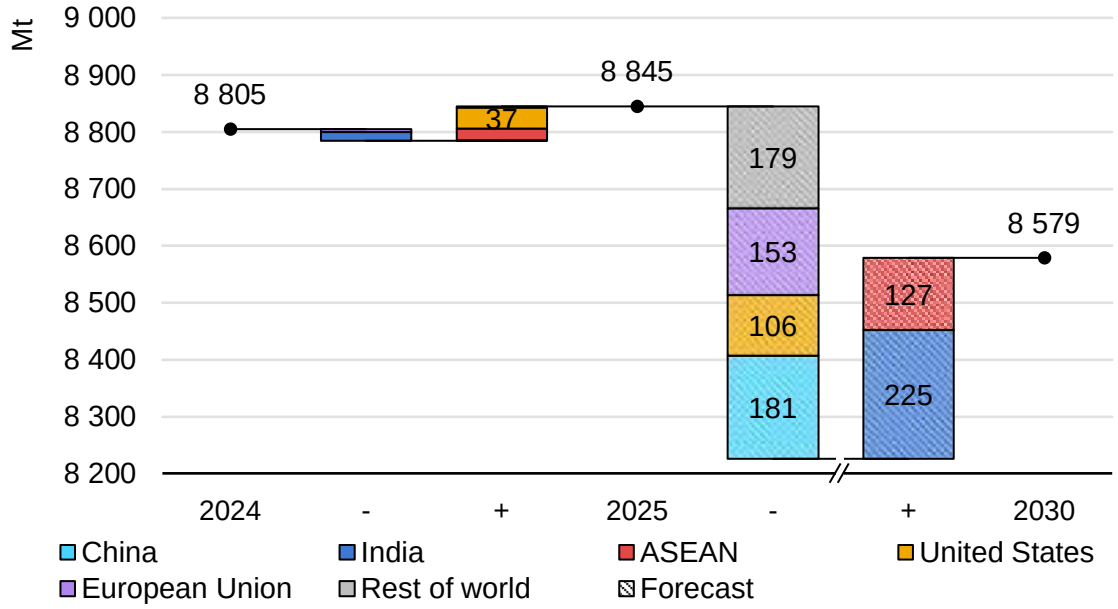
In the period to 2030, global coal demand is forecast to continue its plateau, albeit falling slightly by the end of the decade. In our forecast, global coal demand in 2030 is expected to the level seen in the years prior to 2023. China's share remains dominant, although its coal demand declines very slowly as renewables expand and coal's role in the power sector shifts towards flexibility. India emerges as the main source of incremental demand, adding 225 Mt from 2025 to 2030, while ASEAN countries contribute 127 Mt, driven by Indonesia and Viet Nam. In contrast, the European Union and the United States register further declines of 153 Mt and 106 Mt, respectively, as phase-out policies and fuel switching accelerate. In the rest of the world coal demand declines by 179 Mt, reflecting mixed trends across Africa, South Asia (excluding India) and other emerging markets.

Across all regions, coal's operational role is evolving. In Asia coal remains critical for electricity security and industrial processes, but its share in power generation declines steadily as renewables scale up. Advanced economies continue to phase out coal in power generation, reinforcing the structural eastward shift in global demand. By 2030, coal demand is expected to stabilise within a narrow band, with non-power uses, particularly chemicals, providing resilience even as steel and cement consumption weaken.

Global coal consumption, 2000-2030



Change in global coal consumption, 2024-2030



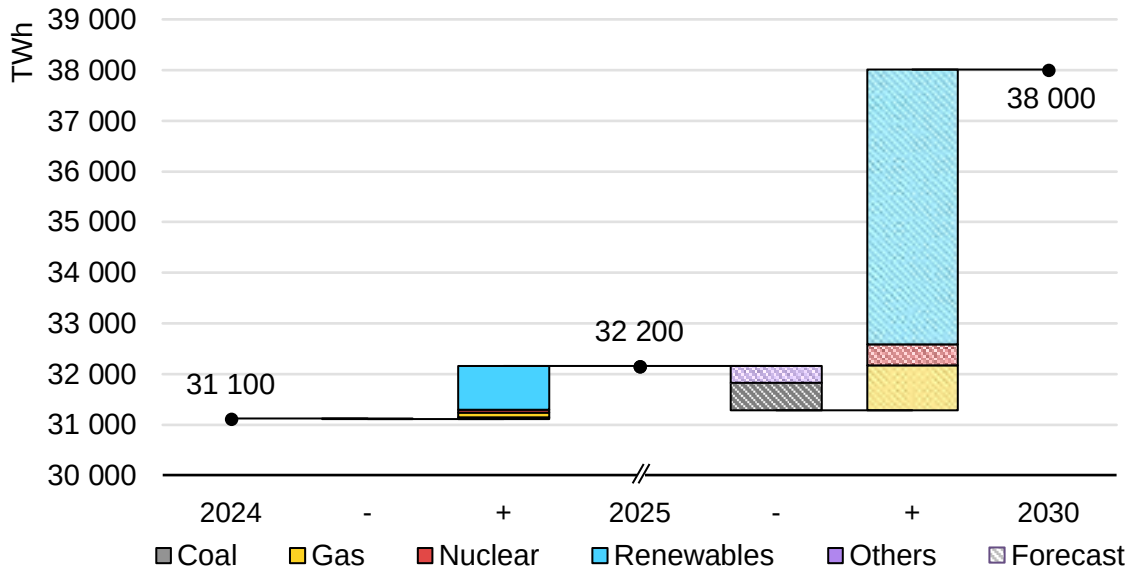
Coal-fired power generation declines slightly through to 2030

Our forecast of coal demand for power generation is made at individual country level, taking into account electricity demand, renewable energy policies and development, and expectations of future fuel prices and generation capacities (see Electricity report for more detail). Global electricity generation is estimated to have reached 31 100 TWh in 2024. Renewables delivered the largest share of incremental growth, while coal-fired generation remained a key source of electricity security despite its declining share in the global mix. Coal demand for power generation in 2024 is estimated at 5 946 Mt, with reductions in advanced economies offset by gains in emerging markets.

Total electricity generation in 2025 is projected to rise to around 32 200 TWh. Most of this growth is expected to come from renewables, which continue to expand at a record pace, while nuclear and gas also contribute modestly. Coal demand for power generation remains broadly stable at 5 964 Mt, supported by seasonal heating needs and system adequacy requirements, particularly in Asia. China's use of coal for power is expected to remain near 3 billion tonnes, sustained by strong electricity demand growth and held back by formidable renewables expansion. India's coal demand for power is estimated at 940 Mt. Despite new coal-fired units, totalling 14 GW, have been commissioned, renewable energy sources are growing rapidly, and they alone offset the weak growth in electricity demand.

In contrast, the European Union continues to see structural declines in coal-fired generation in 2025, albeit a slowing reduction due to lower hydro and wind output in the first half of the year. In the United States, policy measures and reliability concerns slow the pace of retirements, and coal-fired power generation is expected to rebound. ASEAN countries, led by Indonesia and Viet Nam, record further increases in coal use for power generation, driven by new capacity and industrial loads, while advanced economies in Asia Pacific, such as Japan, Korea and Australia, continue to reduce coal consumption as it is replaced by renewables and more abundant LNG.

Change in global electricity generation by source, 2024-2030



Looking ahead, global electricity generation is expected to reach over 38 000 TWh by 2030, with renewables accounting for the overwhelming share of incremental supply. Nuclear and gas also expand, while coal's role shifts towards system adequacy and flexibility rather than baseload generation. Global coal demand for power generation is projected to plateau at around 5 700 Mt, with its share of the electricity mix falling from 35% in 2024 to 27% by 2030. Installed coal-fired capacity remains high, but average utilisation declines as retrofitting programmes enable lower minimum load operation and faster ramping to complement variable renewables. These changes underscore that coal remains essential for reliability in several regions, yet its operational role is increasingly decoupled from energy output as clean energy growth accelerates.

Emerging economies drive growth in non-power steam coal and lignite to 2030

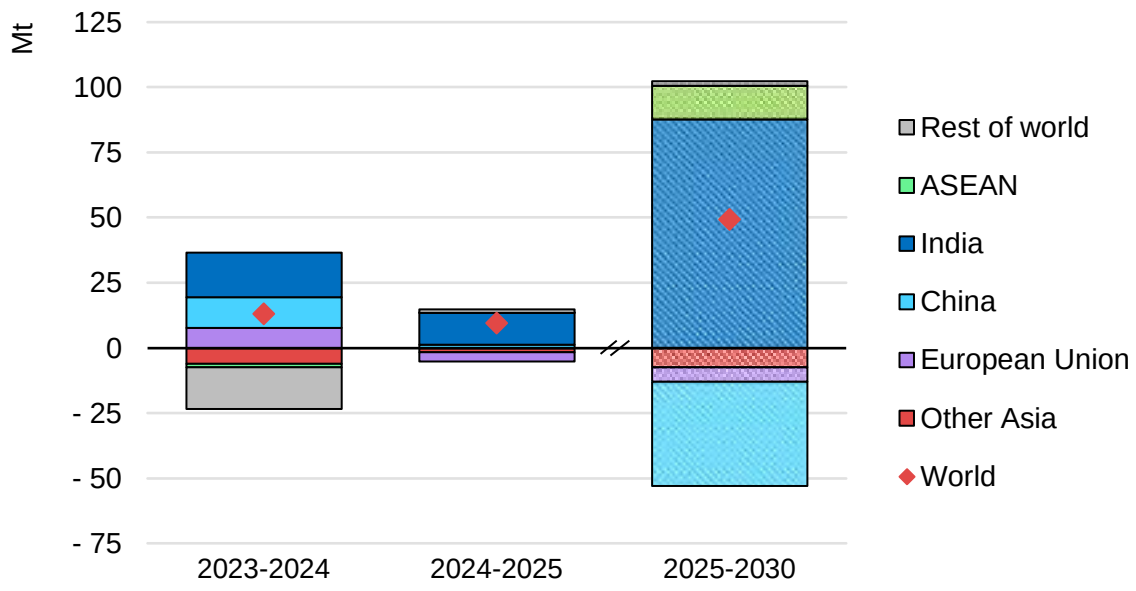
Coal is used in industrial applications such as cement, alumina and paper production, coal-to-chemicals, and heating for small-scale industry, even as structural changes reshape demand. Our forecast, made at individual country level, takes into account the sectors in which different countries use coal together with historical records and prospects for growth, using expectations for economic performance, industrial production and specific industrial outputs.

Global non-power consumption of steam coal and lignite rose slightly in 2024 to 1 757 Mt, accounting for about 23% of total steam coal and lignite use. Growth was concentrated in emerging economies, while Europe and advanced Asia Pacific markets continued to see a decline.

In 2025, non-power steam coal and lignite demand is expected to remain broadly stable at 1 766 Mt, representing a 0.6% increase on the previous year. China's coal-to-chemicals sector drives the growth, offsetting further contraction in cement and other industries. India sustains its growth through the expansion of cement output, coal-based direct reduced iron (DRI) projects and other industries. ASEAN countries add incremental volumes, led by Indonesia's nickel and other industries, while other Asian economies show modest gains. Declines persist in Europe and mature Asia Pacific markets as electrification and alternative fuels advance.

By 2030, global non-power steam coal and lignite demand is projected to increase by nearly 50 Mt compared with the 2025 level. However, this comes with an important caveat: the growth is driven by the coal conversion sector in China and new gasification projects in India. Without these developments, thermal coal consumption in the non-power sector would decline. ASEAN countries add further gains through metals processing and emerging coal-to-chemicals initiatives. In contrast, Europe and advanced Asia Pacific economies record a decline due to falling use of coal in steelmaking. Overall, the coal-to-chemicals sector consolidates its role as the main growth driver, while cement and steel lose share structurally.

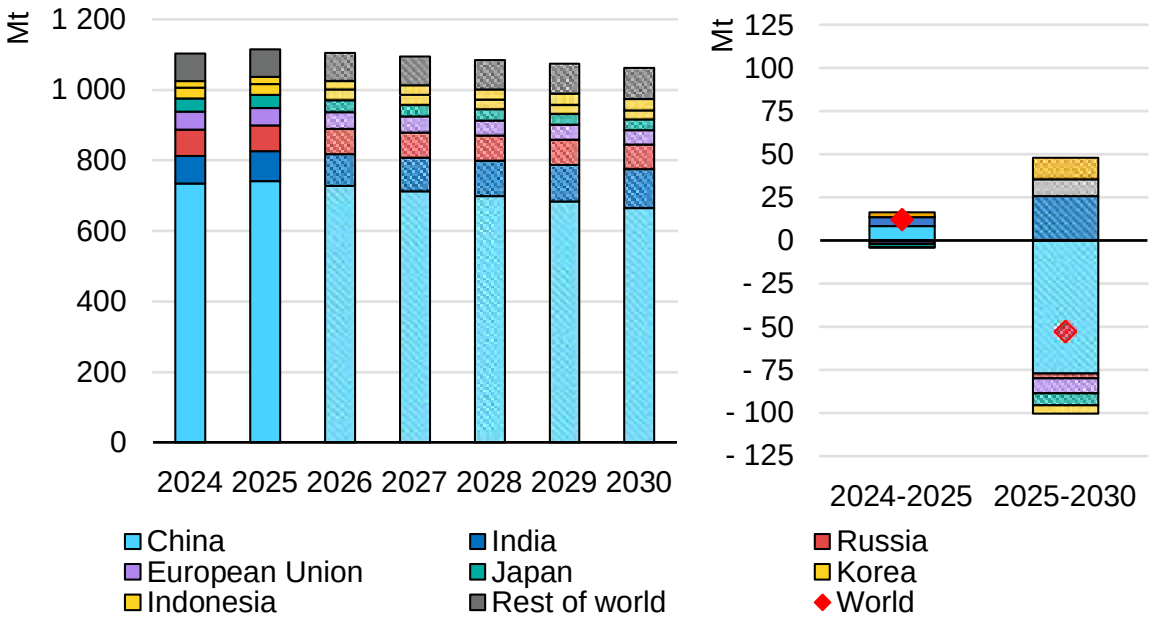
Change in steam coal and lignite consumption for non-power purposes by region, 2023-2030



Global met coal demand plateaus in 2025 before declining slightly through to 2030

Metallurgical (met) coal remains a critical input for steelmaking, encompassing coking coal (hard, medium and semi-soft) and coal used for pulverised coal injection (PCI). Coke, produced by heating coking coal in a coke oven without oxygen, is also employed in the manufacture of carbides, ferroalloys and other chemical compounds. Our forecast for met coal demand continues to rely primarily on pig iron production outlooks from organisations such as the World Steel Association, combined with steel production outlooks and expected GDP growth and industrial activity, while accounting for scrap utilisation rates in different regions. Over the medium term, the adoption of hydrogen-based and other innovative steelmaking processes is expected to remain limited because of cost barriers and scrap availability, meaning coke, and hence coking coal, will continue to play a dominant role.

Met coal consumption and change by region, 2024-2030



In 2025, global met coal consumption is projected to reach 1 114 Mt, remaining broadly stable compared with 2024. This stability masks contrasting regional dynamics. China, which accounts for the largest share of global demand at around 67%, is expected to consume about 742 Mt, with only a slight increase from the previous year. India's demand is projected to rise by 5 Mt, supported by expanding steelmaking capacity and robust industrial activity. Meanwhile, advanced economies such as Japan, Korea and the European Union are forecast to see declines, reflecting subdued steel output and a lower share of steel produced through the blast furnace-basic oxygen furnace (BF-BOF) route.

Looking ahead, global met coal demand is forecast to decline gradually to 1 061 Mt by 2030. This trajectory reflects structural changes in steelmaking and slower growth in industrial activity. The most pronounced reductions are expected in China, where demand could fall by 77 Mt, offsetting gains in India (up 26 Mt) and Indonesia (up 12 Mt). Consumption in the European Union, Japan and Korea is projected to contract by a combined 21 Mt, while the rest of the world sees only marginal growth. Overall, global met coal demand is set to decline by 53 Mt between 2025 and 2030, underscoring the gradual transition in steelmaking technologies and regional economic dynamics.

China

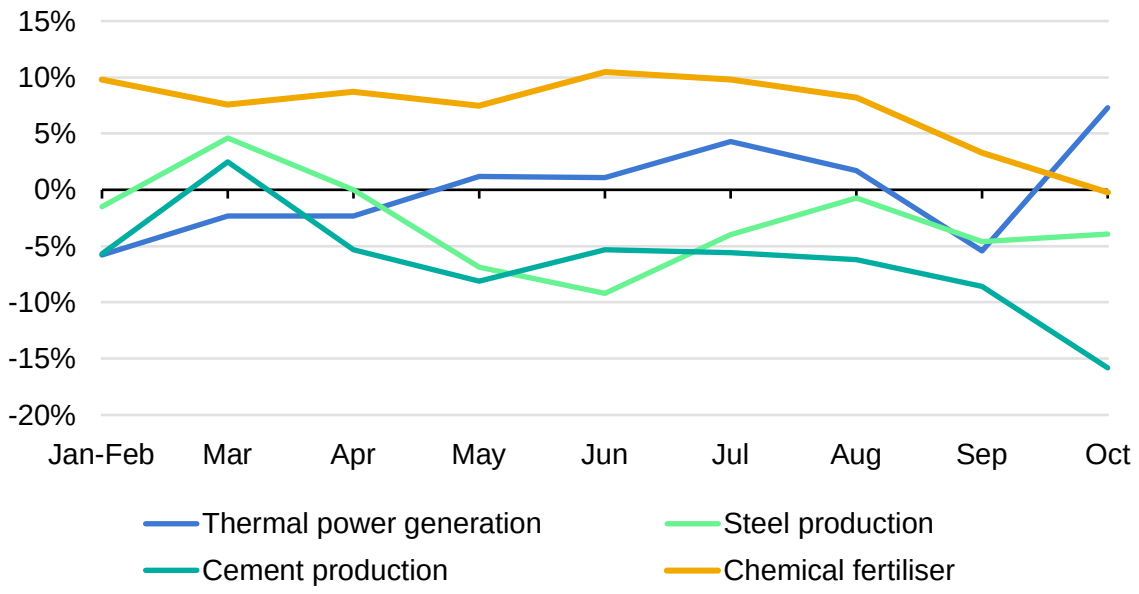
Coal demand in China remains stable with different trends in different sectors

China's coal consumption reached about 4 952 Mt in 2024, up 1.7% y-o-y. Thermal coal accounted for roughly 4 218 Mt, driven by strong electricity demand compared with the previous year. Non-power steam coal remained at 1 116 Mt, while met coal declined slightly to 734 Mt, reflecting subdued pig iron production and a slow shift towards electric arc furnace steelmaking.

In 2025, as the world's largest coal consumer, China is projected to use about 4 953 Mt of coal, remaining stable y-o-y and accounting for roughly 56% of global coal consumption. Thermal coal remains dominant, estimated at 4 211 Mt, primarily for power generation, while met coal demand is expected to be 742 Mt.

Power generation remains the main driver of coal use in China. In 2025, electricity consumption is expected to rise by 5% y-o-y. Coal-fired generation declines slightly, supported by seasonal heating needs even as renewables expand at a record pace, underpinning coal's strategic role. Coal's role is shifting from baseload supply towards flexibility, consistent with policy priorities and operational changes. Thermal coal consumption for power and heat is projected at 3 094 Mt in 2025, a slight decline driven by strong growth in electricity generation from wind and solar energy.

Y-o-y percentage change in various economic indicators in China, January-October 2025



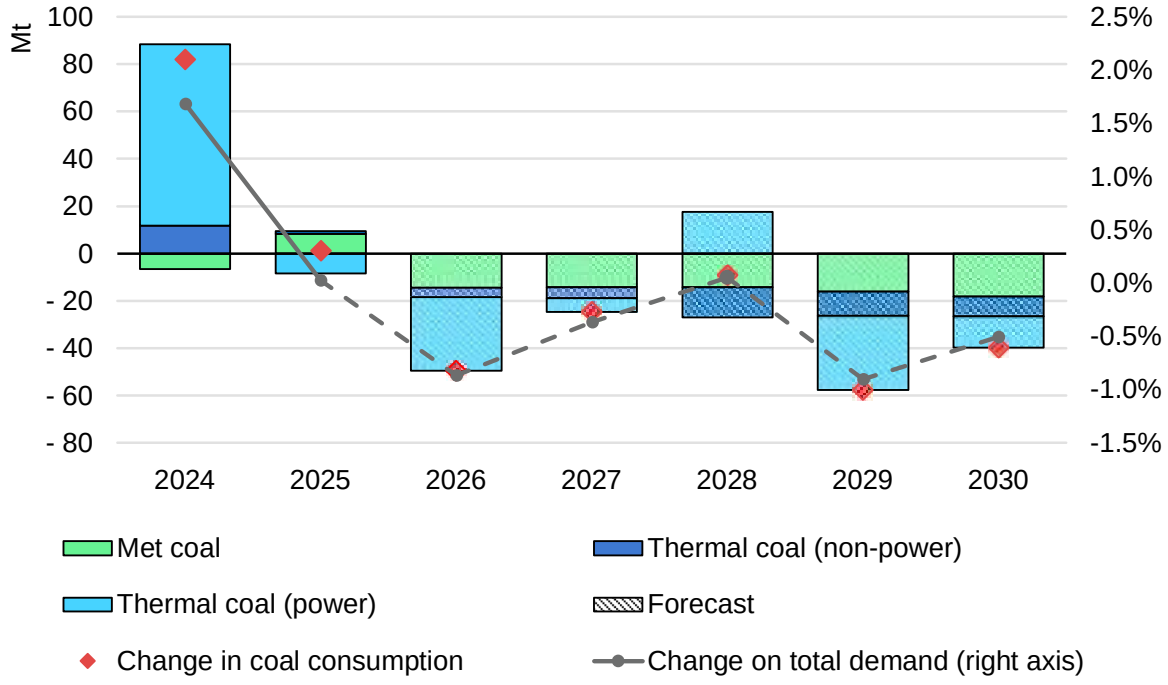
Source: National Bureau of Statistics of China (2025), Statistical Database.

Industrial coal use reflects contrasting trends. Cement production continues to decline, weighed down by structural weakness in construction and real estate, while coal demand for chemicals surges on the back of coal-to-chemicals expansion and strong fertiliser output. This divergence offsets losses in building materials, keeping non-power coal demand broadly stable at 1 859 Mt in 2025.

In 2025, met coal demand recovers slightly by 8 Mt, supported by rising coke production despite lower steel output. While pig iron production remains subdued, increased coke output sustains coking coal demand. Policy measures, including tariffs on imported coking coal and stricter capacity controls, reinforce the outlook for a steady decline during the forecast period.

Looking ahead, China's coal consumption starts declining by the end of the decade mainly owing to renewables rising sharply. By 2030, total coal use is projected to be 4 772 Mt, with thermal coal for power easing to 3 030 Mt and met coal declining to 665 Mt. Non-power steam coal is falling to a level of 1 077 Mt, while the structural contraction of demand for cement and in other industries almost offset by the growth of chemicals.

Annual change in coal consumption by grade and use and change on demand in China, 2024-2030



In China coal-fired power flattens out with a shift towards a backup role in the power mix

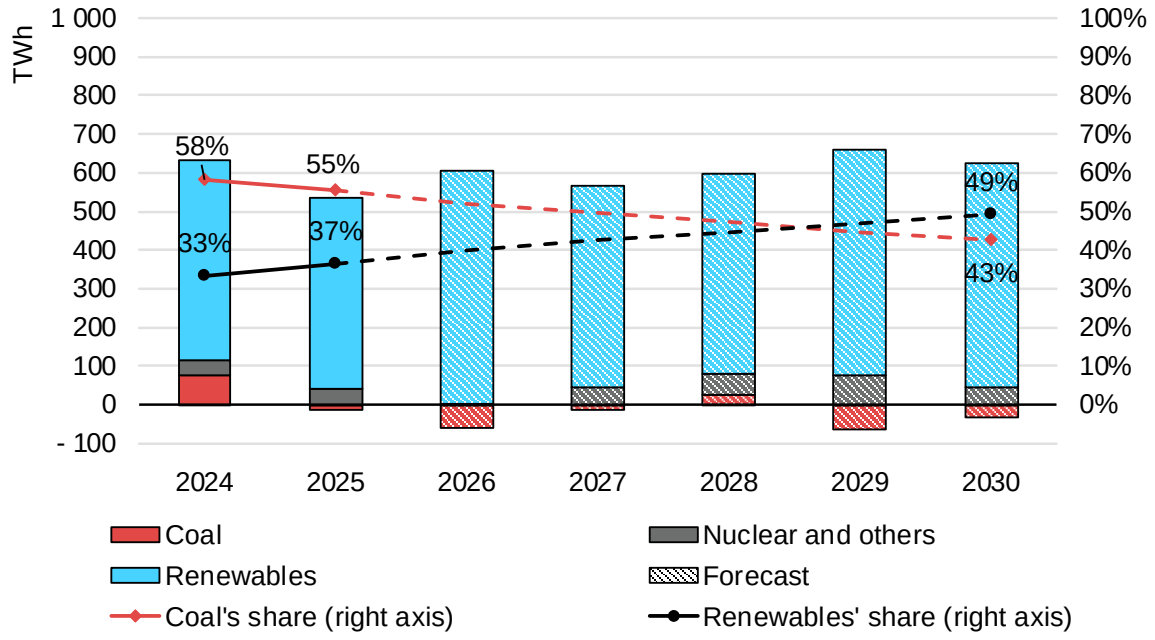
In 2025, coal remains the backbone of China's power system, even as its relative weight in the generation mix continues to edge down amid record wind and solar additions. Demand from coal-fired power plants accounts for about 73% of China's thermal coal demand and roughly 62% of total coal demand, keeping the electricity sector the principal driver of domestic coal consumption. Coal-fired power generation has been largely stable in 2025, albeit slightly lower than last year, decreasing by around 0.2% y-o-y, while overall electricity demand is forecast to grow by about 5% y-o-y. This reflects the crowding-out effect of the expansion of clean energy, as renewable generation is expected to grow by 15%, within which hydropower output in 2025 is only slightly lower than in 2024 and nuclear continues its steady growth.

Installed coal-fired capacity was estimated at 1 170 GW by the end of 2024. We estimate that 21 GW of new capacity was commissioned in the first half of 2025. In the aftermath of the 2021 power shortages, over 200 GW was approved in 2022-2023, plus 67 GW in 2024 and 42 GW in the first three quarters of 2025. Accounting for the retirement of some old, inefficient units, coal-fired generation capacity stands at around 1 400 GW by 2030. The current commissioning surge is concentrated in a handful of provinces – notably Xinjiang, Inner Mongolia and Shaanxi, with additional clusters in Jiangsu and Shandong – reflecting the buildout of northwestern energy bases and industrial load centres. Meanwhile, the policy focus has pivoted from baseload expansion to flexibility and modernisation: the authorities' special action plan for 2025-2027 calls for new or upgraded units capable of very low minimum stable output (20-25% of rated load) to provide a better backstop for variable renewables and reduced cycling costs. Capacity remuneration reforms introduced earlier remain in place, intended to ensure capital recovery as load factors drift lower with rising clean energy penetration.

In market terms, coal use for power in 2025 is being shaped by three opposing forces. First, non-fossil trends: wind and solar continued their double-digit growth, reducing coal burn during the shoulder months, while hydropower grew 1.6% y-o-y to October. Second, supply and stocks: raw coal output rose strongly, easing supply risks and tempering import demand. And third, seasonality: heating demand and a low winter comparison point following a mild winter in 2024 imply a y-o-y rebound in coal burn, aided by expected inventory replenishment by utilities as the ability of wind and solar to displace coal-fired generation diminishes during winter months, when lower solar output and the variability of wind limit their contribution. Against this backdrop, we estimate thermal coal consumption for power and heat of 3 090 Mt in 2025. This could be affected on the upside by a greater need for flexible power dispatch from coal plants, contingent on hydropower performance.

Retrofitting activity under the Chinese government's 2024-2027 Low-Carbon Transformation Plan and the 2025-2027 Flexibility Upgrade Programme is expected to become visible in operational data from 2027 onward. These initiatives are designed to adapt the coal fleet to a system in which coal's share of demand falls from 55% in 2024 to 43% by 2030 while renewables rise from 37% to 49%, necessitating lower minimum-load operation, faster ramps and more frequent cycling to complement variable wind and solar. The measures include flexibility upgrades, biomass or ammonia co-firing, and carbon capture and storage (CCS) retrofits. The net effect on coal consumption is ambiguous: CCS typically raises parasitic auxiliary load and increases coal burn per unit of net electricity, whereas co-firing reduces coal use per MWh and, if paired with lower minimum-load capabilities, can further reduce annual coal utilisation. In practice, we expect installed coal capacity to remain high, but average utilisation to trend lower, with coal increasingly serving as a strategic reserve for system adequacy and reliability in a grid with high penetration of wind and solar.

Annual change in power generation and share of demand by source in China, 2024-2030



Looking ahead to 2030, we assume hydropower availability normalises from low 2025 levels, wind and solar additions remain substantial, albeit moderating from 2024-2025 highs, and nuclear output continues to increase steadily. Under these conditions, incremental electricity demand growth to 2030 can be largely met by non-fossil sources, leaving coal to meet the remaining electricity needs and provide system adequacy, with utilisation rates on a gentle downward trajectory as clean

energy expands. The rising share of renewables in the generation mix, combined with their weather-dependent variability, will significantly influence coal-fired generation, requiring greater flexibility and faster ramping capabilities. This challenge is compounded by strong electricity demand growth of more than 27% between 2025 and 2030, reinforcing coal's role as a strategic balancing resource despite declining baseload operation. Structural indicators signify that national coal consumption for power generation is expected to stabilise into a prolonged plateau during the 2030s. Within that, thermal coal for power shows limited growth potential, with coal-for-power demand in 2030 expected at 3 026 Mt, broadly down 2% from 2025, depending on the interplay between renewable output, electrification and the pace of flexibility retrofits.

Increasing weather impact on coal demand

The growth in electricity consumption in China and the rapid pace of renewable capacity additions remain key drivers of structural change in coal demand for power generation. China is forecast to deploy nearly 500 GW of renewable energy capacity in 2025 and is planning to reach a total of 4 700 GW by 2030, reinforcing its position as the world's largest market for renewables. Following this deployment, renewables are expected to supply 35% of electricity demand in 2025 and are planned to reach almost 50% in 2030, significantly reducing reliance on coal-fired generation.

Daily, weekly, monthly and yearly variations in renewable generation significantly affect coal-fired power generation and, consequently, coal demand. Our calculations for load factors are based on historical average weather conditions, but variations in precipitation, wind speed and solar irradiation will have an increasing impact on the balance of electricity production as the share of renewables grows. Electricity demand also remains weather-dependent due to events such as cold snaps and heatwaves. All these factors influence the utilisation of coal-fired power plants, which typically act as the marginal and the fallback electricity supplier in China.

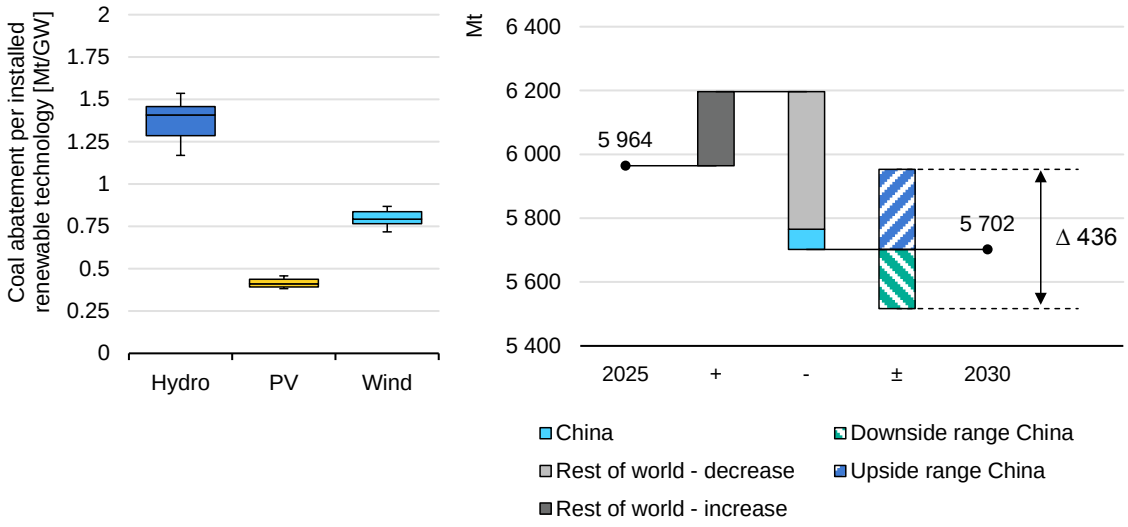
To illustrate the impact of weather-driven variability, historical data show that hydropower in China has a spread of about 10 percentage points between its minimum and maximum load factors over the past decades, while wind and solar fluctuate within narrower ranges (± 2 percentage points for wind and ± 1 percentage point for solar PV). Each additional gigawatt of integrated renewable capacity of hydro, solar PV and wind has the potential to displace coal use on average by about 1.4 Mt, 0.4 Mt and 0.8 Mt respectively.

When renewable load factors are lower than average, in a system dominated by coal power like China, coal must compensate almost entirely. Given China's substantial renewable capacity, these fluctuations significantly affect coal

consumption. Under the strongest combined performance of hydro, wind and solar observed over the past 20 to 30 years, coal consumption for power generation could decline by 188 Mt, while the weakest performance could increase coal consumption by over 248 Mt. This is comparable to the forecast total global coal demand decline for power generation until 2030.

Beyond weather variability, the integration of planned renewable capacity additions will be a decisive factor for coal demand in China. Ensuring that these resources are effectively connected and supported by adequate grid capacity and system flexibility will determine whether the expected coal abatement materialises. Without sufficient integration measures, the structural shift in China's power mix could fall short of its potential, leaving coal as the main balancing source.

Load factor of renewables and effect on global coal consumption for power generation



Notes: (left) Hydro load factor based on 1990-2024 data; PV and wind load factors based on 2000-2024 data. The top and bottom edges of the boxes represent the 75th and 25th percentiles, respectively. The lines inside the boxes represent the medians; (right): Hypothetical coal use represents volumes that would be consumed without the additional integration of renewables. We assume coal consumption of 0.54 Mt per TWh of electricity.

Diverging trends shape non-power coal demand growth

In 2025, China's coal consumption for non-power uses is estimated at 1 859 Mt, accounting for 38% of total coal consumption. Long-standing efforts to replace coal with gas and electricity in small industry and residential heating have significantly reduced coal use across sectors such as food and textiles. Consumption in these segments is expected to continue declining as the transition away from coal progresses.

Cement production, historically the largest industrial consumer of thermal coal, faces structural headwinds. Switching to alternative fuels remains difficult because fuel costs represent a high share of total production costs. Cement output peaked in 2020 and has been falling since then, by 6.2% year-to-date in 2025, reflecting weakness in construction activity and a prolonged downturn in real estate. This contraction is likely to further reduce coal demand for building materials throughout the forecast period.

By contrast, the chemical industry has become the anchor of thermal coal growth, as shown in the next section.

Looking ahead, we forecast total coal consumption for non-power purposes to decline slowly through to the late 2020s, reaching 1 741 Mt in 2030. Chemicals will continue to expand their share of the non-power mix, while coal demand for cement and steel declines structurally.

China's coal-to-chemicals sector – an uncertain expansion

Coal conversion in China refers to the transformation of coal into other products through processes such as gasification and liquefaction. The main routes include: coal-to-liquids, which produces fuels like diesel and gasoline either through direct hydrogenation or indirectly via synthesis gas and the Fischer-Tropsch process; gas works, which generate synthetic natural gas and fertilisers using coal-derived synthesis gas; and coal-to-chemicals, which converts coal into synthesis gas for products such as methanol and ethylene glycol. These technologies have historically been pursued to reduce reliance on oil and gas – mostly imported – and to utilise domestic coal resources, but they remain energy- and water-intensive and emit significant CO_2.

Coal-to-chemicals remains a major driver of coal demand in China due to the scale of its domestic chemical production. The country's methanol and ammonia outputs are predominantly coal-based, with around 85% of production relying on coal rather than natural gas. This results in substantial coal consumption to sustain chemical manufacturing, particularly as China accounts for over 32% of global ammonia output and nearly half of global methanol supply. Consequently, approximately 27% of global ammonia and over 38% of global methanol production is derived from Chinese coal, underscoring the central role of coal conversion in meeting both domestic and international chemical demand.

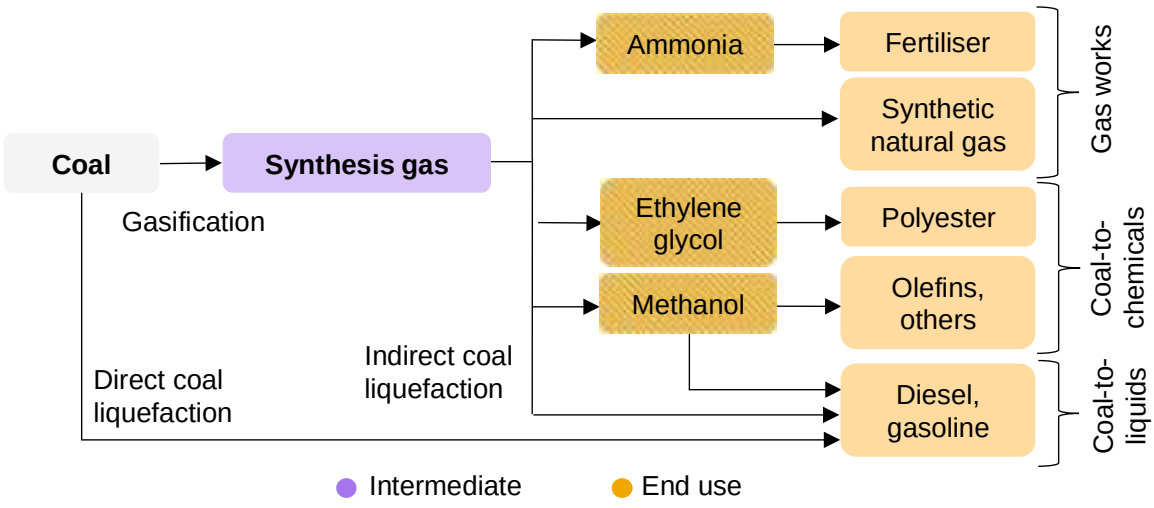
Coal conversion projects have been announced in several provinces across China: Inner Mongolia, Shanxi and Liaoning, to mention but a few. However, Xinjiang leads the efforts to develop coal-to-chemical projects, based around two hubs: Zhundong and Hami. Although it is difficult to follow up individual

projects, announcements include a variety of technologies, with final products from methanol, liquid fuels and synthetic natural gas (SNG) to olefins, ethylene glycol and poly-glycolic acid (PGA). As of October 2025, over 20 projects under construction were identified in Xinjiang, including 9.4 Mtpa of olefins, 34 bcm of SNG and 7 Mtpa of synthetic liquid fuels. This could represent over 165 Mt of additional coal consumption over the forecast period.

In 2025, the sector is pushing to integrate low-carbon solutions and hydrogen technologies to address the challenges of reducing CO_2. The most notable developments are in coal-to-chemicals, particularly methanol production. Foran Energy and Towngas announced plans to acquire ECO Chemical Technology to create an integrated value chain combining coal chemistry and hydrogen applications. Henan Xinlianxin is retrofitting an existing coal-based methanol plant in Jiangxi to produce 30 000 tpa of biomethanol using corn straw blended with coal, aiming for 70% greenhouse gas savings compared with the original design.

China's National Energy Administration launched a Hydrogen Pilot Programme requiring trials to substitute renewable hydrogen for fossil hydrogen in coal gasification processes, with projects mandated to use at least 1 000 tpa of renewable hydrogen. In November 2025, Datang Group announced commercial operation of the first coal-to-chemical plant using green hydrogen produced from wind and solar PV electricity. These initiatives indicate a shift towards integrating biomass and hydrogen into coal conversion routes, which will reduce coal consumption in chemical production.

Key process routes of the coal conversion sector in China



Recovery in 2025 masks structural decline in China's met coal demand

China's met coal consumption is estimated to reach 742 Mt in 2025, marking a recovery from the decline seen in 2024. This accounts for approximately two-thirds of global met coal use and 15% of China's total coal consumption. The majority of this met coal (around 88%) is coking coal, primarily converted to coke for use in blast furnace-based pig iron production and other industrial processes, while the remaining 12% is PCI coal, used to reduce coke consumption.

In 2025, pig iron production is expected to remain subdued due to weak demand from the real estate and infrastructure sectors, which continue to face structural headwinds. Although steel demand is gradually shifting towards machinery and manufacturing, this transition is not sufficient to offset the decline in infrastructure. Despite the pressure from electric arc furnace (EAF) production and lower steel output, coke output is expected to increase in 2025 and hence coking coal consumption is set to rise by 2%. Nonetheless, high inventories and weak spot demand for coking coal were reported this year, reflecting the broader slowdown in steel sector activity.

Met coal demand is forecast to decline steadily through to 2030, falling to 665 Mt, driven by the gradual shift towards EAF steelmaking, carbon neutrality targets, and stricter controls on steel and coke production capacity. While EAF adoption is constrained by scrap availability, costs and the need to depreciate existing BOFs, its share is expected to grow, reducing reliance on coke-intensive BOF processes. As a result, the share of met coal in China's non-thermal coal consumption is expected to decline over the forecast period.

India

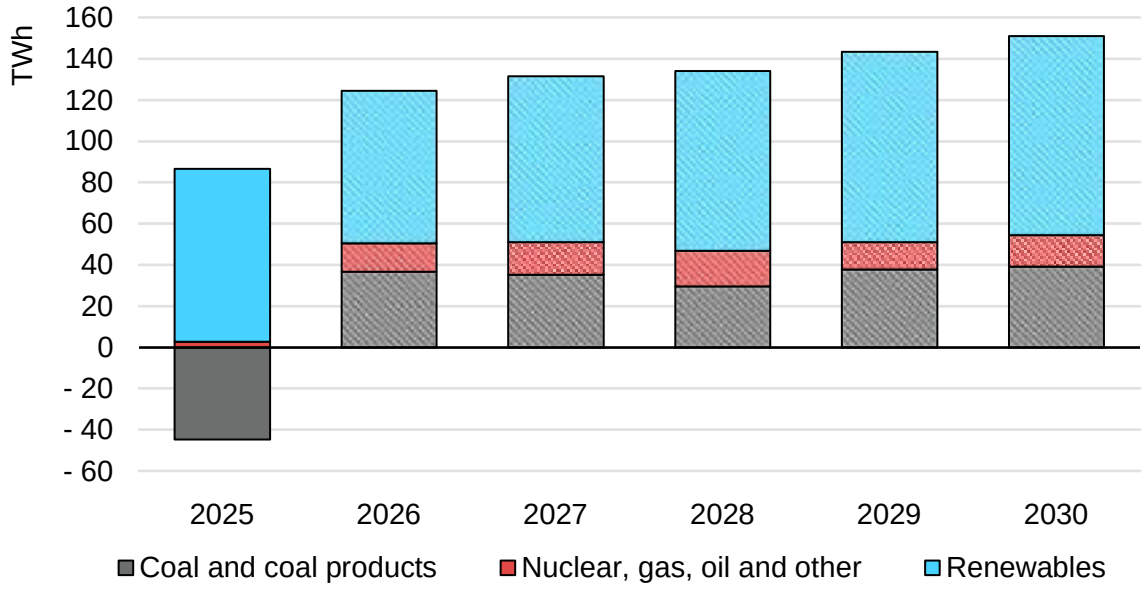
India's coal demand growth shifts towards industry in 2025

India remains a key driver of global coal demand, although total consumption in 2025 is expected to see a slight y-o-y decline of 1.2%, falling by 16 Mt to 1 297 Mt. This marginal decrease is primarily the result of a 3% drop in coal-fired power generation, driven by increased hydropower output and reduced electricity demand for cooling, alongside the continued expansion of renewable energy capacity. Despite this, coal remains a central pillar of India's electricity system. We estimate India's coal consumption for power generation in 2025 to be 940 Mt, approximately 73% of its total coal consumption. As of August 2025, India's total installed power generation capacity stood at 495 GW, including 223 GW of coal-fired capacity (plus around 30 GW of captive coal-fired power plants), 123 GW of

solar PV, 52 GW of wind and 42 GW of hydropower, plus smaller figures for gas, nuclear and others. While the government continues to expand non-fossil generation capacity in line with its 500 GW target for 2030, in 2025 India commissioned or began trial operations at 20 new coal-fired power plants totalling 14 GW, with additional capacity under construction.

Despite these additions, coal's share of the electricity mix is projected to decline from 70% in 2025 to 60% by 2030, as renewable and nuclear power generation continue to grow. Electricity demand is anticipated to increase slightly in 2025, offset by higher hydropower output due to an early and prolonged monsoon season, as well as continued growth in solar and wind generation. Although coal-fired power generation declines in 2025, a moderate increase in coal consumption for power generation is nevertheless expected for the forecast period due to steady rise in electricity demand.

Annual change in power generation by source in India, 2024-2030



Non-power coal demand has been the source of growth in 2025. Industrial coal use is supported by robust infrastructure development and steady expansion in the cement and steel sectors. India, the world's second-largest cement market, expects cement demand to grow by 5-6% in 2025, and demand is projected to remain elevated over the medium term, supported by capacity expansion among major producers such as Ultratech, Adani and Dalmia. Cement makers have increasingly shifted from petroleum coke to thermal coal due to favourable pricing and tax reforms: the goods and service tax (GST), which petroleum coke is subject to, has been increased from 5% to 18%, with the potential to offset through input

tax credits, while the coal cess of INR 400/t, a tax imposed on coal to finance environmental initiatives, has been removed.

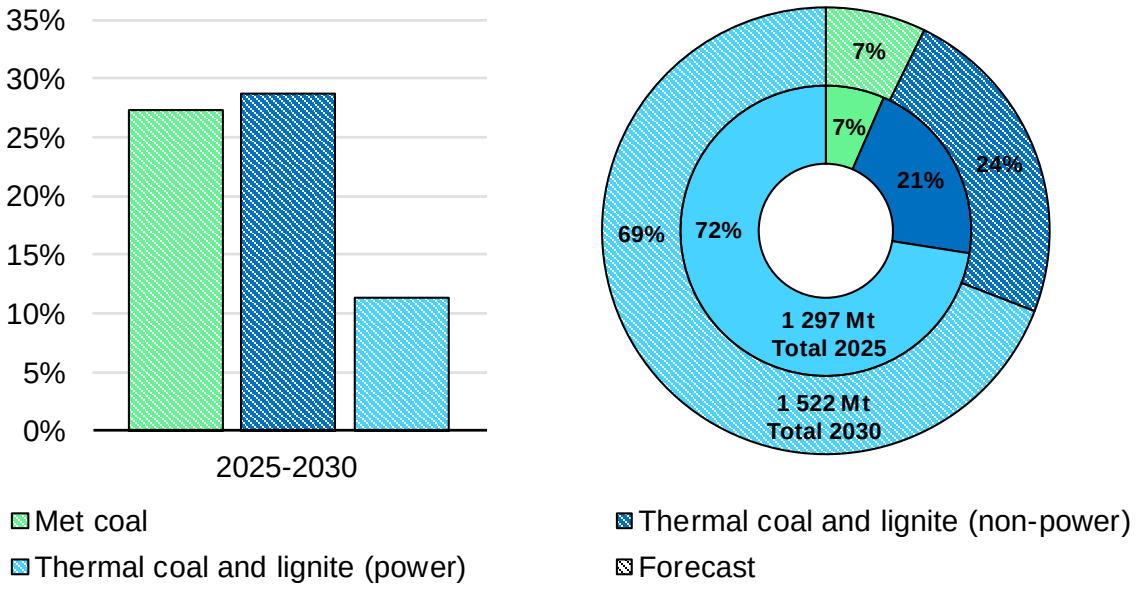
Steel production, particularly through coal-based DRI, also supports thermal coal demand. In 2025, projects such as Jindal Steel and Power's 2 Mtpa coal-to-DRI facility in Odisha have received government incentives to strengthen their capacity under India's national coal gasification strategy, which promotes the use of coal gasification to produce syngas for DRI in steelmaking applications. In addition, met coal demand is expected to rise to 85 Mt[2], supported by strong growth in steel production and the commissioning of new blast furnaces. This trend reinforces coal's role in India's industrial expansion and underlines the importance of both thermal and met coal in meeting rising material demand.

India's coal policy continues to evolve. The government has launched a coal exchange to improve market transparency and efficiency, aiming to modernise the sector and reduce excessive reliance on long-term contracts. At the same time, India is pursuing coal gasification as a strategic priority, targeting 100 Mtpa of coal gasification by 2030, supported by financial incentives totalling USD 1 billion and the launch of early-stage projects. Following government support, some big companies like GAIL, CIL, Adani and Jindal have shown interest in investing in coal gasification. In November 2025, the government announced a further USD 6 billion to support coal gasification. However, we need to be cautious as to the effects of this given the uncertainty about the technological feasibility of high-ash coal gasification and the economics of the different processes. As a result, we estimate non-power coal consumption reaching 356 Mt in 2025 and growing to 470 Mt by 2030, driven by industrial activity and fuel switching in key sectors.

Overall, India's coal demand is expected to grow by 17% through to 2030 to a level of 1 522 Mt. Coal demand in the electricity sector continues to rise, but is being slowed by the increasing use of renewables, with the result that non-power coal is achieving a higher share of total coal demand and playing a critical role in India's industrial growth until 2030.

[2] Coking coal in India used for thermal purposes is classified as thermal coal in this report

Outlook period change and share of total demand by type and use in India, 2025-2030



North America

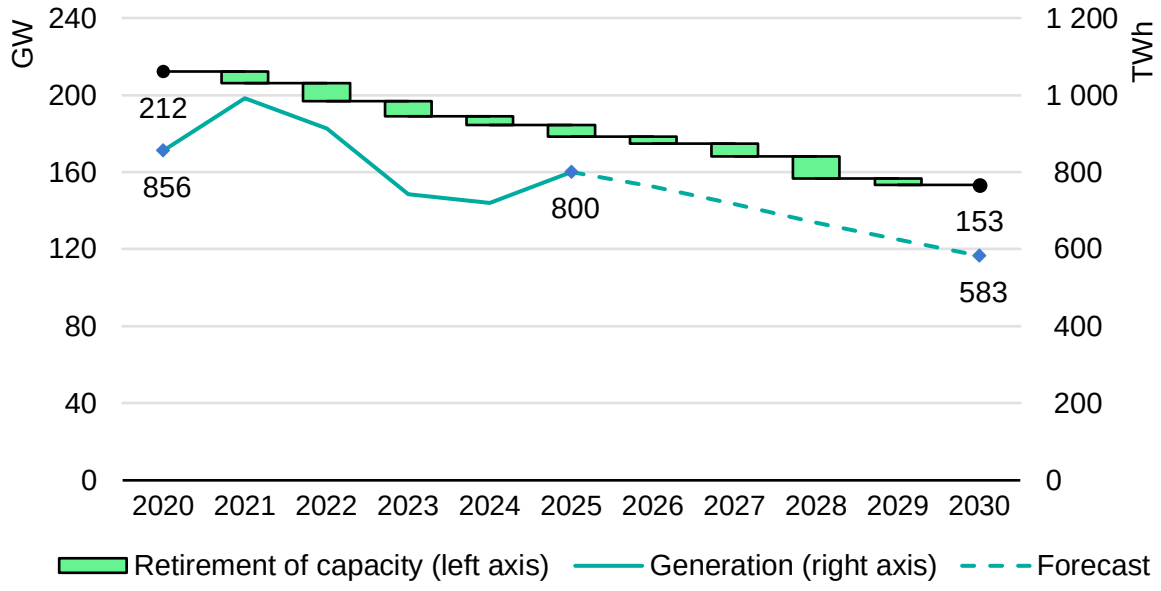
US coal decline slows amid policy support and higher electricity demand

In the United States, coal demand is projected to reach 410 Mt in 2025, with power generation continuing to account for the majority of consumption. Coal-fired generation is expected to deliver around 800 TWh, corresponding to about 17% of the electricity mix. This represents a stronger outcome than previously anticipated, supported by federal interventions, higher gas prices and weather conditions. The US Department of Energy (DOE) made use of emergency powers to keep coal-fired units available beyond scheduled retirement in order to safeguard system reliability.

The policy environment has shifted in favour of coal in the near term. Recent executive actions have reaffirmed coal's role in national energy security, directing agencies to accelerate permitting and reduce regulatory barriers, while the Department of the Interior (DOI) has expanded leasing opportunities on federal lands. These measures complement the joint US DOE, Environmental Protection Agency and DOI USD 625 million programme to modernise existing coal plants and reopen shuttered capacity, alongside the release of additional acreage for new leasing. Basin Electric Power Cooperative has received funds to study the feasibility of building a new coal-fired power plant in the United States, which

would be the first new plant in more than a decade. Together, these steps signal a clear intent to maintain coal's availability during a period of rapid load growth and infrastructure stress.

Coal-fired generation and capacity in the United States, 2020-2030

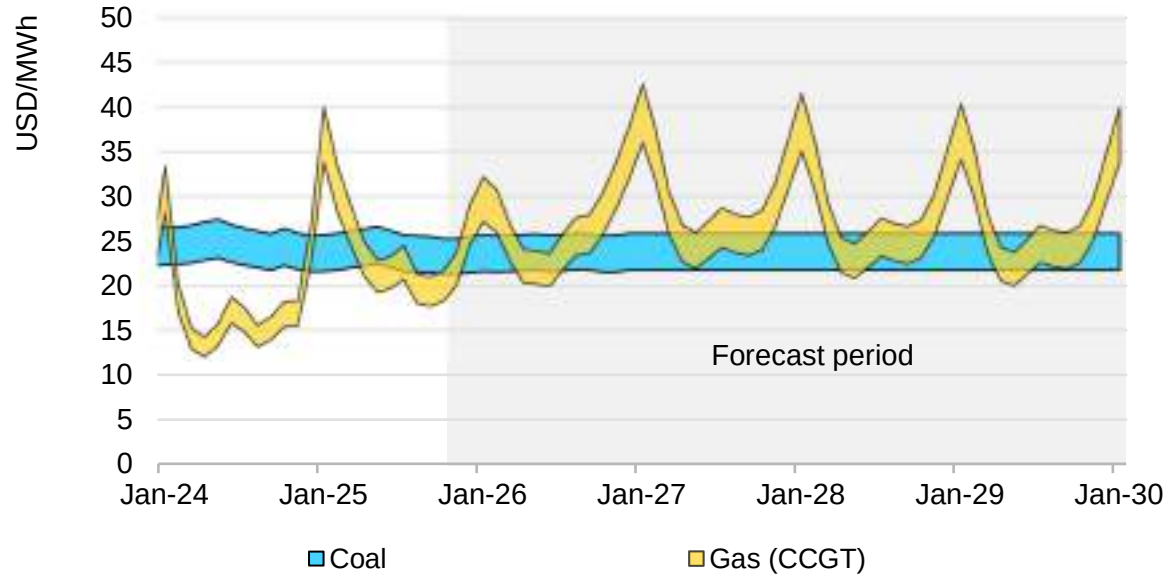


Notes: Capacity values for 2025 to 2030 are based on announced retirements. 2020 aggregated capacity is based on operational capacity in 2025 and retirements and commissions between 2020 and 2025. Retirements after 2025 are planned retirements.
Sources: IEA analysis based on EIA (2025), Electric Power Monthly, EIA (2025), Coal Data, and IEA estimates.

Planned retirements have slowed markedly. Latest reports of capacity to be retired in 2025 total 6.2 GW, well below earlier projections of 15 GW. However, as of September 2025 less than 2.5 GW had been retired, so the final figure could be even smaller. Several utilities, including Duke Energy and Santee Cooper, have extended the operational life of major coal units into the 2030s, citing concerns over electricity supply reliability and rising demand from industrial activity and data centres. Multi-year procurement contracts, such as those issued by AEP and LG&E for deliveries through to 2030, further underscore confidence in coal's medium-term role. Nevertheless, coal capacity is forecast to decline from 172 GW as of July 2025 to a level of 153 GW in 2030.

Short-term dispatch remains highly sensitive to weather and relative fuel prices. In the PJM transmission region, coal output rose by almost 18% y-o-y in September, while in the MISO region coal's share of the power supply reached around 30% in August, reflecting elevated gas prices and subdued wind generation.

Marginal coal- and gas-fired power generation costs in the United States, 2024-2030



Notes: CCGT = combined-cycle gas turbine. CCGT net efficiency = 49-58%. Coal net efficiency = 35-46%. Future gas price estimates are HH futures scaled with historical delivery price for gas-fired power generation.

Sources: IEA analysis based on Argus Media Group (all rights reserved) and IEA estimates.

Looking ahead, coal demand for power generation is expected to decline gradually after 2026, falling to 277 Mt by 2030, as renewable capacity expands. However, the outlook remains uncertain. While coal prices are projected to remain broadly stable through to 2030, natural gas prices are expected to rise modestly, driven by sustained US LNG exports. Seasonal peaks in gas demand during winter could widen the coal-gas spread, prompting higher coal dispatch in cold periods. Policy developments add further uncertainty: recent executive orders and the DOI's leasing initiatives, combined with the DOE's emergency authorities, could delay retirements and sustain coal availability longer than previously assumed.

Non-power coal consumption accounts for 7% of US coal demand and is mainly coking coal used for steelmaking. This is not expected to change significantly in the period to 2030, as the transformation of blast furnaces into production with a lower CO_2 footprint is often facing economic hurdles. Announced technology pilots and limited industrial applications, such as in fertiliser production, may proceed, but their aggregate impact on demand is likely to remain marginal within the forecast horizon.

Europe

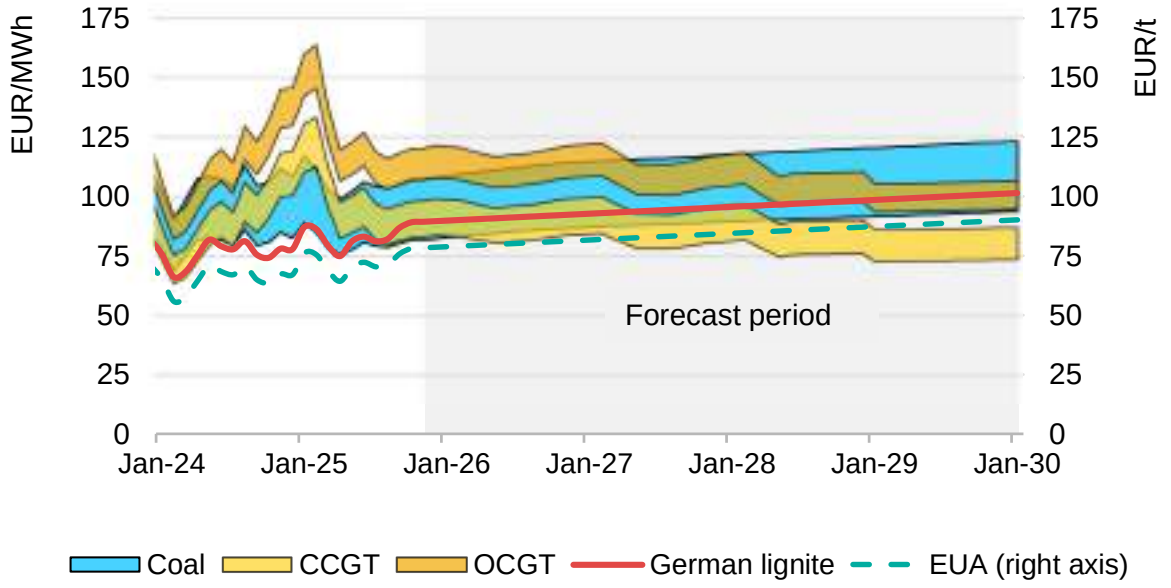
Coal demand in the European Union declines as more countries phase out coal

Following the temporary rebound during the 2022 energy crisis, coal demand in the European Union in 2025 continues its structural decline, driven by rising carbon costs, rapid renewables deployment and national coal phase-out commitments. Total EU coal consumption is estimated at 306 Mt in 2025, with coal-fired generation supplying around 10% of electricity. While overall EU coal demand is falling, power sector coal demand remains roughly stable at 224 Mt, counteracting this trend despite earlier forecasts of a decline, owing to higher gas prices and wind droughts during the first half of 2025. The ongoing downward trend is reinforced by record low coal use overall and the reconfiguration of generation fleets, even as some member states retain coal-fired capacity for security of supply reasons.

Policy developments and market dynamics are closely intertwined. Germany, whose coal-fired power generation increased by 7% in the first half of 2025, has signalled that it may pause additional coal-fired plant closures until new gas capacity is available, while Romania is negotiating to delay its coal exit to 2030, citing high power prices and delays to gas projects. Poland has secured capacity payments for 7 GW of coal units until 2026, ensuring short-term adequacy. Since the Paris Agreement in 2015, six EU countries have already phased out coal power. During 2025, Ireland completed its exit by converting its last coal plant, Moneypoint, to heavy fuel oil and Slovakia also phased out coal. After 2025, eight countries – including France, Denmark and Greece – plan to phase out coal by 2030 or before, while seven more countries, including Germany, are targeting post-2030 exits. Poland has no official phase-out date and states that its coal mining will continue until 2049.

Fuel economics may further accelerate the transition in the European Union. Gas prices in Europe are expected to stabilise at lower levels as an LNG glut depresses TTF hub prices. Unlike the United States, where domestic production virtually meets all the demand, Europe's high import share and low indigenous output mean seasonality is more closely linked to demand, so electricity and heat demand could drive gas prices up or down. Coal prices remain relatively stable, but expectations of higher CO_2 costs towards 2030 erode coal's competitiveness against gas. This dynamic increasingly favours gas-fired technologies: CCGTs maintain a clear advantage on clean spark spreads, while power generation from lignite can be more competitive under higher gas prices. The trend of higher effective costs for coal-fired versus gas-fired plants persists, reinforcing the economic case for an accelerated coal phase-out.

Marginal coal- and gas-fired power generation costs in the European Union, 2024-2030



Notes: EUA = European Union Allowance; CCGT = combined-cycle gas turbine; OCGT = open-cycle gas turbine. CCGT net efficiency = 49-58%. OCGT net efficiency = 40-45%. Coal net efficiency = 35-46%. Lignite net efficiency = 39%.
Sources: IEA analysis based on Argus Media Group (all rights reserved) and IEA estimates.

Non-power coal use in the European Union is projected to be 83 Mt in 2025, with demand projected to decline towards 68 Mt by 2030 as electrification and alternative fuels gain traction. Large energy-intensive firms continue to cut metallurgical coal consumption, replacing it with low-carbon options. These developments, combined with the rapid expansion of renewables and the tightening of carbon policies, point to a steep decline in coal's role in the EU energy mix.

By 2030, coal's share of EU power generation is expected to fall to 4%, with total EU coal consumption declining to 153 Mt. Overall, structural economics and policy commitments point to coal's near-complete exit from the EU power mix early in the next decade.

Coal demand in other European countries remains more resilient amid a slower transition

Coal demand in other European countries in 2025 remains significant, even as structural pressures begin to reshape the market. Total coal consumption here is estimated at 177 Mt, with coal-fired generation supplying around 16% of electricity. Overall coal demand in the region is broadly stable year-on-year. The Western Balkans continue to rely on lignite for baseload, although ageing assets and integration with EU markets are reducing load factors.

Türkiye remains Europe's largest coal-fired power generator outside the European Union, with total coal consumption near 115 Mt in 2025, declining by 5 Mt from the 2024 level. Phase-out commitments remain limited: Türkiye has no official exit date, maintaining coal fleets for adequacy and market reasons, while Western Balkan countries are gradually tightening environmental standards without formal timelines. Türkiye plans to introduce its own domestic emissions trading system in 2026-2027 as a pilot phase, applying carbon intensity caps to sectors such as power, cement and steel to align with the EU Carbon Border Adjustment Mechanism (CBAM). While initial carbon prices may be low, any additional cost of carbon could significantly reduce coal burn in power generation and industry. However, the government has introduced a tariff incentive for domestic consumption, which will strengthen the economics of lignite plants and lead to the blending of some domestic lignite with imported coal in plants designed to use imported coal.

Non-power coal use outside the European Union is projected to be 31 Mt in 2025 and to remain broadly stable through to 2030. Industrial decarbonisation is progressing more slowly than within the European Union, with limited substitution of met coal in heavy industry. These factors, combined with slower renewable deployment and weaker carbon policy frameworks, point to a more gradual decline in coal's role in non-EU European energy systems.

By 2030, coal demand in other European markets is projected to fall to 135 Mt, with Türkiye expected to remain near 90 Mt and Western Balkan lignite use reduced but still significant. While structural economics and policy commitments drive rapid change within the European Union, other European markets maintain residual coal capacity well into the next decade.

Other Asia Pacific

Indonesia and Viet Nam anchor rising coal demand in ASEAN countries

Coal consumption in ASEAN countries is forecast to reach around 516 Mt in 2025, an increase of about 4% compared with 2024. Electricity generation remains the dominant driver, accounting for roughly three-quarters of total demand. Indonesia continues to lead regional consumption, representing nearly half of the total, followed by Viet Nam, the Philippines, Malaysia, Thailand and Lao PDR.

Strong economic growth across the region and the commissioning of new coal-fired power plants underpin this expansion. Industrial activity and rising electricity demand in Indonesia are the main contributors to the increase. Looking ahead, coal demand in ASEAN countries is expected to grow by about 5% annually,

reaching close to 643 Mt by 2030. Indonesia is projected to account for over 56% of this growth, while Viet Nam and the Philippines also see steady increases linked to power sector development. In the case of Viet Nam, growing industry is also a contributing factor.

Coal consumption in Indonesia is forecast to reach around 266 Mt in 2025, supported by sustained population growth, expected economic expansion of 5% and electricity demand rising by 7%. Grid-connected additions and captive power at industrial parks continue to lift coal-fired generation, while industrial coal use expands alongside economic growth, in particular for nickel processing.

Nickel processing continues to underpin coal demand through both direct use in rotary kiln-electric furnace (RKEF) smelters and electricity supplied by captive coal-fired power plants. High-pressure acid leach (HPAL) facilities also add to on-site steam and power needs. Indonesia is a major producer of Class 2 nickel (nickel content < 99.8%) and is expanding its Class 1 (nickel content > 99.8%) capacity to serve battery supply chains. Beyond nickel, aluminium smelting capacity is also scaling up, notably in North Kalimantan, adding around 30 TWh of baseload electricity requirements and reinforcing reliance on coal generation in the near term.

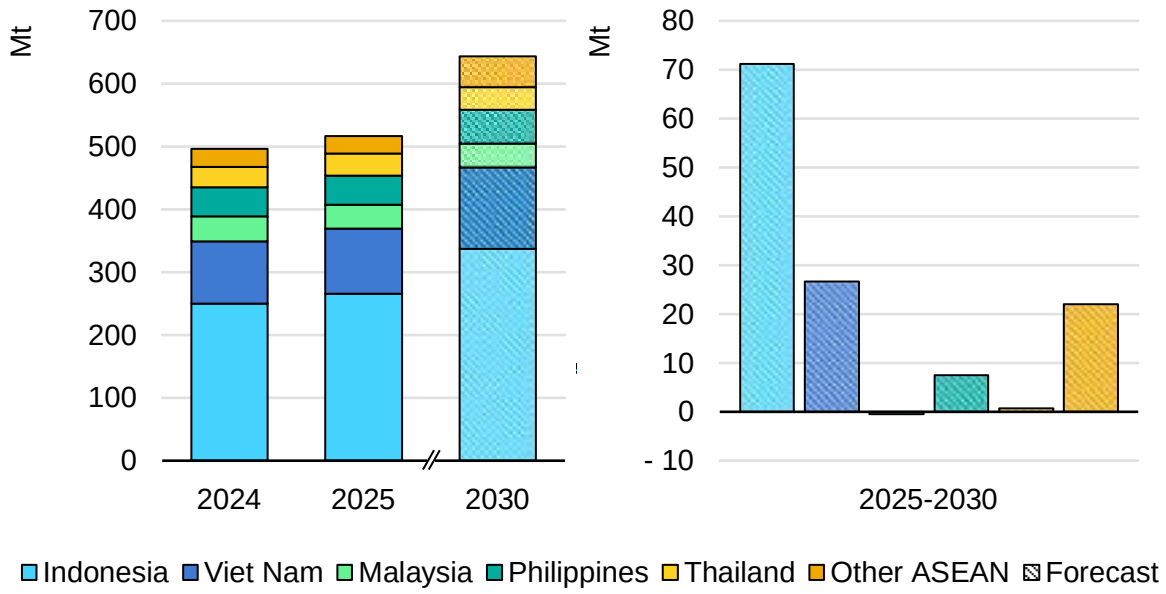
Net coal-fired power capacity is set to increase through a combination of grid-connected units already in the pipeline and captive plants serving smelters and industrial parks. Energy policy discussions have intensified around security of supply, affordability and orderly transition pathways. Via the government-owned corporation PLN, the authorities have increased the coal procurement price cap and enforcement mechanisms to secure domestic coal availability and sustain investment in upstream and logistics. In parallel, the late-2024 announcement to phase out coal power by 2040 provides a long-term signal; however, its impact on demand through to 2030 is limited, given project lead times, locked-in industrial loads and the commissioning schedule for new units.

We expect coal use in power generation to remain the principal driver of growth in 2025, complemented by increasing industrial demand from nickel and aluminium smelting. Indonesia is accelerating the development of coal gasification initiatives (e.g. coal-to-DME) as part of a broader strategy to strengthen energy security and reduce dependence on imported oil products and LPG. This push may increase coal demand in the medium term if projects materialise. Based on policies in place and project pipelines, Indonesia’s coal demand is projected to rise to 337 Mt by 2030, with power and metals processing accounting for the bulk of incremental volumes. Coking coal consumption, both to meet demand from the domestic steel industry and for coke exports, is forecast to increase by over 60% through to 2030. This trajectory positions Indonesia as the largest coal consumer in ASEAN and on track to become the third-largest globally.

Coal demand in Viet Nam is projected to reach 103 Mt in 2025, supported by strong economic growth of around 6% and rising electricity consumption, which is expected to increase by 4%. The 8th National Power Development Plan (PDP8) outlines the significant expansion of renewable energy and LNG import capacity, yet coal remains essential for baseload generation and system reliability, particularly as seasonal hydropower variability persists. While renewable deployment accelerates, a glut of LNG supply is emerging, although utilisation rates are constrained by infrastructure and pricing challenges. Coal-fired power generation output is expected to rise to 154 TWh in 2025 to meet peak demand and industrial loads. Industrial coal demand is also increasing, which requires both coking coal and thermal coal for heat and steam production. Policy discussions focus on balancing energy security, affordability and decarbonisation, with PDP8 signalling a gradual shift away from coal beyond 2030, although near-term reliance remains strong. Coking coal demand is underpinned by blast furnaces under construction with a capacity totalling over 6 Mtpa, implying 4 Mtpa of additional coking coal demand. On current trends, coal demand is forecast to rise steadily through the decade, reaching 130 Mt by 2030, with power generation accounting for the majority of growth and industry providing additional support.

Coal demand in Southeast Asia outside Indonesia and Viet Nam remains shaped mainly by power generation needs. In the Philippines consumption is forecast to be 47 Mt in 2025 and projected to reach 54 Mt by 2030, driven by strong economic and population growth alongside rising electricity demand of 27% over the forecast period. While renewable deployment accelerates, coal-fired generation continues to provide baseload supply. Malaysia's coal use is expected to be 38 Mt in 2025 and remain stable towards 2030. Tenaga Nasional Berhad, Malaysia's largest electricity utility company, prioritises renewable energy expansion while honouring existing PPAs with coal-fired power plants and complies with its long-term strategy to phase out coal. In Thailand, coal demand is forecast to be 35 Mt in 2025 and at the same level in 2030, as higher electricity demand and the extension of the Mae Moh lignite plant sustain output despite renewable additions and LNG availability. In Lao PDR, coal-fired generation is primarily export-oriented, with the Hongsa power plant supplying Thailand and new projects in Xekong and other provinces targeting Cambodia and Viet Nam, reinforcing regional interconnections and supporting coal demand at 18 Mt in 2025. Across these markets, coal remains a critical component of power systems through to 2030, even as policy frameworks signal longer-term diversification.

Development and forecast change in coal consumption in ASEAN countries, 2024-2030



Asia Pacific's mature economies enter structural decline in coal consumption

Coal demand in the advanced economies of the Asia Pacific region – Japan, Korea, Australia and Chinese Taipei – is projected to total just over 412 Mt in 2025, with the majority used for power generation. However, structural changes in energy policy, rising renewable and nuclear capacity, and increasingly competitive LNG pricing are driving fuel switching away from coal. A global LNG supply glut expected from 2026 onward is likely to exert downward pressure on prices, particularly benefiting Asia Pacific countries without access to pipeline gas that rely heavily on LNG imports. This shift is poised to reduce coal demand in these markets over the coming years.

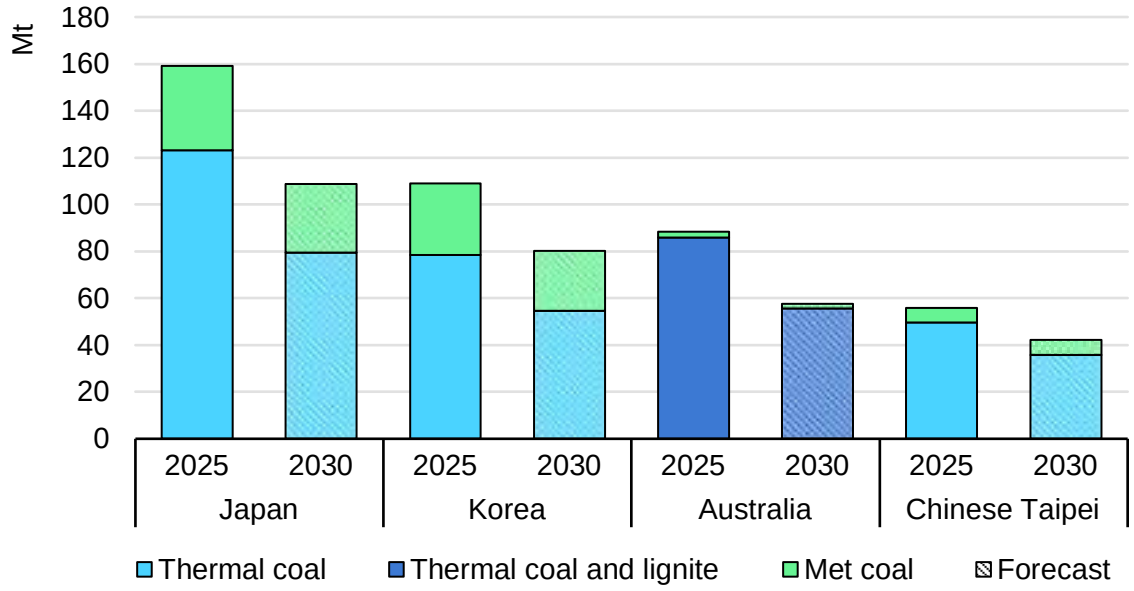
In Japan, coal consumption is projected to decline slightly to 159 Mt in 2025 y-o-y. This comprises a 3 Mt reduction in non-power sectors, which is offset by an increase of 2 Mt in power generation. The downward trend in coal use for steelmaking continues, with non-power coal demand expected to fall by over 21% to 49 Mt by 2030. While electricity demand has been broadly flat since 2010, future growth is anticipated due to electrification of end-use sectors, reshoring of semiconductor manufacturing and expansion of data centres. Despite this, coal-fired generation is expected to decline as older, less efficient coal plants are phased out and replaced by nuclear restarts and renewable sources. Japan's 7th Strategic Energy Plan, announced in 2025, reinforces the goal of carbon neutrality by 2050 and sets a course for reducing coal-fired generation by 37% by 2030, resulting in forecast coal demand of 109 Mt by the end of the decade.

Korea's coal demand is expected to fall to 109 Mt in 2025, a decline of 6 Mt compared with 2024, driven primarily by reduced coal use in the power sector. Although electricity demand is projected to grow slightly through to 2030, coal-fired generation is expected to decline by over 31% from 2025 levels, replaced by increased nuclear and renewable output. Nearly half of Korea's coal-fired units are planned for conversion to LNG by the mid-2030s. Transmission constraints on the east coast – where four coal plants and two nuclear plants share a congested line – are limiting the output of those coal plants (4 GW) to 25% of their capacity until 2026. Met coal demand is also expected to decline, with total coal consumption projected to fall by over 29 Mt to a total of 80 Mt by 2030.

In Australia coal consumption is projected to decline from 90 Mt in 2024 to 87 Mt in 2025, driven mainly by reduced coal demand in the power sector. Non-power coal use accounts for 7% of total coal demand, making it a relatively minor component. Electricity demand remained stable between 2024 and 2025, but coal-fired generation is being displaced by renewables. This trend is expected to continue, with coal consumption forecast to fall by over 30 Mt by 2030, supported by deeper renewable integration and a modest increase in gas-fired generation.

Chinese Taipei is expected to see electricity demand grow by over 6% over the next five years, with the increase projected to be met primarily through expanded renewable capacity. As of May 2025, the country had completed its nuclear phase-out, shutting down its final reactor. Despite the nuclear exit, coal-fired generation is forecast to decline by over 29% by 2030, in line with environmental targets. The Taichung power plant (5.5 GW), one of the world's largest coal-fired stations and consisting of ten units, may retire three units before 2030. Overall, our forecast shows a reduction in coal demand for power generation to 31 Mt from 44 Mt in 2025. Met coal demand is expected to remain stable, with total coal consumption projected to fall to 42 Mt by 2030.

Coal consumption by grade in selected mature Asia Pacific economies, 2025 and 2030



Rising utilisation and domestic resource strategies drive coal demand in South Asia

Coal demand in South Asian economies outside India remains shaped by power generation needs and industrial activity, with Pakistan and Bangladesh accounting for the largest share. These countries were heavily affected by high energy prices in 2022, which led to energy shortages and constrained imports. While prices have since eased, coal continues to play a critical role in meeting rising electricity demand and supporting economic growth, even as policy frameworks signal longer-term diversification.

In Pakistan coal demand is estimated to be 27 Mt in 2025, supported by strong summer power demand and competitive coal prices that encouraged higher utilisation of coal-fired plants. Generation from coal reached multi-year highs in mid-2025, with imported and domestic coal plants running at elevated levels. At the same time, domestic lignite from the Thar field is gaining importance and infrastructure projects to improve inland coal logistics are advancing. However, the power sector in Pakistan has been reshaped by the extraordinary deployment of solar PV in recent years. Policy signals point to a structural shift: Pakistan has reiterated its intention to phase out imported coal by 2030, while signing agreements for coal gasification projects to leverage local resources, although it remains unclear whether these projects will be implemented. Despite these changes, coal demand is projected to rise gradually, reaching 31 Mt by 2030, as existing capacity operates at higher utilisation rates and lower-grade lignite replaces imported coal.

Bangladesh entered 2025 with around 5 GW of recently added coal-fired power plant capacity, including large plants at Rampal and Banshkhali and two operational units at Matarbari. The government has revived plans for a second phase at Matarbari and approved development of a deep-sea port to facilitate coal imports, which will reduce logistics bottlenecks and lower generation costs. These steps signal that coal will remain part of the country's energy mix throughout the decade, even as LNG imports continue to rise and gas remains the dominant fuel. Coal consumption is projected to increase from 17 Mt in 2025 to 25 Mt by 2030, contingent on financing stability and operational reliability.

Across these markets, coal remains a critical component of power systems through to 2030, even as policy ambitions to reduce import dependency and environmental pressures reshape supply chains. Combined demand in Pakistan and Bangladesh could reach 56 Mt by 2030, up from 44 Mt in 2025, reflecting incremental capacity utilisation and system adequacy needs.

Africa

South Africa anchors Africa's coal demand

Africa's coal consumption in 2025 is expected to increase slightly, driven mainly by operational improvements and capacity additions in South Africa, while Morocco maintains stable coal use and Zimbabwe records a modest rise from a small base. South Africa remains the dominant player, accounting for most of the region's coal use. The return of major units at Kusile and Medupi, combined with temporary reinstatement of additional capacity and extended lifetimes for several other plants, is set to support coal-fired generation. Despite Eskom's long-term strategy to transition toward cleaner energy sources, near-term constraints on renewable deployment and financing gaps mean coal will continue to play a central role in meeting peak demand. The controversial Musina-Makhado Special Economic Zone could be a boost for coal demand, but it is not clear if it will go ahead. More likely is Suiso's plan to build a fertiliser plant using coal as a feedstock. We project South Africa's coal consumption to reach around 164 Mt in 2025 and remain stable at this level by 2030, as lifetime extensions, the return of old units and repowering projects sustain coal use.

Morocco, the continent's second-largest coal consumer, is on a clear path toward decarbonisation, but coal demand is expected to remain broadly stable through to 2030. The updated national climate plan targets a phase-out of coal for power generation by 2040, while renewables are projected to supply over 50% more electricity in 2030 compared with 2025. Coal demand is therefore expected to hold at around 10 Mt in 2025 and remain at that level in 2030, even as the share of renewables rises significantly.

Zimbabwe's coal demand outlook shows only a slight increase. Persistent electricity shortages and industrial ambitions underpin new coal projects and mining investments. Refurbishment at Hwange, proposals for additional coal-fired capacity, and Chinese-backed projects – including a large steel plant and new generation units – are set to lift coal consumption. We estimate Zimbabwe's coal demand to rise by over 2 Mt to 2030, assuming announced projects proceed as planned.

In Zambia, one coal-fired power plant with a capacity of 300 MW is currently under construction. If completed, it could consume around 1 Mt of coal annually. Other projects have not been included in our forecast as they are considered unlikely. Among them are the Morupule B expansion in Botswana, the Sakadamna project in Niger and other projects in Zimbabwe and Nigeria. In Kenya, the Environment and Land Court upheld the cancellation of the Lamu coal power plant.

Taken together, these developments point to modest growth in Africa's coal demand in the near term, reaching about 196 Mt in 2025 and continuing to rise slightly to around 202 Mt by 2030.

Supply

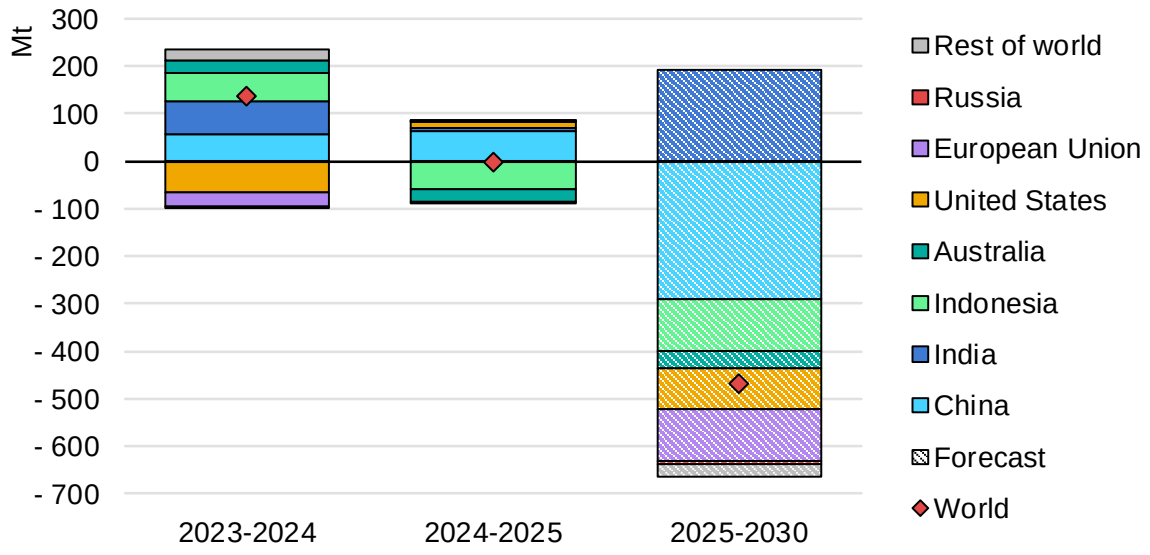
Coal production plateaus in 2025 as structural shifts emerge to 2030

In 2024, global coal production hit a record high of 9.1 billion tonnes, largely driven by increased output in China, India and Indonesia. China retained its position as the world's leading coal producer, maintaining output at 4 666 Mt. Coal remains the primary energy source in both China and India, making domestic production a cornerstone of their energy security strategies. Following supply shortages in 2021, both countries have ramped up coal production for several years in a row.

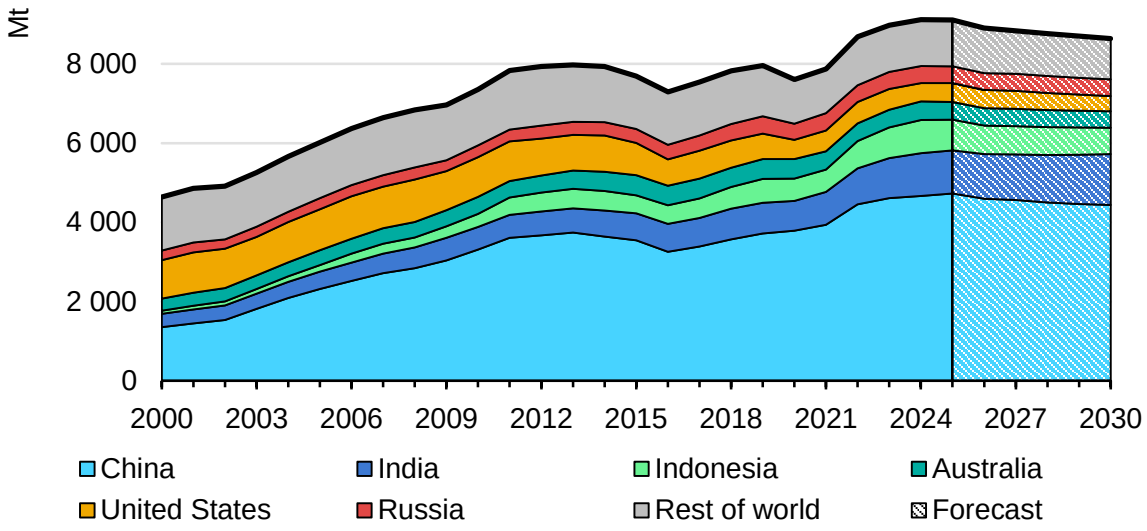
At 9 111 Mt, global coal production in 2025 is projected to remain at 2024's level. This marks a plateau before entering an expected downturn later in the decade. The decrease reflects weaker output in major exporters such as Indonesia (output at 778 Mt) and Australia (output at 446 Mt), where lower prices and weaker import demand weighed on supply. China has maintained growth but at a slower pace, reaching 4 730 Mt as authorities implemented summer supply cuts to manage inventories amid low prices. India's production is projected to remain broadly stable at 1 089 Mt, supported by captive and commercial mines despite seasonal disruptions. In contrast to previous years, US output has risen to 473 Mt, driven by policy measures that improved mine economics and supported unit availability. The European Union is expected to maintain a constant output level of 242 Mt, centred on lignite to meet power generation needs, although its structural decline persists.

Over the forecast horizon, global coal production is expected to decline gradually from the 2025 level, trending down to 8 641 Mt by 2030. The reduction is led by China, although it comes with uncertainties, followed by smaller but more certain declines in the European Union and the United States, as phase-out schedules and cost pressures accelerate. However, US policy support slows the pace of contraction, with a possibility that the actual decline may be even smaller. Output contracts in Indonesia as rising domestic demand is outpaced by shrinking exports, and China's output declines in line with lower consumption. India remains the main source of incremental growth, supported by captive and commercial blocks, but this is insufficient to offset reductions elsewhere. Overall, global supply trends lower during the second half of the decade.

Change in global coal production, 2023-2030



Global coal production, 2000-2030



China

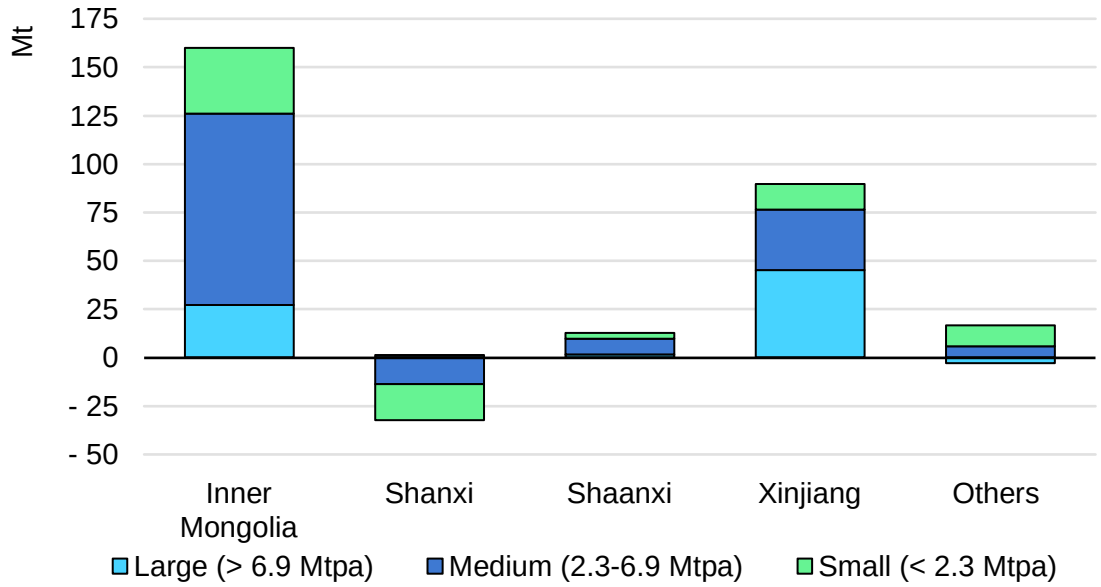
In 2024, growth in Chinese production was driven by Inner Mongolia and Xinjiang

Following the coal shortages experienced in 2021, China introduced a series of policy measures aimed at increasing domestic coal production. These measures led to a significant rise in output. In 2024 production increased by another 1.2%,

reaching 4 666 Mt. However, this growth came at the cost of coal quality, which declined on average during the same period.

Thermal coal remains the dominant type in China's coal production, accounting for more than four-fifths of total output. In 2024, around 81% of this thermal coal was produced in four major regions: Inner Mongolia, Shanxi, Shaanxi and Xinjiang. Inner Mongolia led, producing 30% of national thermal coal output, followed by Shanxi at 22%, Shaanxi at 18% and Xinjiang at 11%. Notably, Xinjiang recorded the highest y-o-y growth in 2024, with production rising by more than 16%.

Change in thermal coal production in China's major producing regions by mine size, 2023-2024



Sources: IEA analysis based on CRU (2025) and National Bureau of Statistics of China (2025), Statistical Database.

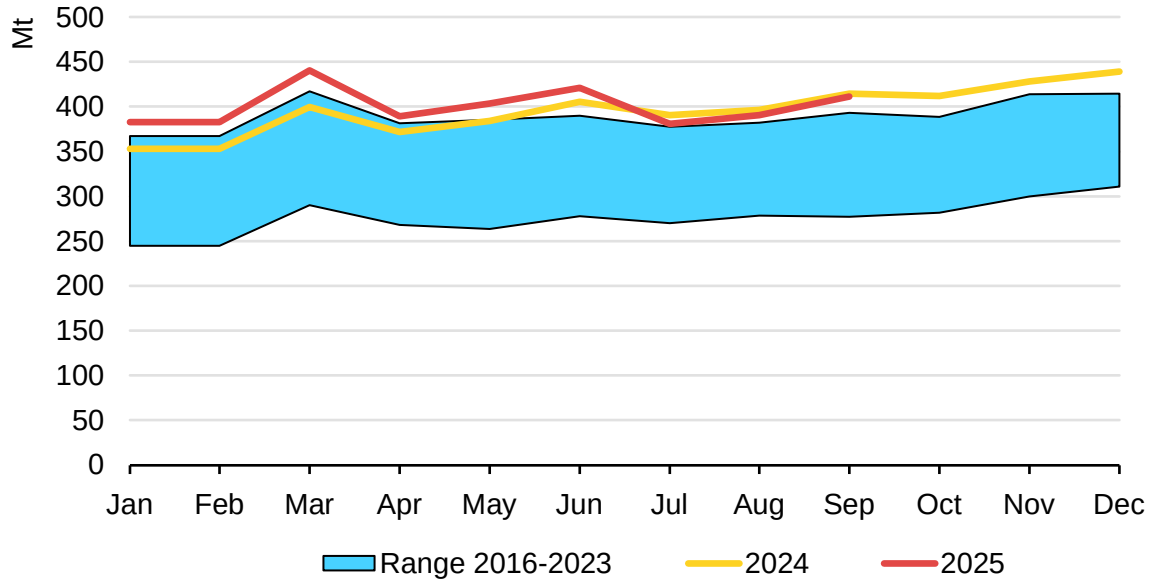
These four northern provinces play a central role in supplying coal to other regions across China, placing significant strain on the country's transport infrastructure. In 2024, analysis of production growth by mine size revealed that medium-sized mines in Inner Mongolia were the main contributors to the overall increase, adding 99 Mt. This increase made Inner Mongolia the province with the highest production volume, overtaking the traditionally leading province of Shanxi, where a series of mining accidents triggered shutdowns and safety inspections, resulting in an overall decline of 31 Mt in the province. Yet, Shanxi is the largest producer of coking coal by far.

Chinese production is set to reach another all-time high in 2025

China's coal production continues to expand in 2025. However, it is set to reach a total of 4 730 Mt, representing an absolute increase of just 64 Mt, or 1.4%. Monthly production data reveal a steady upward trend in the first half of 2025, with the highest y-o-y gains occurring in March (up 41 Mt), January (up 38 Mt), and February (up 23 Mt). However, July and August recorded declines compared with the previous year, as production cuts were made in response to the high level of supply relative to sluggish demand and the resulting low prices.

Growth is expected to be unevenly distributed across both steam and met coal. Steam coal output in 2025 is projected to rise by 41 Mt to 4 091 Mt, a 1% increase, while met coal production is expected to grow by 23 Mt to 638 Mt, marking higher relative growth of 4%.

Monthly coal production in China, 2016-2025

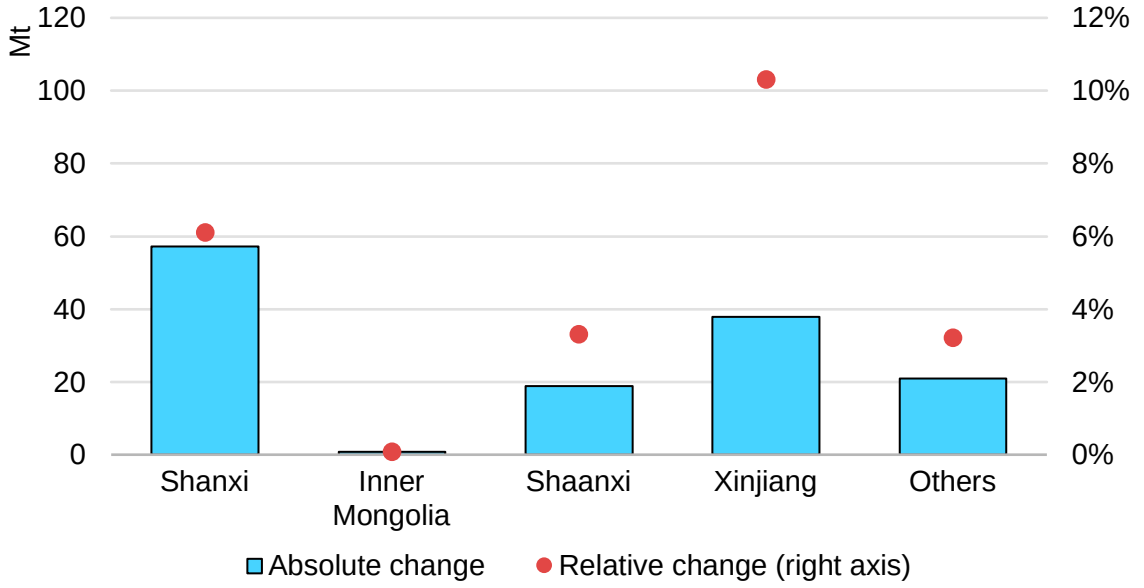


Note: January and February based on cumulated data from February.

Source: IEA analysis based on National Bureau of Statistics of China (2025), Statistical Database.

Regionally, Shanxi led in absolute growth terms with an increase of 57 Mt from January to September y-o-y, recovering the losses from 2024. This was followed by Xinjiang, which added 38 Mt during the same period, the highest relative growth among provinces at 10%. Shaanxi contributed 19 Mt (up 3%), while Inner Mongolia saw flat production development. Other regions collectively added 21 Mt (up 3%).

Y-o-y change in coal production by region of China, January to September 2024-2025



Source: National Bureau of Statistics of China (2025), Statistical Database.

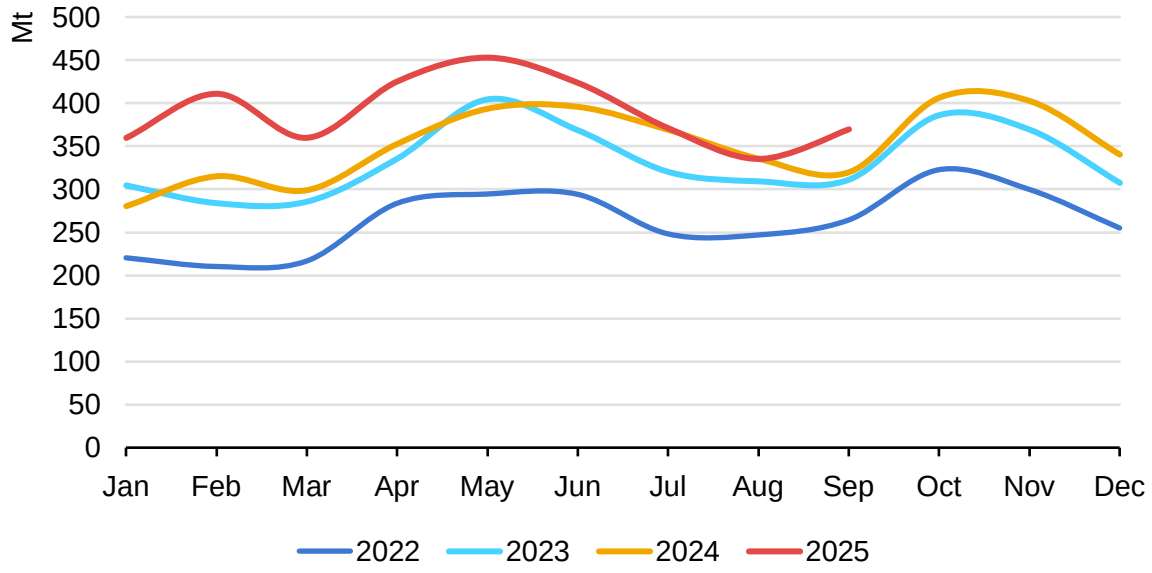
Following China's production surge in late 2021, a noticeable gap emerged between reported supply and demand, leading to rising coal inventories. In response to the shortages experienced in 2020 and 2021, China placed a strong emphasis on energy security, with maintaining robust coal stockpiles becoming a central strategy to cushion short-term disruptions caused by market volatility, extreme weather or geopolitical tensions.

Due to the complexity of China's coal supply chain, inventories reach several hundred million tonnes, stored across mines, ports, power plants, industrial sites and rail transshipment hubs. The domestic supply chain handles over 4 billion tonnes of coal annually, with more than 2 billion tonnes transported by rail and over 800 Mt by ship. Consequently, shifts in China's coal stockpiles and logistics have a direct impact on global coal supply and trade dynamics.

Coal consumption in China typically peaks during the winter heating season and in summer when cooling demand drives up electricity use. Inventory levels tend to rise ahead of these peak periods. Since the 2021 shortages, inventories have grown significantly. Average stockpiles at mines, plants and ports rose from 229 Mt in 2021 to 351 Mt in 2024. In the first six months of 2025, inventory levels were again higher than in 2024, up by 10 Mt y-o-y. However, as a result of supply cuts in summer, inventories returned to 2024 levels during July and August. This analysis is based on stockpiles at representative mines, power plants and ports, and extrapolates these figures to estimate broader inventory trends. The figures

do not include coal held by end users outside power generation or at transshipment stations, which may add further volume to total inventories.

Indicative monthly coal inventories at selected sites in China, 2022-2025



Note: Inventories computed with disaggregate days of use at representative mines, ports and power plants. Analysis does not cover all Chinese inventories such as transhipment sites or final consumers outside the power sector.
Source: IEA analysis based on data from Argus Media Group (all rights reserved).

Three trends are notable about Chinese coal production through to 2030. At a regional level, the four leading producers (Inner Mongolia, Shanxi, Shaanxi and Xinjiang) will continue to be the cornerstone of coal supply, but Xinjiang will be the main engine of growth. At a size level, big projects will be the focus of expansion. As of December 2024, 88 mines with a capacity larger than 10 Mtpa were operating in China, representing around 1.5 billion tonnes of annual capacity. We expect the number of mines larger than 10 Mtpa to surpass 100 in the coming two years, and hence a larger share of production to come from large mines. On the technology side, automation and AI are being applied widely in the mining sector and we expect this trend to continue both for safety and competitiveness reasons. Open pits operating with entirely driverless fleets or workerless underground coal faces will become more frequent in the coming years.

By 2030, China's domestic supply is expected to follow the downward trend in demand. Production is projected to decline by 291 Mt to 4 439 Mt from 2025 to 2030, corresponding to an average annual decrease of 1.3%. The drop in met coal output is expected to be sharper, falling by 45 Mt or 1.5% per year, while thermal coal is projected to contract by 246 Mt or 1.2% annually.

India

2024 was a record year for coal production; 2025 output is set to be flat

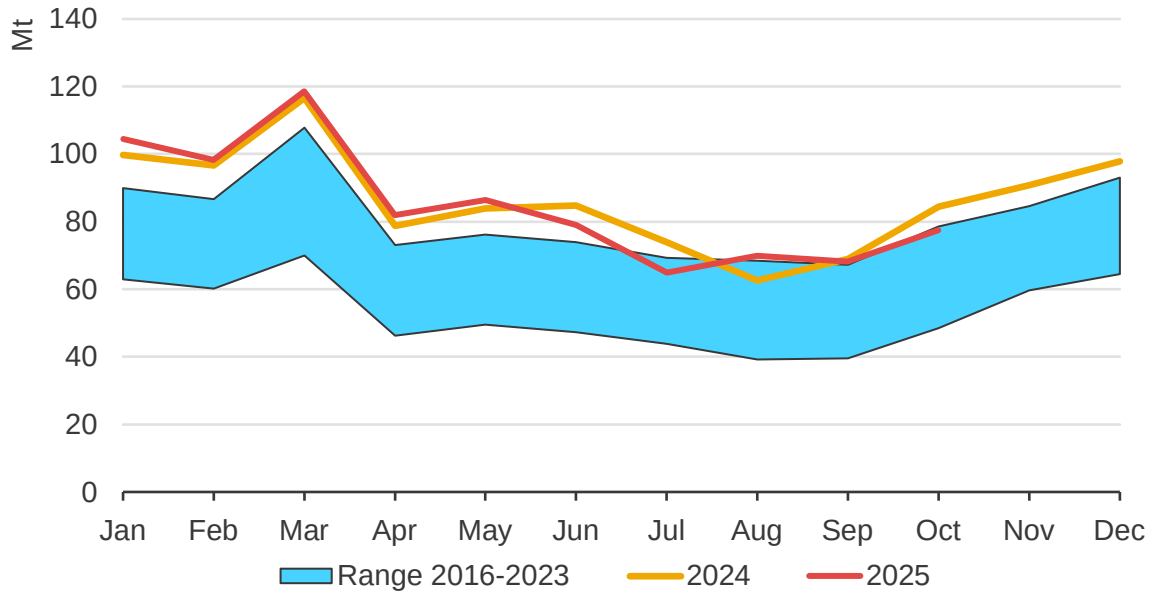
In 2024, India's coal production rose by 7% to reach 1 082 Mt, an all-time high for the country. While the majority of this output was thermal coal, India also produced some lignite and met coal. This growth, which was 2 percentage points higher than the increase in demand, supports the country's long-term strategy of reducing coal imports and strengthening energy security, aiming to prevent supply shortages and high prices.

India's coal production is divided into public, captive and commercial mining. The public sector is led by Coal India Ltd (CIL) and, to a lesser extent, Singareni Collieries Company Ltd (SCCL), along with the state-owned lignite producer NLC India Ltd. Except for the latter, these producers supply coal to the domestic power sector at notified prices set by CIL to ensure affordable electricity. CIL alone accounts for 76% of India's coal output, and its production grew by 6% in 2024. The overall growth was mainly driven by the captive and commercial mining sectors, which expanded by almost a third. Captive producers supply coal for their own industrial or power needs and are restricted in their ability to sell coal on the open market. Currently, they contribute only about 15% of India's total coal output. NTPC, the largest captive producer, produced 46 Mt in FY2026.

To further increase output, the Ministry of Coal has been promoting the use of mining developers and operators (MDOs) to manage CIL-owned mines. These private contractors handle the entire mining process, from extraction to delivery. The government has identified 28 mines with a combined capacity of 257 Mtpa to be operated under the MDO scheme.

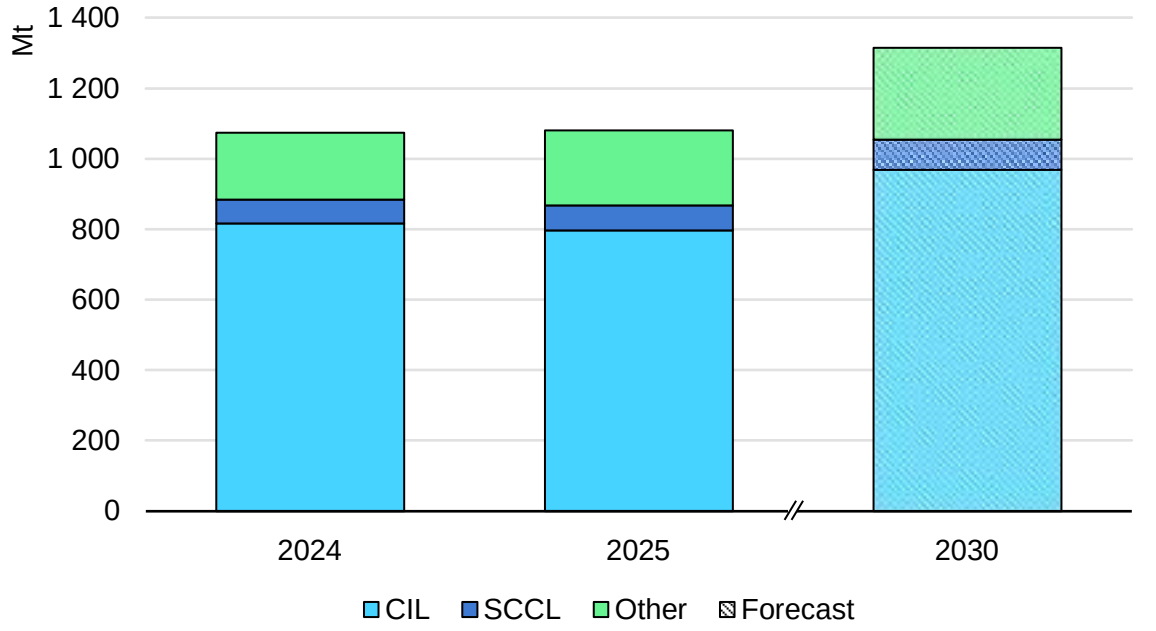
Coal production in India is expected to remain flat in 2025, with output projected to settle at 1 089 Mt, with public companies (CIL and SCCL) declining while commercial and captive blocks increase production. In the first nine months of the year, coal output (excluding lignite) increased slightly by 0.7%, or 5 Mt y-o-y, again driven by growth in the captive mining sector. Between May and July 2025, coal production declined due to heavy rainfall, resulting in lower output compared with the same months in 2024. The y-o-y increase observed in August 2025 was primarily due to the unusually weak production in August 2024, which had also been affected by heavy rains.

Monthly coal production in India, 2016-2025



Source: IEA estimates based on McCloskey Coal and Energy Report by OPIS (2025)

Annual domestic coal production by company in India, 2024-2030



Sources: IEA analysis based on McCloskey Coal and Energy Report by OPIS (2025) and IEA estimates.

The government of India continues its efforts to increase the efficiency of the coal sector. In October 2025, it launched Koyla Shakti, a dashboard that integrates the whole coal value chain on a single platform, and CLAMP (Coal Land Acquisition

Management Portal), a centralised platform containing land data. It is also setting up a Coal Trade Exchange, due to be ready by 2027. At the same time, through first mile connectivity projects and promotion of rail-sea-rail utilisation, the government is seeking to reduce transport costs.

Underpinned by government policies and increasing demand, Indian coal production is forecast nearly 1.3 billion tonnes by 2030, average annual growth of 3%, with upward potential in the case that demand is higher than forecast. We expect higher growth rates in the commercial and captive sectors than in the public sector.

Commercial auctions are leading to higher coal output

In 1993, the Indian government began partially liberalising CIL's monopoly by allowing private companies to participate in coal mining. This move enabled the development of captive coal blocks. In 2015, the government took a further step by permitting commercial coal sales, aiming to boost domestic production, reduce reliance on imports and enhance the competitiveness of the coal sector to support industrial growth.

Currently, coal mine allocations are conducted through a tendering process open to both public and private entities, aiming to support the role of commercial mining in India's coal supply. Mines that remain unallocated are re-auctioned in subsequent rounds. The first auction round was launched in June 2020.

As of November 2025, 136 coal mines had been allocated through 12 completed rounds and the ongoing 13th round. Most of these are thermal coal mines, intended to meet the needs of captive and grid-connected coal-fired power plants. The fully explored mines have a combined peak rated capacity (PRC) of approximately 325 Mtpa, representing 25% of India's estimated coal output in 2030. This figure is expected to grow as exploration of the remaining mines progresses. On 21 August 2025, the government launched the 13th auction round, offering 14 additional coal blocks, of which three were awarded in November.

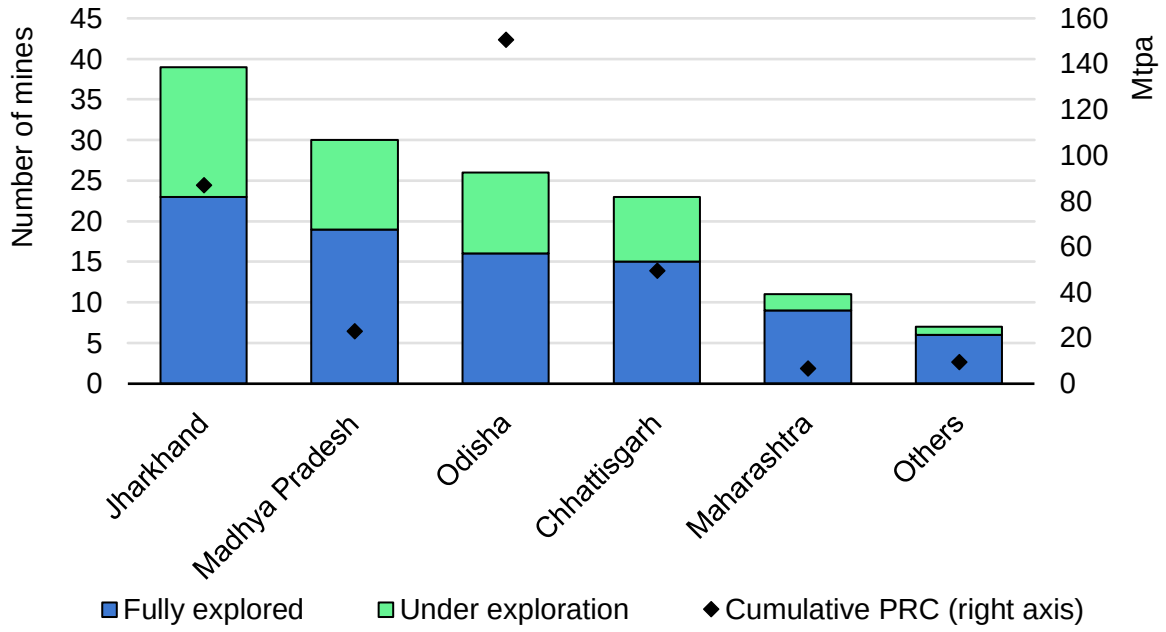
The regional allocation of awarded coal mine capacity aligns with the pattern of overall production in India. Allocated mines in Odisha – the state with the highest production – have a cumulative PRC of 151 Mtpa. Furthermore, only 26 mines have been awarded in Odisha, indicating relatively large blocks. Jharkhand has 39 allocated mines with a PRC of 87 Mtpa, followed by Chhattisgarh with 23 mines and a PRC of 50 Mtpa. Madhya Pradesh accounts for 30 mines with a PRC of 23 Mtpa, while Maharashtra has 11 mines with a PRC of 7 Mtpa.

Despite the large number of mines offered in each round, the allocation rate has remained relatively low. This is largely due to the challenging locations of many sites, which are often situated in dense forests or difficult terrain. To attract more

bidders, the Ministry of Coal has started releasing more information regarding the mine sites ahead of auctions, thereby reducing uncertainty for bidders.

By April 2025, 32 commercial coal mines had begun operations. The government has set a target of producing 380 Mt from captive and commercial blocks by 2030. The target appears achievable, as mainly large industrial conglomerates with sufficient financial strength are awarded these blocks.

Number of mines and expected peak rated capacity at commercial mines by state in India, November 2025



Note: PRC = peak rated capacity.
Source: IEA analysis based on Ministry of Coal (2025).

Other producing countries

Coal production trend in ASEAN countries is led by Indonesia's export slowdown

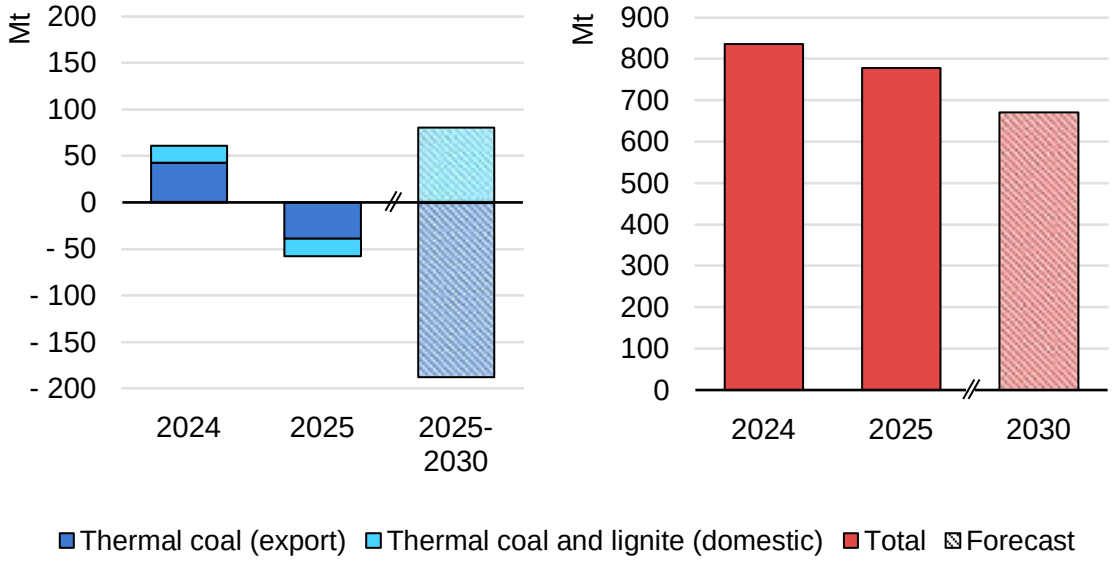
Indonesia's coal production grew by 8% in 2024, increasing by 61 Mt to reach 836 Mt. The Indonesian government's production quota for 2024 was set at 922 Mt. Indonesian coal flows can be grouped into three major markets of similar size: domestic consumption, exports to China, and exports to other international destinations. In 2024, Chinese demand for seaborne thermal coal from Indonesia rose by 22 Mt, while Indonesia's domestic demand growth of around 28 Mt also contributed to production growth.

For 2025, production is expected to change course significantly, with output projected to decline by 7%, bringing total production down to approximately 778 Mt. Producers are facing challenges due to lower prices and oversupply in the low- and mid-CV coal segment, as their main markets – China and India – are requesting lower volumes.

Over the next five years, Indonesian coal production is set to be shaped by export trends and rising domestic demand. Domestic consumption is projected to grow by over 70 Mt, but at the same time, exports of Indonesian coal are expected to decline significantly, by 137 Mt, whereas imports of coking coal will increase. Overall, production is forecast to fall by 107 Mt to 671 Mt by 2030.

As regards other ASEAN countries, coal output in Thailand is expected to increase by 15% in 2025, while Viet Nam's output is projected to remain flat. Both countries are expected to maintain production levels close to 2025 output through to 2030. In the Philippines, the country's largest coal producer, Semirara, is projected to keep production at around 15 Mt. In Lao PDR coal production is expected to increase, driven by supply to neighbouring Viet Nam and rising domestic consumption. The latter is expected to grow by 12 Mt following the commissioning of a new coal-fired power plant, which is scheduled to begin operations in 2030.

Change in coal production and total coal production in Indonesia, 2024-2030



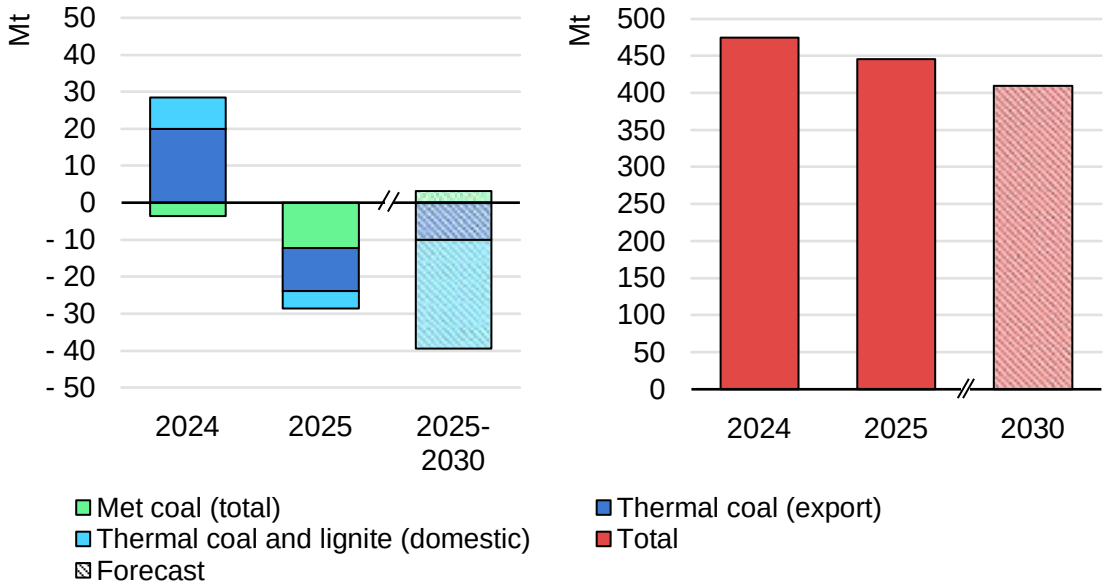
Declining margins and regulatory headwinds constrain Australian coal supply

Australian coal production remains predominantly export-oriented, with output shaped by international prices, seaborne logistics, weather-related mining conditions and an evolving policy environment. In 2025, sustained pressure from lower benchmark prices combined with a rising cost structure and episodic weather-related port and rail disruptions led to tightened margins and amplified the sensitivity of supply to short-term shocks.

Supply responded to weaker pricing and operational constraints. Government forecasters trimmed export expectations for the fiscal year due to prolonged wet weather and softer prices, while congestion and repeated weather-related stoppages at Newcastle raised vessel queues and turnaround times, delaying shipments and complicating mine scheduling. At the company level, producers emphasised cost control and selective output. BHP reduced thermal output during July-September due to maintenance and logistical issues, while Whitehaven reported mixed site-by-site performance but kept its guidance conservative in view of costs and marketing conditions. The low price backdrop – especially for mid- to high-ash grades – tightened cash flow across the industry, with signs of financial stress among some miners. On balance, we estimate Australian coal supply in 2025 at 446 Mt, with a y-o-y decline of 29 Mt driven by price trends and logistics.

Project pipeline dynamics in 2025 were mixed. Boggabri Coal, Lake Vermont, Caval Ridge and Ulan coal mines received extension approvals, but conversely creditors moved to suspend underground mining at Dartbrook only months after its restart, while the New South Wales Court of Appeal blocked the Mount Pleasant lifetime extension. Yancoal's Moolarben open-cut extension faced timing delays, further tempering additions. Against these headwinds, Bravus/Adani confirmed a staged expansion of Carmichael towards 16 Mtpa, although the pace is constrained by capital discipline and market conditions. At the policy level, in September 2025 Australia updated its Nationally Determined Contribution, committing to reducing emissions by 62-70% below 2005 levels by 2035, which will affect the coal mining sector through the Commonwealth's Safeguard Mechanism. The Queensland government has indicated that coal-fired power will persist "for decades" (although its unchanged royalty scheme is hampering coal mining), whereas Western Australia reaffirmed a 2030 phase-out for state coal generation, and New South Wales advanced proposals to reduce state mines' Scope 1 emissions. Together this reinforces a patchwork policy landscape that adds planning and compliance costs for existing and new supply.

Change in coal production and total coal production in Australia, 2024-2030



Looking ahead, the supply mix is expected to shift gradually towards met coal as producers seek higher-margin segments amid thermal price weakness. Met coal's share of total output is projected to rise from 34% in 2025 to 38% by 2030, supported by expansion at Queensland mines and sustained demand from steelmaking markets – even as overall volumes remain constrained by cost pressures and regulatory hurdles. Australia's Office of the Chief Economist projects seaborne thermal coal exports to edge lower by 2030 as global trade contracts, with producers navigating both cyclical price movements and structurally higher approval and compliance hurdles. Investment signals are further dampened by reduced coal exploration spending, as well as financing and royalty frictions cited by several operators. This suggests limited appetite to add marginal tonnes unless price support improves and logistics normalise. Under these conditions, we project Australian coal supply to be 409 Mt in 2030, with volumes increasingly determined by sustained cost competitiveness at existing operations, the timing and scope of a small number of brownfield debottlenecking projects, and the net effect of state-level policy divergence on investment.

The decline of US coal supply slows down, supported by federal policies

Coal production in the United States is projected to be 473 Mt in 2025. Unlike the contraction seen in 2024, this year's supply profile is shaped primarily by higher coal demand and the policy actions of the new federal administration: executive orders to expand access to federal lands and to use emergency authority to keep

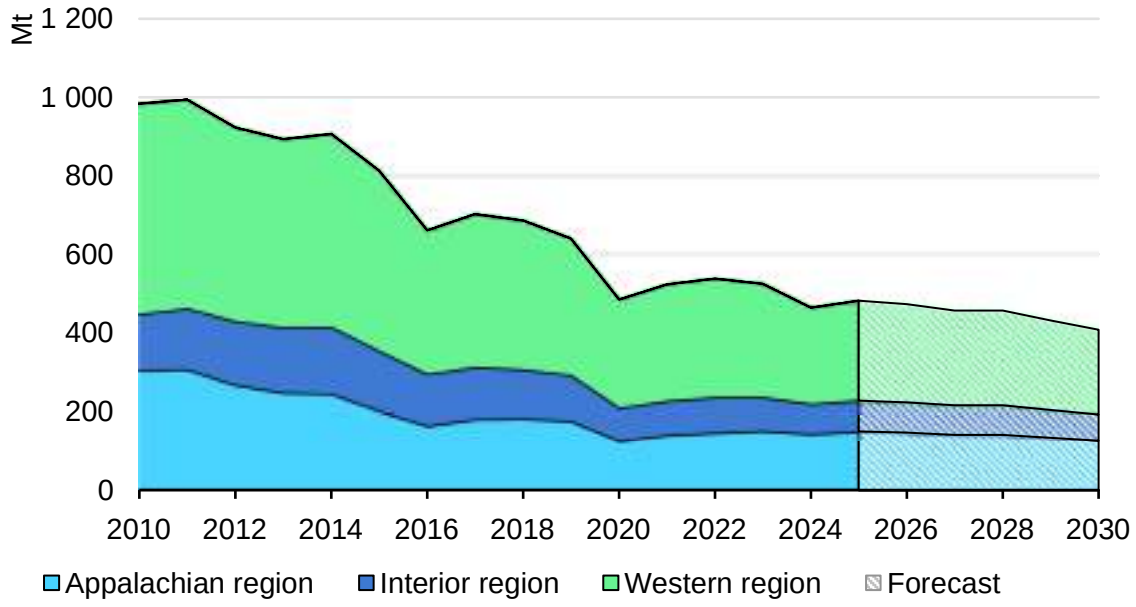
coal-fired units available, a formal national energy emergency that accelerates permitting, and temporary waivers of certain air pollution compliance deadlines for coal plants and related industries. In parallel, the “One Big Beautiful Bill Act” cut federal coal royalty rates and opened additional acreage to leasing, while Congress overturned Bureau of Land Management resource plans that had constrained Powder River Basin (PRB) leasing. These measures jointly improve the economics and availability of federal coal resources. In addition, domestic demand prospects improved, mostly owing to the continuing emergence of AI and its growing demand for electricity.

Regionally, Western supply (principally PRB coal) has been supported by both policy and operational developments. Producers reported material output gains in Q2 2025 at large PRB mines, reflecting improved mine availability and policy tailwinds. The US DOI’s approval of the Black Butte mine plan modification adds recoverable tonnage and extends mine life in southern Wyoming under expedited federal procedures, further supporting Western supply capacity. In the Appalachian region, Northern Appalachia raised output in 2025 as major longwall complexes recovered from earlier disruption, whereas Central Appalachia remained constrained by higher costs and weakness in met coal export pricing, limiting incremental supply from that basin. On the logistics side, coastal export flows through Hampton Roads were periodically lower in 2025 amid muted seaborne pricing and terminal works – a factor that capped incremental supply aimed at export markets. Nevertheless, Ramaco Resources expects to ramp up the capacity of its Brook mine in Wyoming to 4.5 Mtpa of thermal coal and rare earths feedstock production, enabling the production of approximately 3 400 t of oxides per year of rare earth elements and other critical minerals, directly strengthening US supply chain security.

For the forecast period, US coal supply is expected to evolve under two opposing forces. On one hand, closure plans remain substantial – operators still list 33 GW of coal-fired power capacity as retiring by the end of 2028, which would normally translate into a gradual decline in supply for domestic demand by the decade’s end. It remains to be seen whether political measures will further delay these retirements. On the other hand, the administration has institutionalised coal support through emergency orders that can prolong unit availability, set aside USD 625 million in federal funding to modernise or recommission coal units, permanently reinstated the National Coal Council and expanded federal leasing with lower royalties – all measures that slow the pace of supply contraction by preserving mining demand and permitting optionality. Balancing these drivers, we project coal production to be 386 Mt by 2030, a decline of 18% on 2025 production, with Western output declining more gradually than previously anticipated owing to the combination of lease availability, royalty relief and approved mine lifetime extensions, while Appalachian supply trends modestly lower given cost intensity and exposure to met coal pricing.

We will continue monitoring the measures supporting both US coal demand and production, as they could stimulate additional coal output.

Coal production by region in the United States, 2010-2030



Sources: IEA estimates based on EIA (2025), Coal Data.

Russia's production increases despite mine shutdowns

Sanctions imposed on the Russian Federation (hereafter, "Russia") following its full-scale invasion of Ukraine have led to an acceleration of the shift in production from central and western regions towards the east in the years since. However, the reorganisation of supply chains associated with this eastward shift have caused disruption due to a bottleneck in the rail network, preventing the country from expanding production. Total Russian coal production reached 426 Mt in 2024, remaining broadly unchanged from the previous year. Thermal coal output declined by 1%, while met coal production increased by 2%, offsetting the reduction in thermal coal. The export duty on coal introduced in October 2023, but then removed in October 2025, put pressure on both exports and production.

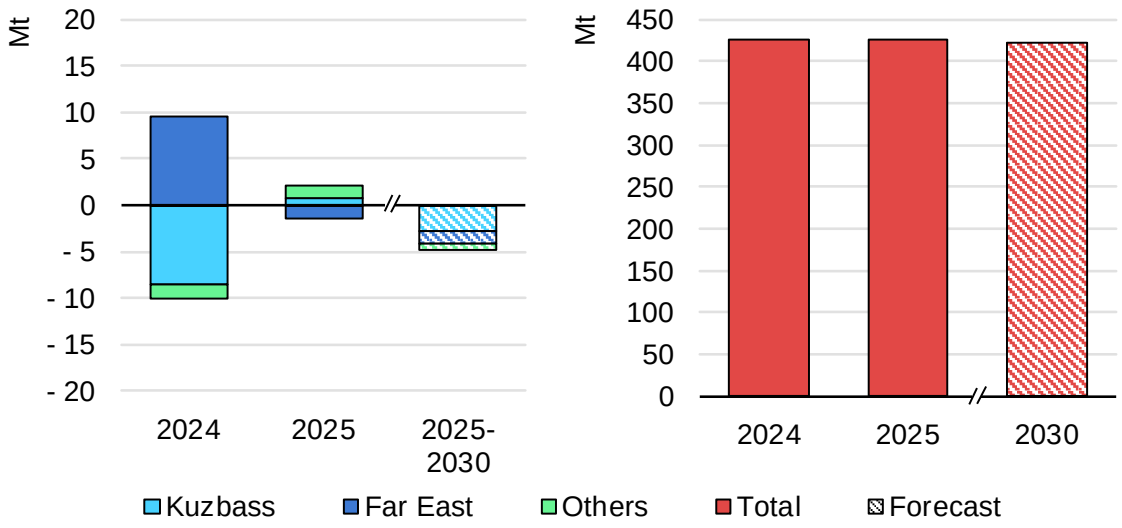
Production in 2025 is expected to stay flat, at around 427 Mt, at similar levels as in 2023. By region, the shift of production towards the East has continued, as the coal markets are moving to Asia. In addition, Russian coal continues to be banned in the European Union. The Kuzbass area in southwestern Siberia is projected to decline, whereas growth is expected in the Far East.

And this is despite the proportion of companies in the coal sector reported as being unprofitable rose to 65% during the first seven months of 2025.

In response, the Finance Ministry allocated more than USD 750 million to support the industry in 2025. Nevertheless, over 23 firms – 18 of which are located in Kuzbass – have halted production. By contrast, the utilisation rates of the mines remaining operational have increased significantly.

By 2030, coal production is expected to decline, with eastern sites least affected due to their proximity to remaining markets such as China. The anticipated reduction in global seaborne import demand over the next five years weighs on Russian exports and, consequently, on overall production. Annual coal output is forecast to fall to 422 Mt in 2030, a level similar to those seen in 2022-2024. Kuzbass is the region where we expect a decrease in production. Overall, however, China's demand for Russian coal is likely to support production, particularly in eastern regions. Forecasting for Russia remains challenging under current wartime conditions.

Change in coal production and total coal production in Russia, 2024-2030



Source: Adapted from CRU (2025), DataLab and IEA estimates.

The sharp decline in EU coal production slows in 2025

In the European Union, lignite continues to represent more than 80% of overall coal supply, dedicated primarily to the power sector. As a result, supply remains concentrated in a few member states, with Germany and Poland together producing 174 Mt of coal in 2025, accounting for around 72% of EU coal output. Germany is the largest producer of lignite, while Poland provides virtually all EU steam and met coal. In 2025, EU coal production is estimated to be 242 Mt.

Unlike previous years of continuous decline, the first half of 2025 showed a slight y-o-y increase in coal supply, driven by higher coal-fired generation during periods

of tight power markets and lower wind and hydro output. This temporary uptick was most visible in lignite production in Germany, Bulgaria and the Czech Republic, where operators maintained output to ensure system adequacy despite ongoing phase-out commitments. In Poland, production remained broadly stable as state-backed support measures and restructuring efforts at major mining firms helped offset cost pressures. However, these developments do not alter the structural trend: coal production remains under long-term pressure from both policy and economic factors.

From 2026 onward, coal supply is forecast to resume its downward trajectory. The decline can be explained almost entirely by lignite in Germany, where the coal phase-out framework continues to drive mine closures, even though short-term flexibility is retained to safeguard security of supply. Steam coal supply in Poland is expected to contract gradually as deeper seams raise costs and domestic demand continues its decline. Slovenia's lignite production falls steadily towards its planned exit by 2033, while Bulgaria's revised emissions reduction plan slows – but does not halt – the decline in its lignite mining.

Overall, EU coal production is projected to decrease to 132 Mt by 2030, the reductions being mainly in lignite output. But the pace of the reduction is dependent on the implementation of policy phase-outs, the extent of rising mining costs and the impact of transition programmes across member states.

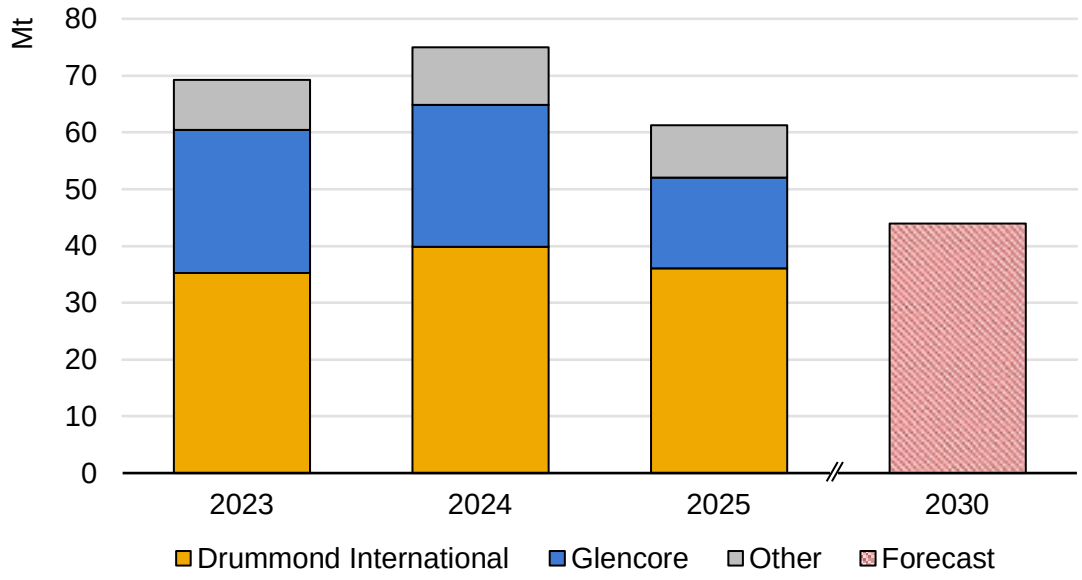
International demand and domestic constraints define coal supply trajectories in Colombia and Canada

Colombian coal supply in 2025 is estimated at 61 Mt, a y-o-y decrease of 18%, with exports constrained by significant logistical disruption and producer curtailments. The Cerrejón mine experienced multiple days of halted rail operations due to blockades and bomb attacks, materially reducing effective export capacity. Major producers adjusted mine plans in response to weaker seaborne pricing and unsold volumes: Cerrejón cut 2025 output by 5-10 Mt, while Drummond signalled reductions to optimise operations, citing freight disadvantages into Asia and a higher cost base. These factors, combined with softer coking and thermal coal benchmarks, weigh on 2025 supply.

A tightening policy and security backdrop adds downside risk to supply through to 2030. The government submitted to Congress a new mining code that would ban new thermal coal exploration and production, and promote the gradual shutdown of large open-pit mines while honouring existing titles. Fiscal pressure intensified via a permanent export levy and a new tax bill lowering the price trigger for surcharges on income tax for coal companies. Security conditions further deteriorated after the suspension of ELN peace talks, with rebels vowing more attacks on energy infrastructure. On balance, we project a decline to 44 Mt by

2030, contingent on the evolution of policy and security. Long-term offtake dialogue with Chinese buyers could partially mitigate the decline if concluded.

Coal production by company in Colombia, 2023-2025, and forecast production, 2030



Source: Adapted from CRU (2025), DataLab and IEA estimates.

Canadian coal production remains split between met coal for export, thermal coal, which has historically been in decline, and some lignite. In 2025, total coal supply is estimated to have increased by 6% to 50 Mt, driven by a rise in exports, reversing previous declines as West Coast terminals handled higher volumes early in the year. This rebound contrasts with the long-term phase-out trend. Met coal continues to dominate the supply structure, with production estimated at 33 Mt in 2025, representing a 3% increase compared with last year. Glencore's integration of Elk Valley Resources underpins met coal output, even as global prices softened. A fire at Westshore Terminals in August removed one berth for about ten weeks, creating short-term constraints.

For the forecast period, Canadian coal supply is projected to decrease by 10% to 45 Mt by 2030, with thermal coal falling after its 2025 rebound to 7 Mt. However, Saskatchewan's regional government has decided to delay the phase-out of coal-fired power plants, thus supporting domestic demand. Met coal, mostly dedicated to international markets, is expected to hold steady at 34 Mt. Domestic infrastructure investment and labour stability will support export flows, but price trends and trade conditions remain key determinants.

South Africa’s coal supply holds steady while regional projects drive incremental gains

Coal production in South Africa is estimated at 234 Mt in 2025 (almost stable compared with 2024). Supply-side dynamics are shaped by infrastructure and investment decisions. Rail performance improved after Transnet implemented recovery measures and allowed private operators onto its network, which could add up to 10 Mtpa of export capacity over the next three years. The government’s financial guarantee recovery plan has stabilised Transnet’s finances, reducing operational risk. Mining companies such as Thungela reported higher output in the first half of the year, supported by better rail availability. However, long-term policy signals point to a gradual decline: the Integrated Resource Plan 2025 targets the decommissioning of 8 GW of coal-fired capacity by 2030 and prioritises renewables, which may discourage new coal mine investment. Sasol’s decision to maintain Secunda coal-to-liquids output and secure internal coal supply suggests some stability in production in the medium term. South African coal production is projected to be 228 Mt in 2030, trending flat as logistics reforms partly offset the structural decline in investment.

Coal production in other African countries is estimated at 30 Mt in 2025. Growth is concentrated in regions with new mining projects and steel-related demand. In Zimbabwe, refurbishment of the Hwange power station units and new coal-fired capacity underpin higher coal output, while Chinese-backed mining projects signal further expansion. Botswana is supporting coal production through new coal-fired baseload generation projects at Morupule and Mmamabula, which will require additional mining capacity. In Mozambique, the Benga coking coal mine is set to more than triple its current output over the next two years, supported by steel production and port expansion plans at Matola and Macuse. Ethiopia’s plans to impose import duties on coal could incentivise domestic coal mining, but progress depends on the availability of washing capacity and the suitability of potential industrial consumers. For 2030, aggregate coal production outside South Africa is projected to be 30 Mt, remaining stable compared with the level in 2025.

Trade

International coal trade is set to decline in 2025

International coal trade grew by 3% in 2024, reaching a new record of 1 544 Mt. This growth was driven by increases in both thermal coal (up 26 Mt to 1 176 Mt) and met coal (up 21 Mt to 368 Mt). Coal trade accounted for approximately 18% of global coal demand, with thermal coal making up more than three-quarters of total traded volumes. Seaborne trade continued to dominate, representing over 90% of global coal trade in 2024.

The Asia Pacific region further strengthened its dominance, accounting for 85% of global coal imports in 2024. China led global imports in 2024 with 548 Mt, an unprecedented figure for any country in history, followed by India (237 Mt) and Japan (162 Mt). Together, these three countries represented over 60% of global coal imports. On the export side, Indonesia remained the top exporter with 555 Mt, primarily thermal coal, followed by Australia (363 Mt) and Russia (198 Mt), which directed 75% of its exports to Asia in 2024. Combined, these three countries accounted for nearly 74% of global coal exports in 2024.

After years of growth, global coal trade is expected to decline by 5% to 1 468 Mt in 2025, reversing the previous upward trend. Thermal coal trade is set to decrease by 6% to 1 111 Mt, while met coal trade is expected to contract by 3% to 357 Mt. This shift is primarily driven by China, where abundant stocks and sluggish demand have driven its imports down by around 58 Mt to 489 Mt. Similarly, in India domestic thermal coal production is flat while demand is weak, keeping imports at around 235 Mt. Chinese Taipei, Korea and Japan, with negligible domestic production, are also expected to reduce coal imports in 2025. Meanwhile, the European Union is expected to maintain their coal import levels at 70 Mt, effectively pausing the structural decline seen in recent years.

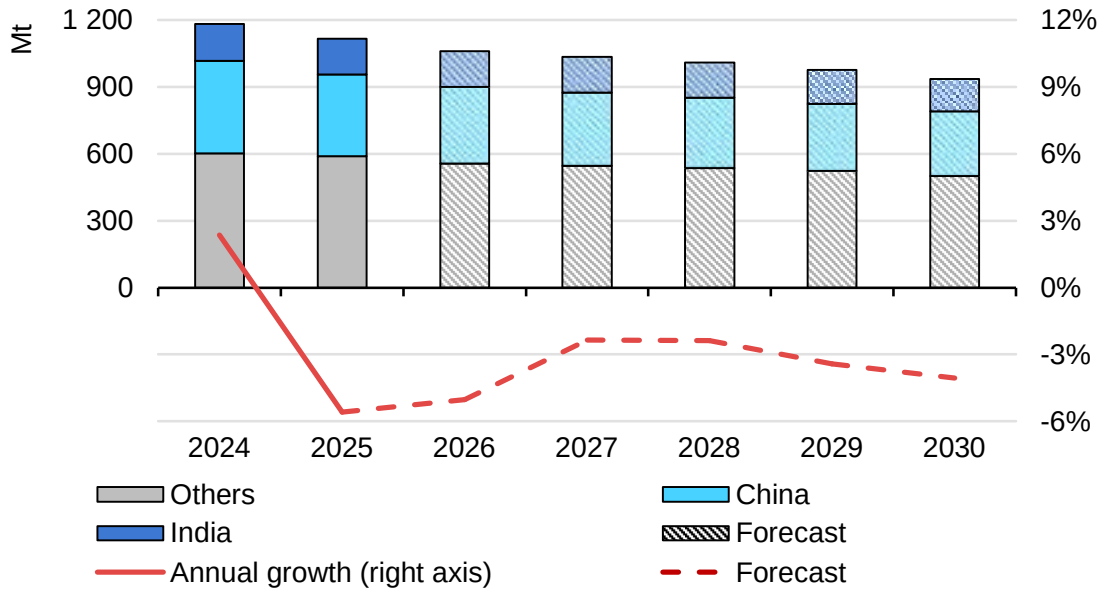
Mirroring trends in importing countries, Indonesia, which is Asia's key swing supplier, is expected to reduce its coal exports by at least 9% in 2025, bringing volumes down to 505 Mt. Similarly, Australia and Colombia are expected to experience export contractions, with volumes falling by 4 Mt and 11 Mt, respectively, largely due to persistently low international coal prices that continue to undermine production economics. Furthermore, South African exports are forecast to decline modestly by 1 Mt.

Looking ahead to 2030, global thermal coal trade is expected to continue its downward trajectory to a level of 936 Mt. This trend is primarily driven by developments in China and India. In China slightly declining coal demand combined with strong domestic production is likely to reduce the need for imports. Similarly, India's ongoing expansion of domestic thermal coal output is expected to outpace demand growth, further curbing import requirements. At the same time,

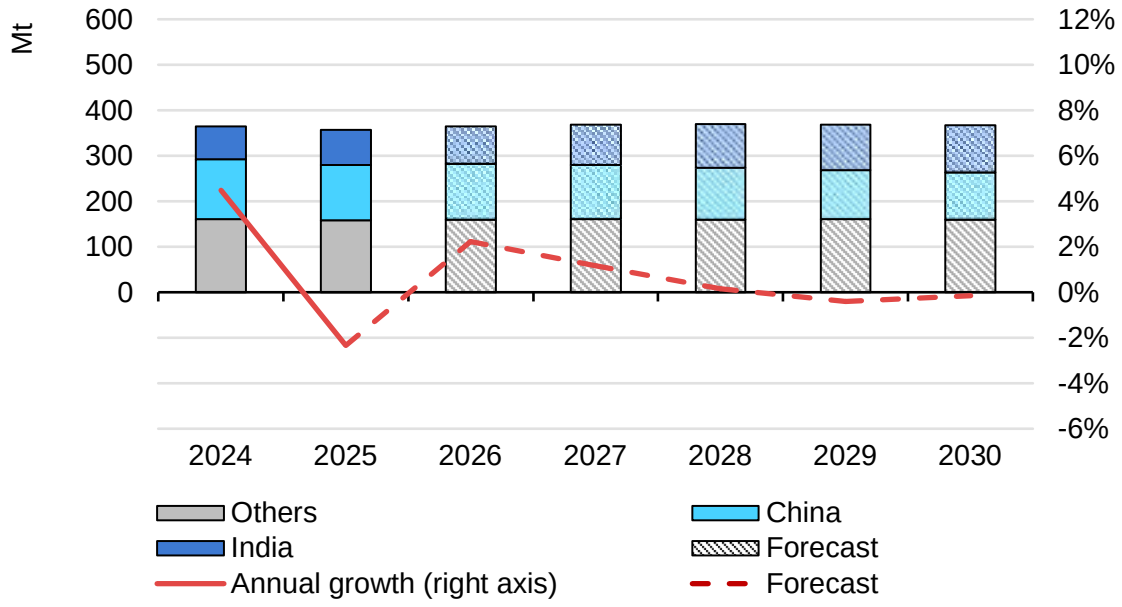
many Western countries are advancing their coal phase-out strategies, contributing to a broader decline in global thermal coal trade.

In contrast, the outlook for met coal is somewhat more resilient. After the decline in 2025, met coal trade in 2030 returns to 2024 levels. We revised our previous forecast upwards largely due to slower than anticipated deployment of low-carbon steelmaking technologies, such as hydrogen-based direct reduction furnaces.

Thermal coal exports by destination and trade growth, 2024-2030



Met coal exports by destination and trade growth, 2024-2030



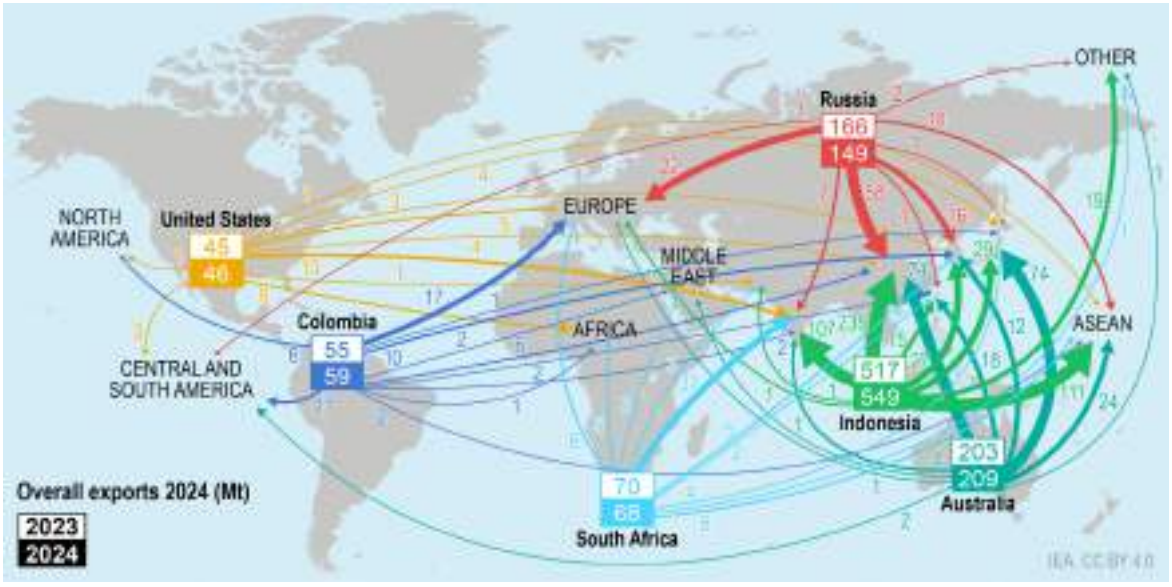
Thermal coal

Thermal coal trade reached an all-time high in 2024

Global thermal coal trade continued to expand in 2024, driven by strong demand from Asia despite declining imports in advanced economies. Total imports into China rose by 13% to over 416 Mt, reinforcing its position as the world's largest thermal coal importer. India also saw growth, with imports increasing by 2% to 164 Mt, as domestic supply remained insufficient to meet power sector needs. In contrast, thermal coal imports declined in Japan and Korea, falling by 3% and 7%, respectively, driven by the electricity sector. The European Union recorded the sharpest drop, with imports falling by 48% to just 26 Mt, reflecting the dynamics in the electricity sector amid decarbonisation policies. Other Asian economies collectively increased imports by 12%, while the rest of the world saw a decline of 6%.

Growth on the supply side in 2024 was led by Indonesia, which increased shipments by 6% to 549 Mt, maintaining its position as the largest exporter. Australia followed with a 3% rise to 209 Mt, supported by strong demand from Asia. In contrast, Russian exports declined by 10% to 149 Mt, as Western sanctions and rouble appreciation put Russian coal in a difficult position. South Africa also saw a modest drop of 3%, with exports falling to 68 Mt. Colombia recorded the strongest growth among smaller exporters, rising by 8% to 59 Mt, while the United States increased exports by 3% to 46 Mt. Exports from the rest of the world grew by 3%, reaching 103 Mt.

Main trade flows in the thermal coal market, 2024 (Mt)



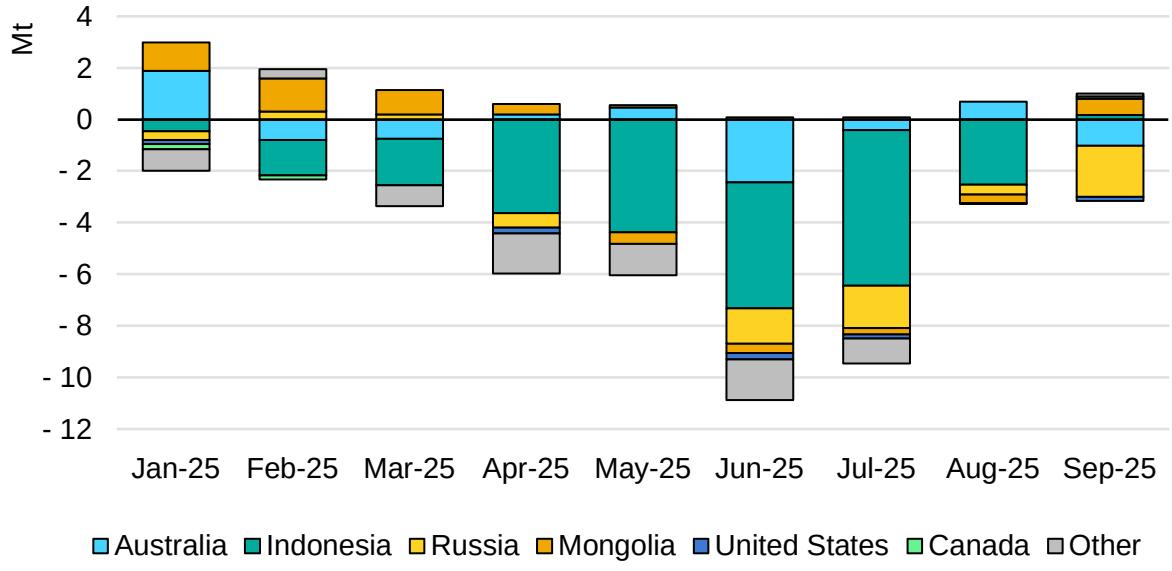
Despite lower imports, China remains the top destination for thermal coal in 2025

Global thermal coal trade is expected to decrease by 5% in 2025. Contrary to previous years, mature economies such as Japan and the European Union are set to record flat imports amid higher than expected coal-fired power generation, while India and especially China are set to record sharply lower imports. In total, thermal coal imports are expected to total 1 106 Mt, with trade still concentrated in Asia.

In 2025, China's thermal coal imports are expected to decline by 12% compared with the previous year, reversing the strong growth recorded in 2023 and 2024. Monthly import data show weakening volumes from March onward. Indonesia, China's largest supplier, reported a corresponding drop in shipments, with imports down by 25 Mt year-on-year in the period from January to September.

Chinese imports from Australia have been volatile throughout 2025, with several months showing negative year-on-year growth. Russian volumes have remained subdued, falling by 6 Mt during the first nine months of the year. In contrast, imports from Mongolia have continued to grow, adding 3 Mt after a strong increase of 10 Mt in 2024. Overall, we expect the full-year import volume for thermal coal to be 372 Mt (down 39 Mt).

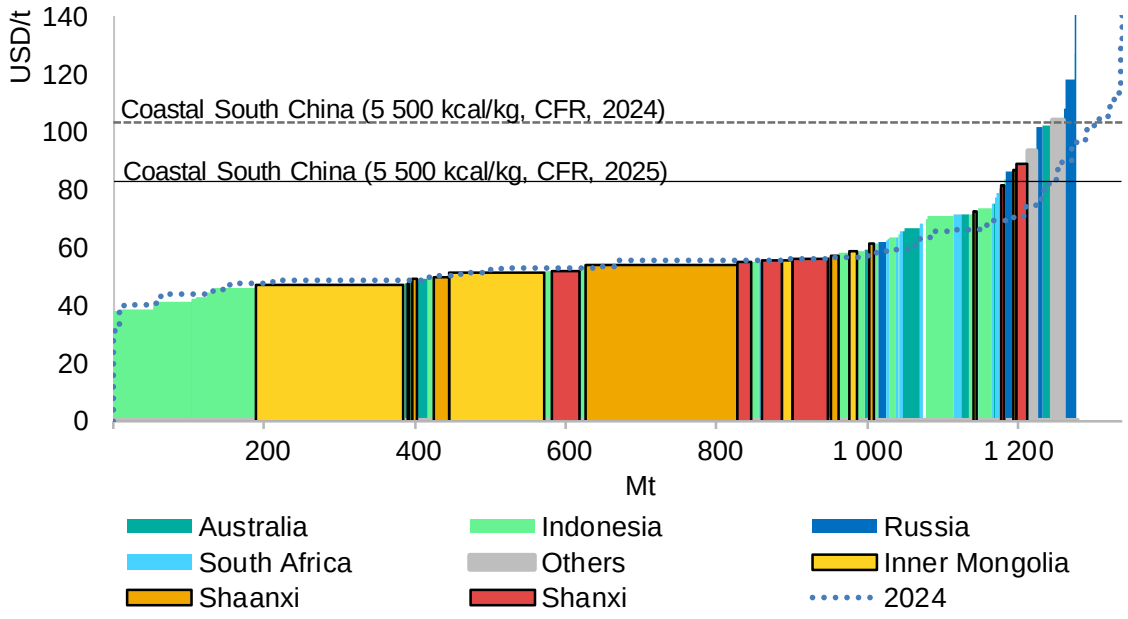
Change in monthly y-o-y thermal coal imports by source into China, 2025



Source: IEA estimates based on McCloskey Coal and Energy Report by OPIS (2025).

International exporters to China face increasing competition from domestic producers. An indication of this is the plan to expand the capacity of Huanghua, the largest coal port in the world, from 210 Mt to 260 Mtpa, and the capacity of the Shuohang railway – a critical corridor for transporting coal from western to eastern China – is due to be expanded from 350 Mtpa to 450 Mtpa. Producers from major coal regions such as Inner Mongolia, Shaanxi and Shanxi are able to supply coal to coastal markets at a lower cost than most foreign competitors once transport costs – including rail freight for domestic coal and sea freight for imports – are taken into account. However, the role of imports in easing the supply and demand balance in the coastal region cannot be overlooked.

Short-run marginal cost curve for mid-CV supply, to coastal China, 2025



Notes: CV = calorific value; mid-CV = 4 200-5 700 kcal/kg. CFR = cost and freight, meaning the seller is responsible for the cost of the goods and freight to the destination port. In this case, it applies to seaborne coal arriving at southern Chinese ports. The cost curves account for variable production costs, overburden removal, royalties, inland transport and port usage fees. The cost curve is not adjusted for different qualities of coal. The 2025 prices are based on the monthly average from January to September.

Sources: IEA analysis based on Argus Media Group (all rights reserved) and adapted from CRU (2025), DataLab.

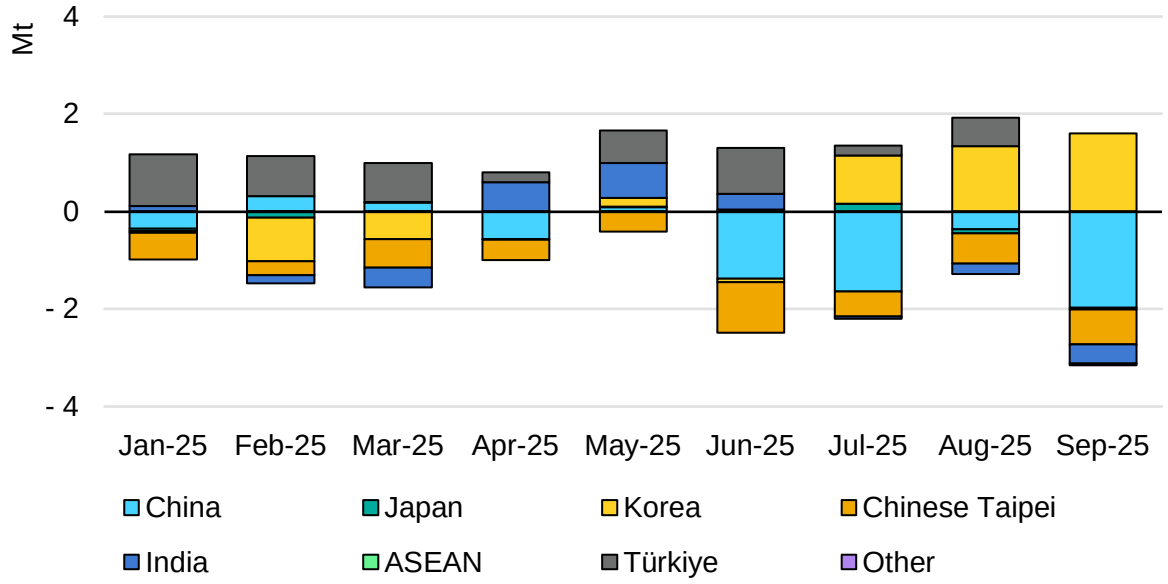
India, another country that previously recorded notable growth in thermal coal imports, saw lower volumes in 2025. In the first seven months, thermal coal imports declined by 5% y-o-y, with Indonesian shipments down by 10 Mt, the largest drop in absolute terms among exporters to India. For the full year, thermal coal imports are expected to settle at 159 Mt. Weak coal demand and increasing domestic production are behind this.

In 2025 the European Union is expected to increase its imports by 3 Mt to reach 29 Mt. Japan's and Korea's imports are expected to decrease to 122 Mt and

78 Mt, respectively. Chinese Taipei is expected to see a decrease of 3 Mt, bringing its total to 46 Mt. Other Asian countries, mainly driven by Pakistan and Bangladesh, are estimated to increase their thermal coal imports by 1 to 3 Mt in 2025.

Russian thermal coal exports showed mixed trends across key destinations during the first nine months of 2025. Russian government support, pivotal to underpin exports, included postponement of the mineral extraction tax until 1 December 2025, loan deferrals and a 12.8% discount on the rail tariff for Siberian exports. Shipments to China declined sharply, with cumulative reductions of 6 Mt, reflecting weakening demand. Exports to Japan remained relatively stable with minor fluctuations, while those to Korea shifted to growth mid-year, ending with a net increase of 3 Mt. Exports to Chinese Taipei fell consistently, totalling a reduction of 5 Mt. India displayed early volatility but closed the period slightly positive with a 0.5 Mt total increase. Türkiye emerged as the strongest growth market, adding 5 Mt. For the full year 2025, we expect Russian thermal exports overall to decline by 2 Mt to 147 Mt.

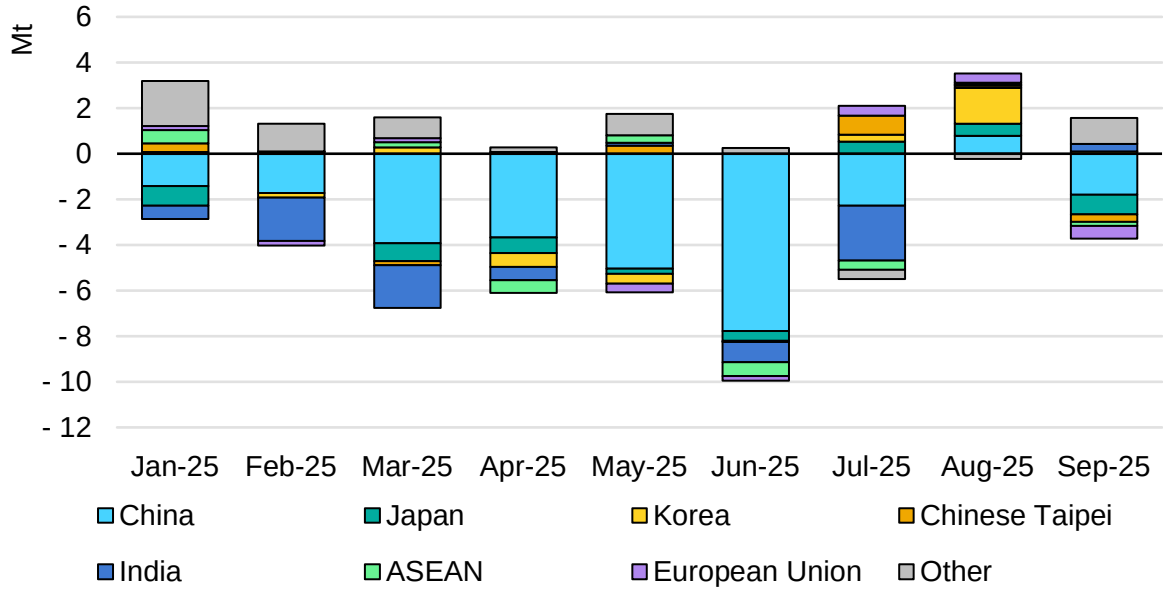
Monthly y-o-y change in thermal coal exports from Russia by destination, 2025



Source: IEA estimates based on McCloskey Coal and Energy Report by OPIS (2025).

We expect Indonesian thermal coal exports to decrease by 9% in 2025 to a total of 499 Mt. In the first nine months of the year, exports fell by an estimated 30 Mt y-o-y due to reduced demand from its main markets, China and India. Combined they represent 58% of all Indonesia's thermal exports. Other ASEAN countries reduced their imports by 1 Mt y-o-y, while exports to mature economies Korea and Chinese Taipei rose in that period in total by 2 Mt.

Monthly y-o-y change in thermal coal exports from Indonesia by destination, 2025



Source IEA analysis based on McCloskey (2025). McCloskey Coal, Metals and Mining Service.

Australian thermal coal exports are estimated to increase slightly by 0.5% in 2025 to a total of 210 Mt. Thermal coal exports from South Africa are expected to decrease by about 1 Mt in 2025. After Indonesia, the second-largest drop in export volumes is expected from Colombia, declining by 11 Mt to 48 Mt.

Thermal coal trade falls below 1 billion tonnes by 2030

Global thermal coal trade is projected to decline by 174 Mt to 936 Mt by 2030. Between 2025 and 2030, global thermal coal import patterns are expected to undergo a significant transformation, marked by pronounced regional differences. China is anticipated to reduce its thermal coal imports by 21% to 286 Mt, reflecting its ongoing energy transition while emphasising domestic coal production. However, as shown above, imports into China play an important role in ensuring competitive supply to the coastal region, so a balance between domestic and imported coal to that region will remain for some time. India's imports are expected to fall by 8% to 146 Mt in 2030. Our analysis shows a floor of over 100 Mt of imports per year for India, as over 18 GW of coal capacity is designed to use imported coal, while some industries such as sponge iron prefer imported coal and other plants require imported coal for blending due to the quality of domestic coal. Japan and Korea are projected to reduce thermal coal imports by 35% and 31%, respectively, reaching a total of 132 Mt in 2030, reflecting efforts to decarbonise and shifts in the electricity sector.

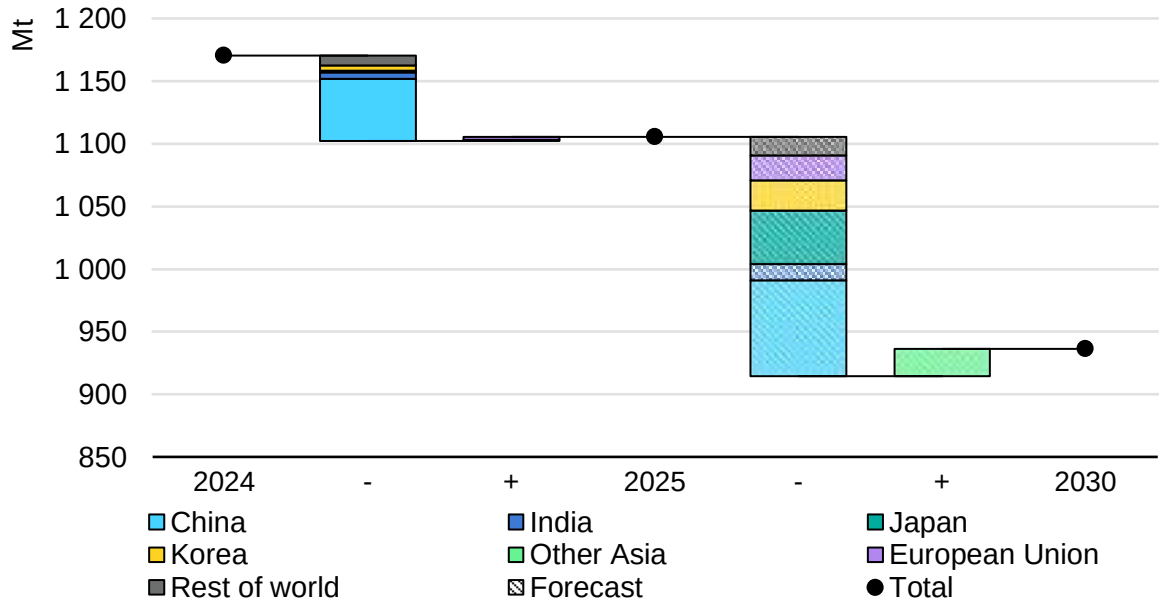
In contrast, thermal coal demand in other Asian countries is projected to increase by 17%, highlighting growing energy needs in emerging economies, especially in the ASEAN region. However, coal imports are in competition with LNG imports, as they can be substituted for power generation. Up to 2030, liquefaction terminals with roughly 300 bcm of capacity globally are expected to enter the market. Thus, a supply glut towards the end of the decade is likely to put downward pressure on LNG prices, thereby challenging the competitiveness of imported coal. The European Union is forecast to cut its coal imports by a substantial 69% to 9 Mt, driven by ambitious climate policies and the ongoing coal phase-out in power generation.

Indonesia, the world's largest exporter, is forecast to ship 363 Mt in 2030, down by 27% from 2025, as demand from traditional buyers weakens. For the same reason, Australia is also expected to see a 5% drop to 200 Mt. Colombia and South Africa are also expected to see notable declines of 35% and 4%, respectively, with 2030 volumes at 31 Mt and 64 Mt.

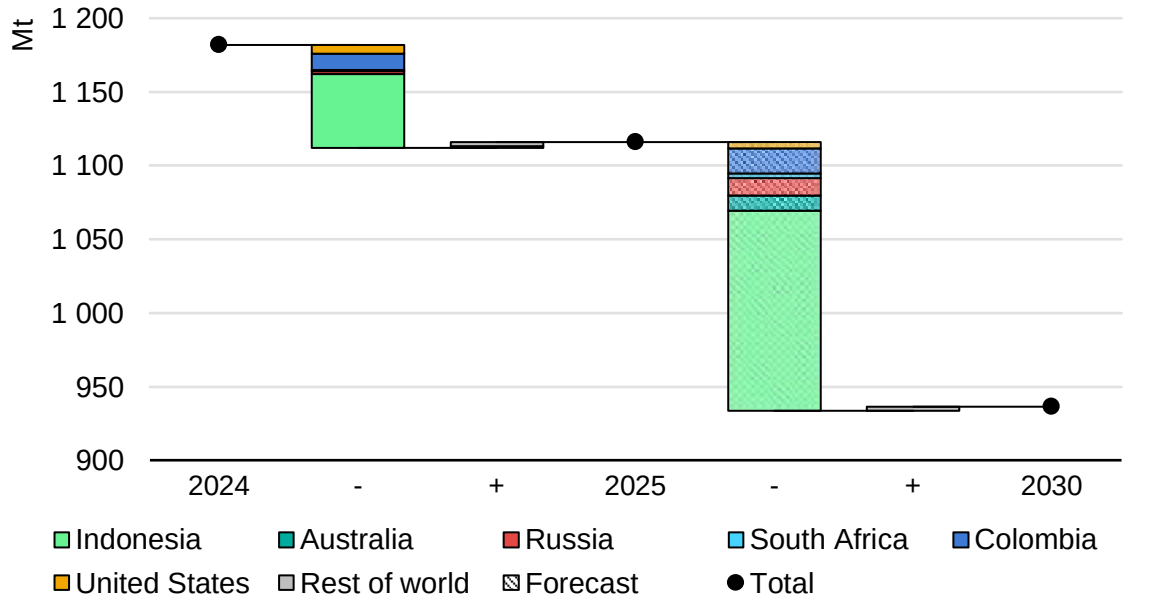
Russia is projected to experience a steep decline, with exports falling by 8% to 135 Mt, largely due to geopolitical constraints meaning reduced access to European and some Asian markets. The Russian government has introduced measures to support the sector, such as granting coal exports via western and southern ports a 12.8% annual price discount on Russian Railways tariffs, establishing agreements between Russian Railways and coal companies in Khakassia to guarantee rail capacity for eastbound coal exports, directing VEB.RF (the Russian state development corporation) to provide financial support to coal enterprises, and proposing international negotiations to remove import duties on Russian coal in China and India. Notably, should Western sanctions against Russia soften or disappear, this outlook would change dramatically.

The United States, traditionally a swing supplier to international markets, is forecast to reduce its annual thermal coal exports during the period at around 36 Mt. The Lao PDR-Viet Nam partnership needs to be monitored as its development is not certain. As with Mongolia's trade with China, Lao PDR currently exports only to Viet Nam, and if its plans to export 30 Mtpa to Viet Nam succeed, it could reduce Viet Nam's need for seaborne coal imports.

Change in global thermal coal imports by market, 2024-2030



Change in global thermal coal exports by country, 2024-2030



Met coal

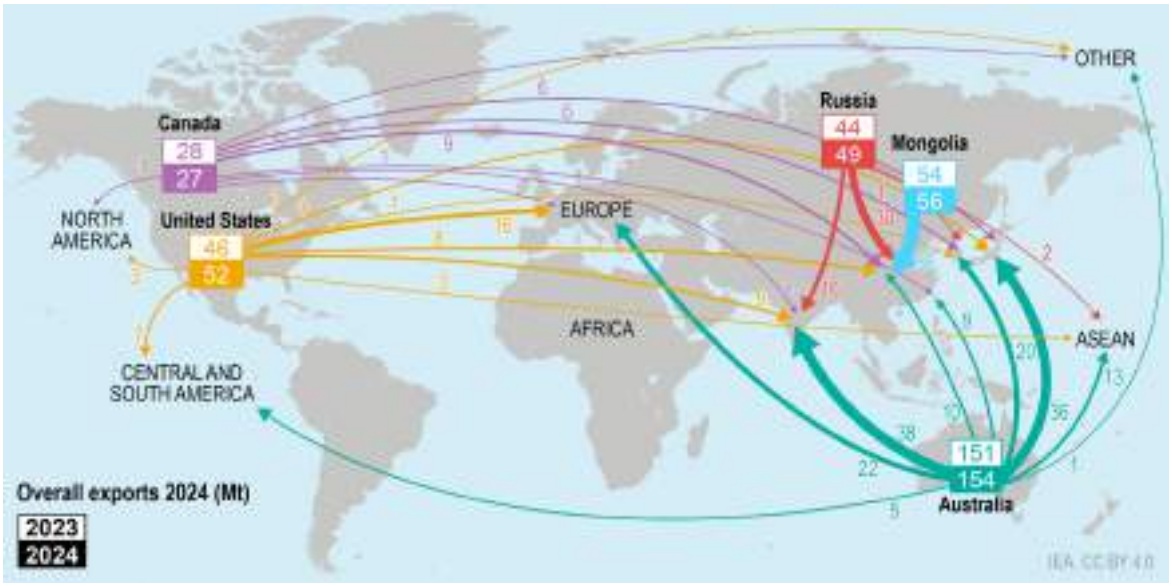
Met coal trade surged in 2024 on Chinese demand

In 2024, global met coal trade increased by 6%, reaching a total of 368 Mt. This growth was primarily driven by rising demand from China, while imports into the European Union and Japan experienced modest declines. Although met coal trade represents roughly one-quarter of total coal trade, its significance is underscored by the fact that international trade accounts for around one-third of total met coal demand.

China and India remained the largest importers of met coal, together representing half of global imports. In China, imports complement domestic production, while India depends more on imports due to lower quality local coking coal unsuitable for steelmaking. China was the world's largest met coal importer in 2024, with volumes increasing by 18% to reach 131 Mt. In contrast, India's imports remained stable at 73 Mt, consistent with 2023 levels. Amid subdued economic growth, the European Union's and Japan's imports declined by 3% to 42 Mt and 39 Mt, respectively.

On the supply side, international met coal markets continue to be dominated by a few key exporters. Australia remained the leading supplier, accounting for 42% of global exports. Mongolia followed with a 15% share, maintaining its position as the second-largest exporter ahead of the United States, which contributed 14%. Russia, once the second-largest exporter, ranked fourth with a 13% share. Despite import bans in the European Union and Japan, Russia's exports rose by approximately 11% to 49 Mt. Canada supplied 8% of global met coal exports.

Main trade flows in the met coal market, 2024 (Mt).



China is the key driver of decline in met coal imports in 2025

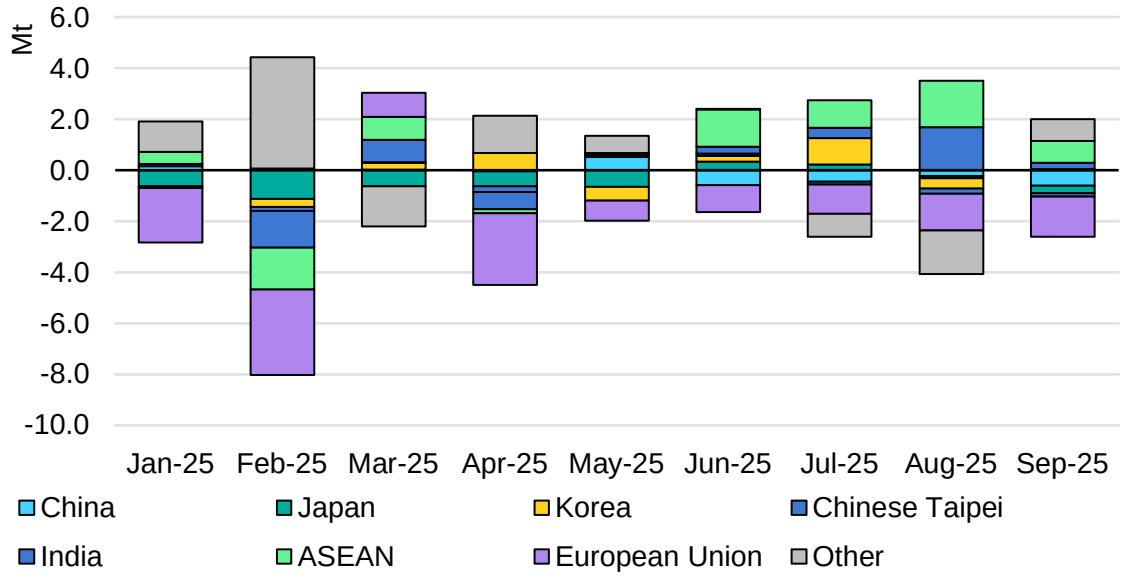
In 2025, global met coal trade is expected to decline by 3% to 357 Mt, down by 11 Mt. After several years of driving growth, China is expected to register the largest absolute reduction in met coal imports. During the first nine months of 2025, Chinese imports fell by more than 6%, and for the full year they are projected to decrease by 9 Mt to 122 Mt. Lower imports have been underpinned by higher output from its primary coking coal production sites in Shanxi, the largest coking coal producing province by far. Thus, Chinese met coal imports from Mongolia dropped in particular.

This Chinese decline is partially offset by India, where met coal imports are expected to increase by 4 Mt in 2025 following a year of flat development in 2024. The main source of imports is Australia, which supplied 39% (22 Mt) until August 2025, followed by Russia with 13 Mt in the same period.

The continuation of sluggish economic performance in the European Union weighed on its demand level, resulting in estimated met coal imports of 41 Mt. Japan's imports declined slightly to 37 Mt, while Korea recorded a drop to 23 Mt. Indonesia saw a notable increase, with imports rising by over 3 Mt to reach 21 Mt.

Australia will still be the top met coal exporter in 2025, supplying 149 Mt globally, despite an 5 Mt drop from the previous year. Volumes directed to the European Union declined the most, down by 13 Mt from January to September year-on-year. As Australian met coal prices declined to less than USD 180/t in September 2025, it forced several producers to cut production. However, it also attracted renewed interest from buyers in Korea, India and the ASEAN region.

Monthly y-o-y change in met coal exports from Australia by destination, 2025



Source IEA analysis based on McCloskey (2025). McCloskey Coal, Metals and Mining Service.

In 2025, Russia is set to maintain stable met coal export volumes at 50 Mt, with a slight increase of 1 Mt due to imports into India. The United States is projected to export 46 Mt, marking a decrease of 6 Mt compared with the previous year. Canada stands out as the only major exporter, besides Russia, to record growth in 2025, with exports rising by 1 Mt to reach 30 Mt.

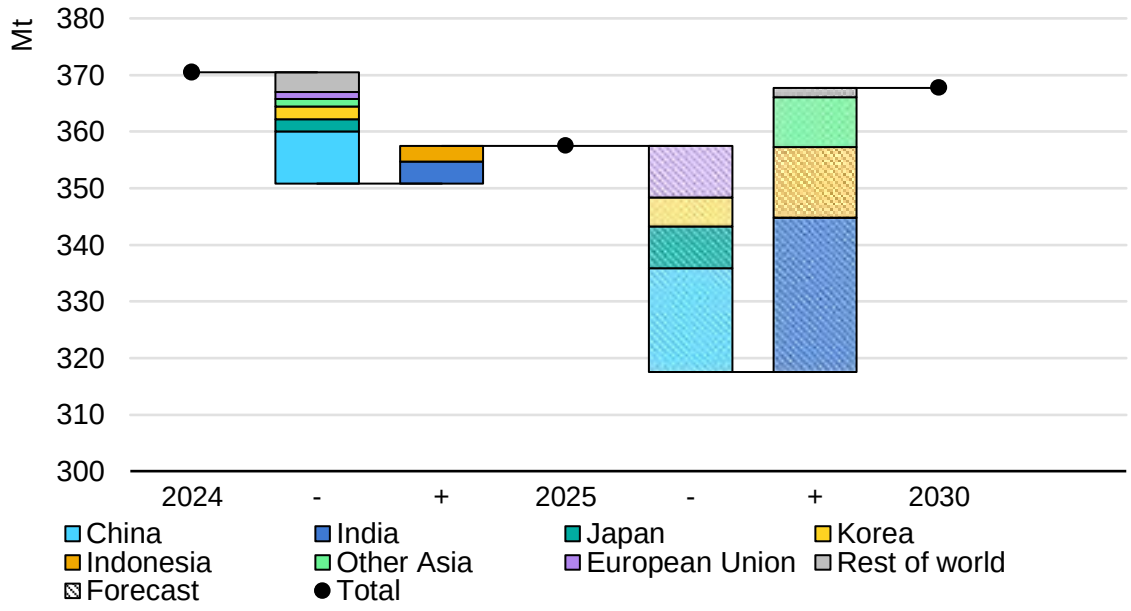
Higher imports into India and Indonesia are to be more than offset by lower imports into Europe through to 2030

Global met coal imports are expected to remain stable over the forecast period. We estimate global met coal trade to settle at 368 Mt in 2030, a slight increase of 3% from 2025, reaching the level seen in 2024. China sheds another 18 Mt, Japan drops 7 Mt, Korea falls by 5 Mt, and the European Union reduces its imports by 9 Mt. These reductions reflect structural changes in steel production and decarbonisation efforts across Asia and Europe. Meanwhile, India adds 27 Mt between 2025 and 2030, becoming the key growth market. Indonesia also grows steadily, adding 12 Mt over the same period, supported by expanding coke production capacity.

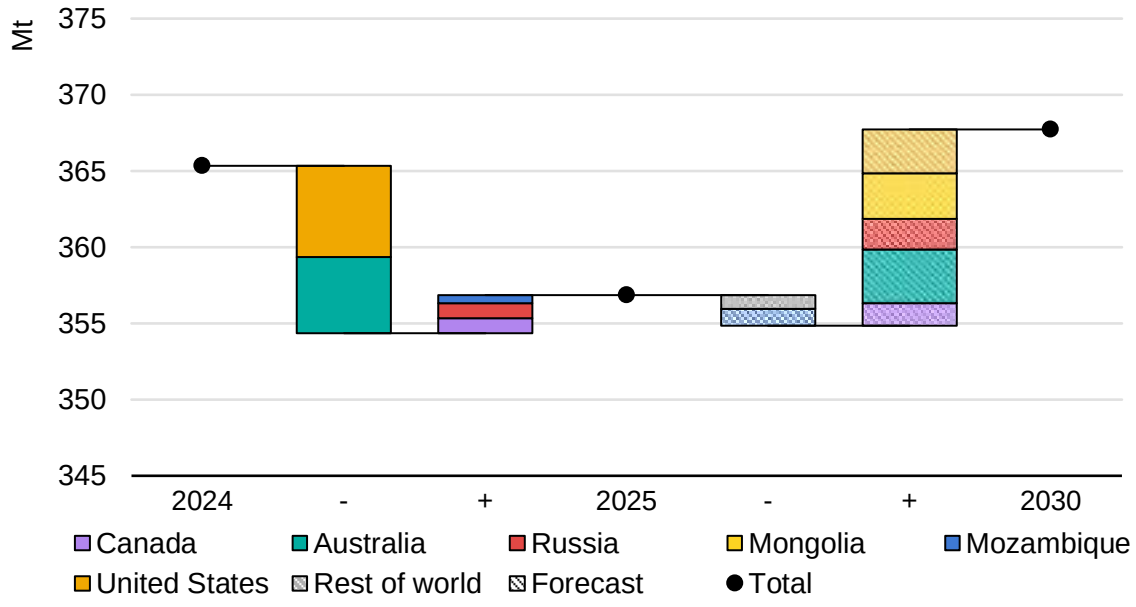
Australia, currently the largest exporter of met coal, remains the top supplier, with exports increasing slightly by 4 Mt to 152 Mt over the five years to 2030. Russia's exports are expected to increase by 2 Mt, reaching 52 Mt by 2030. Mongolian exports are projected to stabilise at around 60 Mt through to 2030. This plateau reflects level demand from China, Mongolia's sole export destination. The United States is forecast to experience a modest recovery, with exports rising slightly to 48 Mt by 2030, supported by policy shifts under the new administration. A positive trajectory is also expected for Canada, with exports set to rise to 31 Mt by 2030.

Our analysis shows that from an economic point of view, it might be profitable for China to import coking coal from Mongolia and export domestic coal in the seaborne market. This is subject to international market prices and depends on the policies of the Chinese government, which sets export quotas.

Change in met coal imports by market, 2024-2030



Change in met coal exports by country, 2024-2030



Prices and costs

Prices

Coal prices averaging lower in 2025 than in previous years

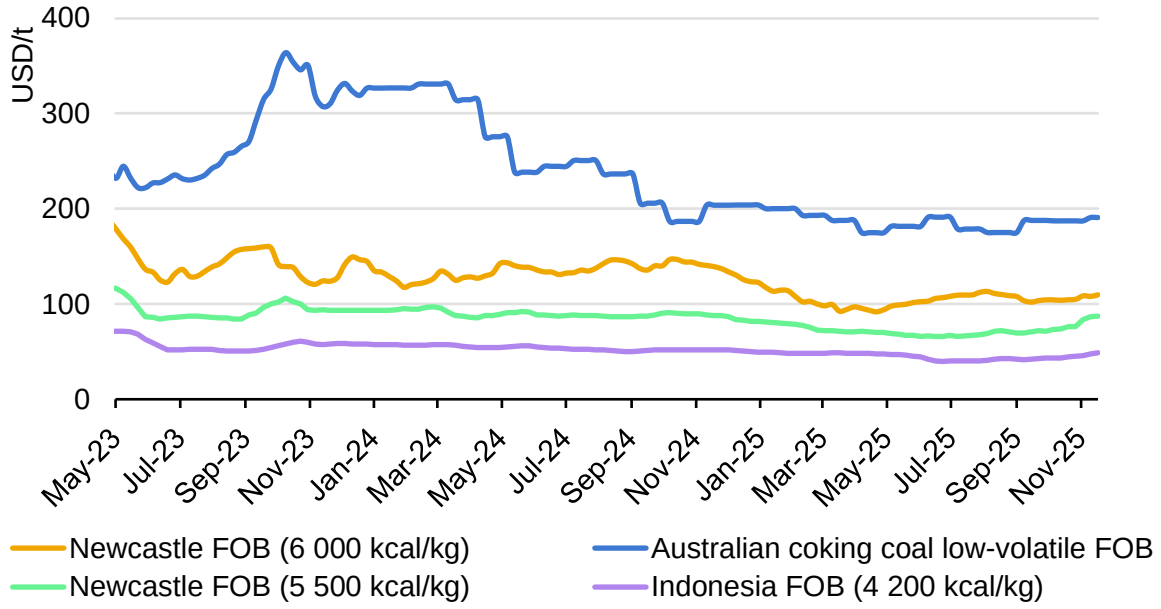
After unprecedented prices in 2021 and 2022 amid the energy crisis, coal prices continued to be higher than the pre-Covid levels throughout 2023 and 2024. Prices for different coal qualities generally move in tandem, as partial substitution is possible. Thermal coal is mainly consumed in power generation and in this section is classified into low-CV (CV below 4 200 kcal/kg), mid-CV (CV between 4 200 kcal/kg and 5 700 kcal/kg) and high-CV (CV above 5 700 kcal/kg) categories. In some cases, direct substitution between grades is feasible, and blending higher-grade coal with lower-grade coal is commonly employed to meet specific quality requirements. Coking coal is the most important type of met coal and is primarily used in the production of coke for steelmaking.

In the Pacific Basin thermal coal price markers have moved in correlation. Between January and August 2025, the price of high-CV coal averaged USD 104/t. Mid-CV and low-CV coal recorded average price levels of USD 71/t and USD 45/t, respectively. Most volatility occurred in the high-CV market, where prices fluctuated between USD 92/t and USD 122/t, while for low-CV the spread was only USD 9/t.

Met coal prices have followed a distinct trajectory since mid-2023, with significantly higher volatility compared with high-CV thermal coal. Prices exceeded USD 350/t in the third quarter of 2023, driven by rising demand from China and India. Market tightness eased in the second quarter of 2024, supported by increased exports from Mongolia to China. Since then, prices continued to decline, averaging USD 186/t in the first eight months of 2025.

Recent market movements underscore the different dynamics of coal prices, which are influenced by segment-specific factors and vary by region and coal quality. Nonetheless, except for high-CV thermal coal, price indicators suggest greater stability in 2025 compared with previous years.

Price markers for different qualities of coal, 2023-2025



Notes: FOB = free on board.
Source: IEA analysis based on data from Argus Media Group (all rights reserved).

Thermal coal price markers have edged towards pre-Covid levels in 2025

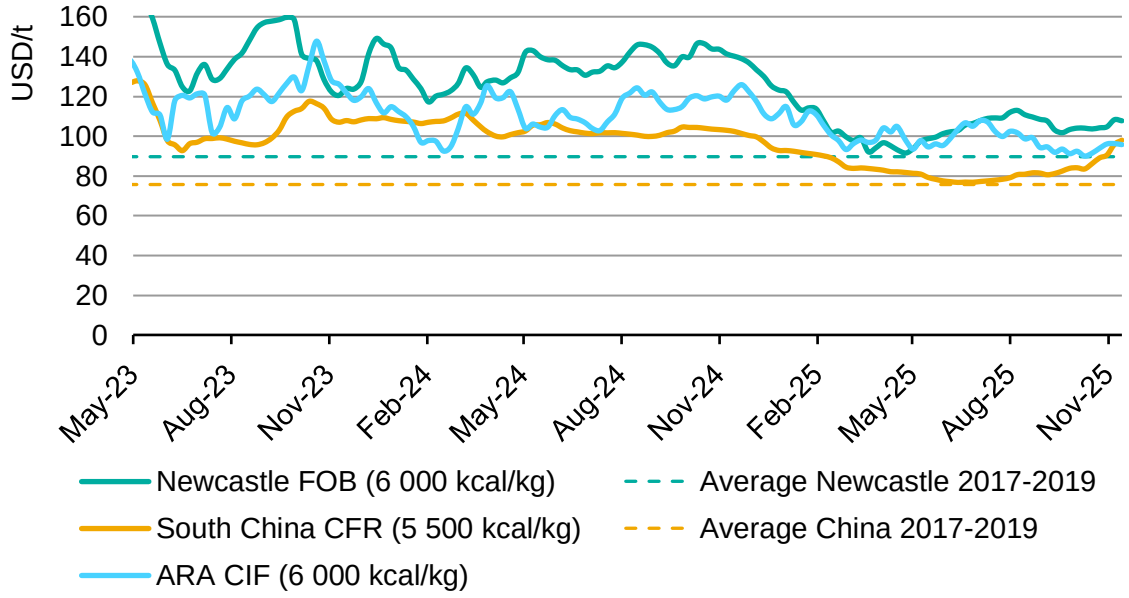
Coal benchmark prices moderated in 2025 compared with 2024 across the major Atlantic and Pacific markers, while remaining above the pre-Covid-19 average (2017-2019) in nominal terms. Newcastle FOB (6 000 kcal/kg) averaged USD 104/t in 2025, a decrease of 22% from 2024, yet still around 17% above its 2017-2019 baseline of USD 89/t. The price of 6 000 kcal/kg coal at the Amsterdam Rotterdam Antwerp ports (ARA) including cost, insurance and freight (CIF) averaged USD 101/t in 2025, down 10% y-o-y but still about 12% higher than the 2017-2019 average of USD 90/t. South China including cost and freight (CFR) (5 500 kcal/kg) averaged USD 83/t in 2025, 20% lower than in 2024, yet still approximately 9% above the 2017-2019 average of USD 76/t.

The most pronounced y-o-y price adjustment occurred at Newcastle, reflecting softer supply–demand dynamics for high-CV seaborne coal in the Pacific Basin. While ARA prices also declined, the drop was less severe, supported by stronger than anticipated demand in the Atlantic Basin. In contrast, the South China CFR marker experienced a significant decrease, driven by robust domestic production and abundant stockpiles, which dampened import demand and consequently put downward pressure on import prices.

In 2025 price differentials between major coal benchmarks narrowed significantly. The spread between Newcastle FOB and ARA CIF contracted from USD 21/t in

2024 to just USD 3/t, indicating a more balanced supply–demand dynamic between the Pacific and Atlantic Basins and increasingly aligned market expectations across regions. The continued discount of South China CFR relative to Newcastle and ARA remains consistent with differences in coal calorific value, even when accounting for freight and delivery terms embedded in CFR pricing.

Thermal coal price markers, 2023-2025



Notes: ARA = Amsterdam Rotterdam Antwerp; CIF = cost, insurance and freight; CFR = cost and freight; FOB = free on board.
Source: IEA analysis based on data from Argus Media Group (all rights reserved).

Russian discounts are mostly in the high-quality coal trade

Prior to Russia's full-scale invasion of Ukraine in early 2022, Russian coal prices from Baltic and Black Sea ports closely tracked European import prices (ARA), reflecting Russia's role as a key supplier to European markets. However, the war and subsequent sanctions, including the EU ban on Russian coal imports, disrupted this relationship. Russian coal prices began to diverge from European benchmarks, with discounts deepening due to restricted market access and the need to attract alternative buyers.

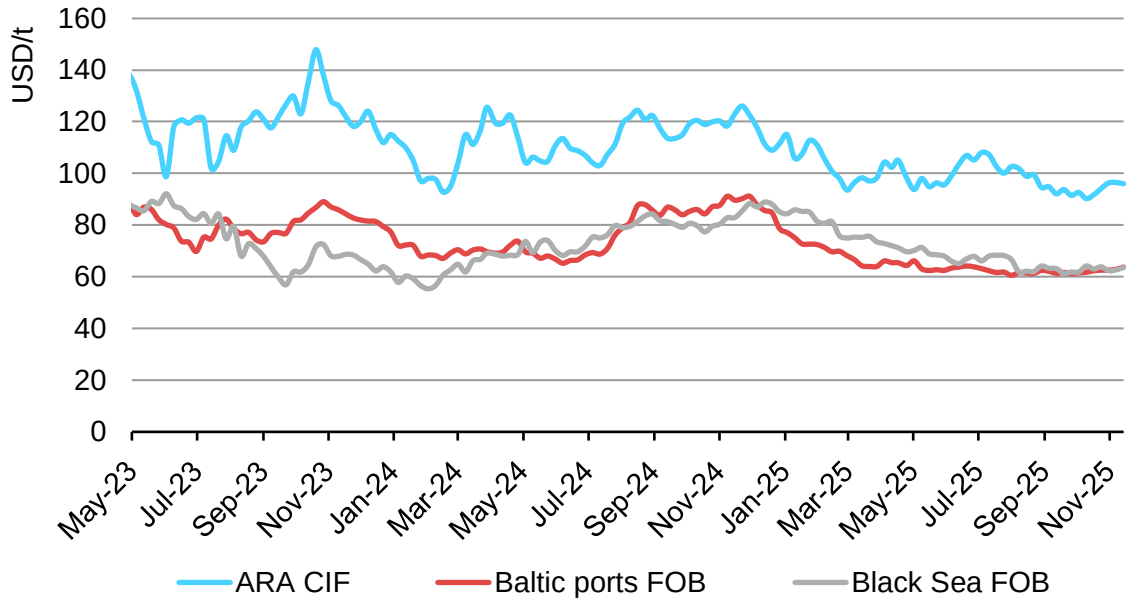
The discount on high-CV Russian coal has remained persistent. In 2024, Russian coal from Baltic ports traded at an average discount of USD 36/t to ARA, excluding insurance and freight costs. This trend continued into 2025, with the discount holding steady at USD 36/t. The persistence of this discount reflects both geopolitical constraints and the compliance of European buyers with sanctions.

A similar pattern is evident in the Pacific Basin. Historically, Russian high-CV coal exported from Far Eastern ports closely tracked Australian high-CV prices because of overlapping buyer bases in Asia. However, since the invasion, Japan and South Korea, which are the main buyers of high-CV thermal coal in the region, have aligned with sanction regimes and reduced their intake of Russian coal, resulting in sustained discounts. In 2024, the average discount on Russian high-CV coal at Vostochny was USD 31/t, although this has narrowed to USD 21/t in 2025, as most Russian producers cannot reduce prices further.

For the years 2023-2025, we estimate that discounts have resulted in over USD 15 billion in potential lost revenue for Russian coal producers, with more than 80% of the losses concentrated in the Pacific Basin. These numbers should be considered with caution, as over half of this potential revenue loss occurred in 2023, when prices were high due to the crisis after Russia's invasion of Ukraine, while the projected loss for 2025 is approximately USD 3 billion.

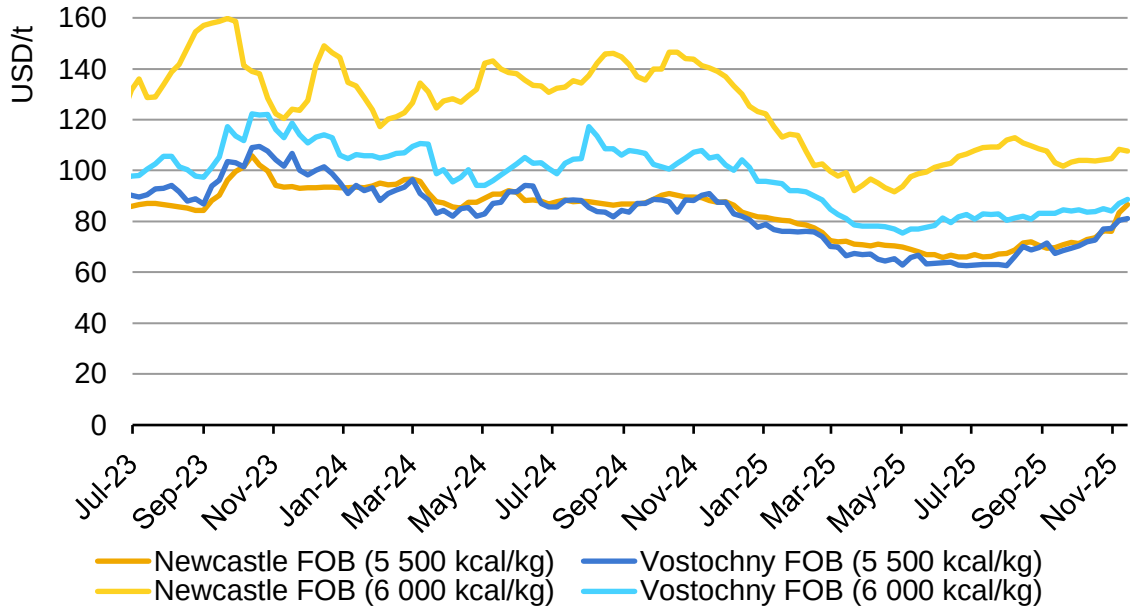
In contrast, the mid-CV segment has shown greater price convergence. In 2024 and 2025, the price spread remained minimal, with Russian coal trading at just USD 2-3/t below Australian benchmarks, indicating a more lenient buyer base of non-OECD Member countries in this segment.

European and Russian high-CV (6 000 kcal/kg) price markers, 2023-2025



Notes: ARA = Amsterdam Rotterdam Antwerp; CIF = cost, insurance and freight; FOB = free on board.
Source: IEA analysis based on Argus Media Group (all rights reserved).

Australian and Russian thermal coal price markers, 2023-2025



Notes: FOB = free on board. Vostochny = port in the Russian Far East.
Source: IEA analysis based on Argus Media Group (all rights reserved).

The appreciation of the US dollar has had an impact on coal importers

International coal trade is primarily priced in US dollars, making exchange rates a key factor in coal competitiveness. When a currency depreciates against the US dollar, the cost of coal for buyers generally increases, making purchases more expensive.

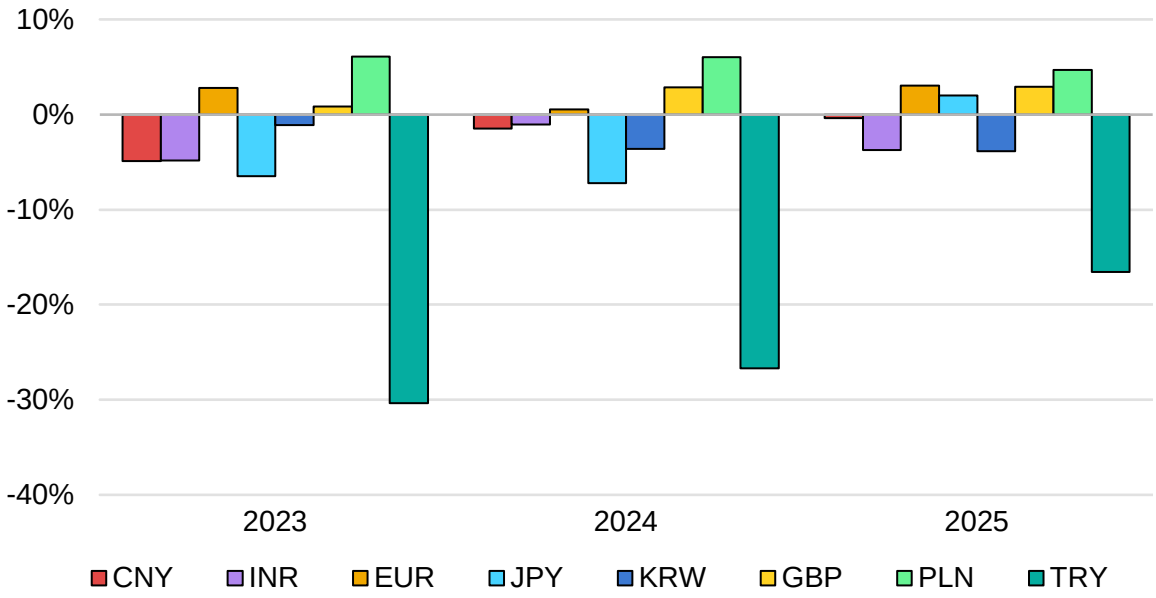
In recent years, currency movements have continued to shape coal import dynamics. Several currencies resumed their depreciation against the US dollar in 2024 and 2025. The Turkish lira remained the weakest, depreciating by over 15% in 2025 following a 27% decline in 2024, further straining Türkiye's coal import costs. The Indian rupee and the Korean won also weakened notably, by 3% and 4% respectively in 2025, while the Chinese yuan saw a more moderate decline of 0.7%.

The Japanese yen, the euro and the British pound showed modest but consistent gains in 2025 at 1.9-2.4%.

Poland stands out as a notable exception. The Polish zloty appreciated by over 6% in both 2023 and 2024 and maintained positive momentum in 2025 with a further 3.7% gain. These gains reflect strong economic performance, as Poland recorded the highest growth rates in the European Union. This sustained

appreciation has helped offset coal import costs and supported Poland's purchasing power in international markets.

Y-o-y development of selected importing countries' currencies against the US dollar, 2023-2025



Notes: CNY = Chinese yuan renminbi; INR = Indian rupee; EUR = euro; JPY = Japanese yen; KRW = Korean Republic won; GBP = British pound sterling; PLN = Polish zloty; TRY = Turkish lira. 2025 values represent average exchange rates to October 2025.

Source: OECD (2025), Monthly Monetary and Financial Statistics (MEI) exchange rates (USD monthly averages).

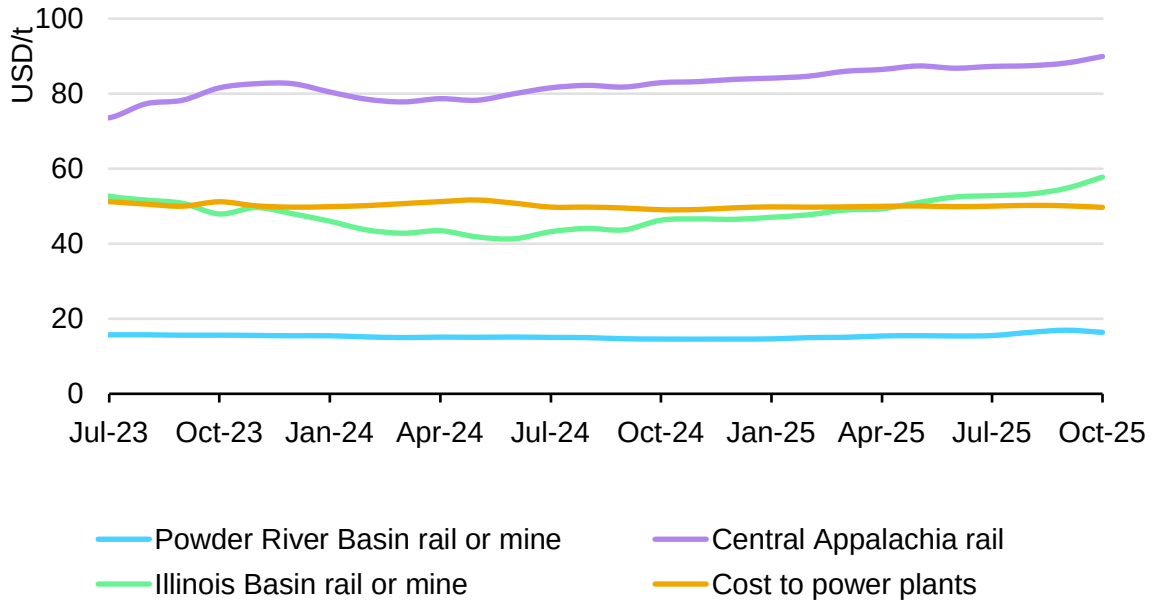
US coal consumers benefited from more stable prices due to long-term contracts

United States domestic coal prices remained largely driven by domestic consumption under long-term contracts, typically indexed to cost inflation metrics such as diesel prices. In 2024, the average cost of coal delivered to US coal-fired power plants relative to 2023 declined by 3.2% to USD 52/t, before rising to USD 53/t by August 2025.

Regional price dynamics varied significantly. In the Illinois Basin prices reached a low of USD 44/t in August 2024 but recovered by 20% over the following 12 months. In contrast, spot prices in the Central Appalachian region increased by 5% in 2024 and a further 4% in 2025, averaging USD 86/t. Prices in the Powder River Basin remained broadly stable, fluctuating only by a few cents around USD 15/t, reflecting the region's limited exposure to export markets.

The price spread between regions persisted, with Appalachian prices averaging USD 26/t higher than Illinois Basin prices during the first eight months of 2025, largely due to differences in coal quality, location and mining costs.

Spot coal prices in different regions and average cost of coal supplied to power plants in the United States, 2023-2025



Sources: IEA analysis based on Argus Media Group (all rights reserved) and EIA (2025), STEO.

Coal prices are lower and less volatile than oil or natural gas prices

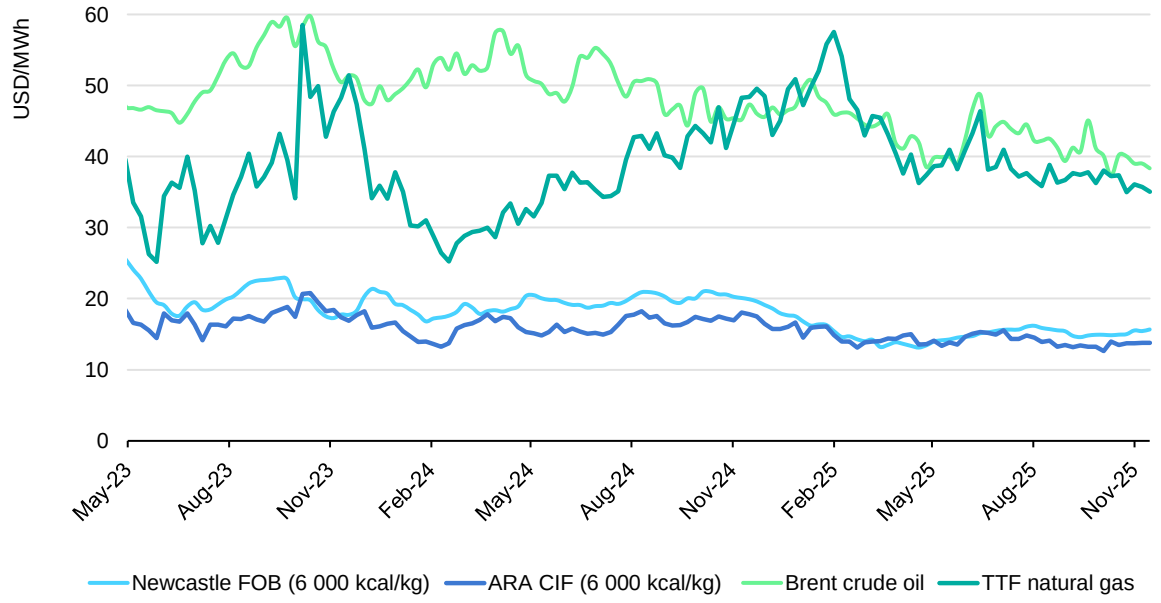
In 2023 and 2024, energy commodity prices remained elevated but were significantly lower than the peaks observed during the energy crisis. Throughout this period, Brent crude oil and TTF natural gas were consistently priced above coal benchmarks such as Newcastle FOB and ARA CIF when measured in terms of energy content.

TTF natural gas averaged USD 37/MWh (USD 11/MBtu) in 2024, but increased by 12% to USD 42/MWh (USD 12.3/MBtu) during the first nine months of 2025. Brent crude oil averaged USD 82 per barrel in 2024, equivalent to USD 50/MWh, but had declined by 13% to USD 71 per barrel or USD 44/MWh by September 2025.

Coal prices, already lower in energy-equivalent terms, fell further. Newcastle FOB (6 000 kcal/kg) dropped from USD 19/MWh (USD 134/t) in 2024 to USD 15/MWh (USD 104/t) in 2025, a 23% decrease. ARA CIF (6 000 kcal/kg) declined from USD 16/MWh (USD 113/t) to USD 14/MWh (USD 100/t), down 11% y-o-y.

These developments highlight the comparatively low valuation of coal in energy terms, particularly in 2025, when coal benchmarks reached their lowest levels in recent years. The widening gap between coal and other energy commodities underscores the competitiveness of coal as an energy carrier.

Prices of selected energy commodities, 2023-2025



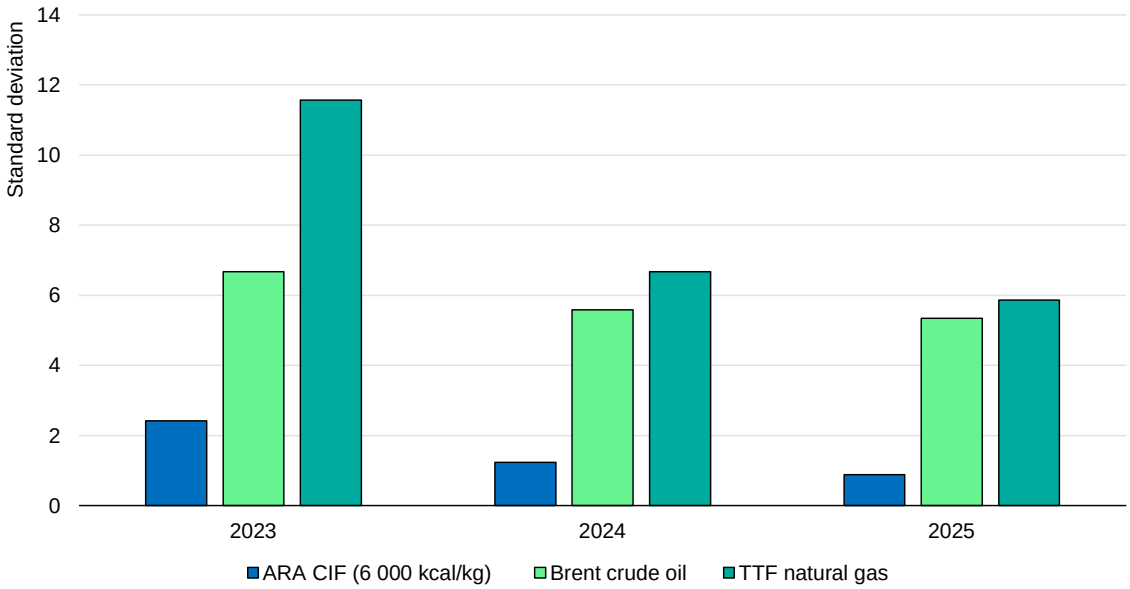
Notes: ARA = Amsterdam Rotterdam Antwerp; CIF = cost, insurance and freight; FOB = free on board; TTF = Title Transfer Facility.
Source: IEA analysis based on Argus Media Group (all rights reserved).

In addition to lower price levels, coal benchmarks have exhibited significantly reduced volatility compared with oil and natural gas indexes. This difference has become increasingly pronounced in the years since the energy crisis.

Since 2023, volatility in coal markets has remained consistently low. The ARA CIF index (6 000 kcal/kg) dropped to a standard deviation of 2 in 2023 and stabilised at 1 in both 2024 and 2025. In contrast, Brent crude oil showed higher volatility, albeit decreasing from 7 in 2023 to 5 in 2025. TTF natural gas remained the most volatile, with standard deviations of 11 in 2023 and 6 in 2025.

These developments highlight the relative stability of thermal coal prices compared with oil and gas. While natural gas and crude oil continue to be influenced by geopolitical risks and supply-side uncertainties, coal markets have shown more predictable and subdued price movements.

Standard deviation of weekly European energy commodity prices, 2023-2025



Notes: ARA = Amsterdam Rotterdam Antwerp; CIF = cost, insurance and freight; TTF=Title Transfer Facility.
Source: IEA analysis based on Argus Media Group (all rights reserved).

Forward markets for coal and natural gas decouple

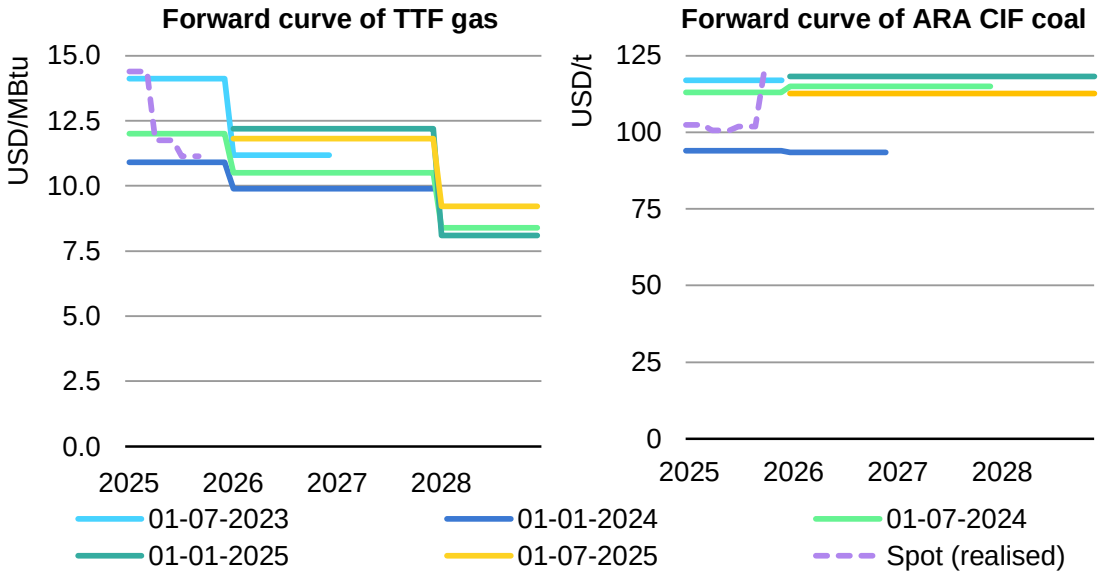
Normally, movements in the gas market exert a strong influence on coal prices because gas and coal are key substitutes in power generation. However, recent developments in forward pricing suggest a growing divergence between the two commodities. As of July 2025, the forward curve for ARA CIF coal remains broadly unchanged from its July 2023 level, hovering around USD 110/t. Moreover, coal forward curves have remained relatively flat across the coming years, indicating stable market expectations and limited anticipated shifts in supply–demand fundamentals.

In contrast, the TTF gas forward curve has shown a consistent downward trajectory across successive observation dates. In July 2023, forward prices for 2025 delivery were near USD 14/MBtu, falling to around USD 8/MBtu for a delivery in 2028. The January 2024 curve started at a lower level of approximately USD 11/MBtu, while subsequent curves in January and July 2025 began well above USD 10/MBtu. These later curves also exhibited a less pronounced backwardation, with smaller differences between delivery years.

The more dynamic movement in gas prices, particularly in the front years of the curve, reflects expectations of expanding LNG supply capacity, which is anticipated to exert downward pressure on prices over time. Coal markets, by contrast, lack a comparable supply expansion outlook. This structural difference is contributing to the divergence in both the level and trajectory of forward curves

for coal and gas. Another factor behind the decoupling of coal and gas price signals in Europe is the reduced ability to switch between the two fuels in power generation. As coal phase-out policies advance, European countries have limited flexibility for short-term coal-to-gas shifts, weakening the traditional link between these markets.

Forward curve development for TTF gas prices and ARA CIF coal prices, 2023-2025



Notes: ARA = Amsterdam Rotterdam Antwerp; CIF = cost, insurance and freight; TTF=Title Transfer Facility.
Source: IEA analysis based on Argus Media Group (all rights reserved).

Costs

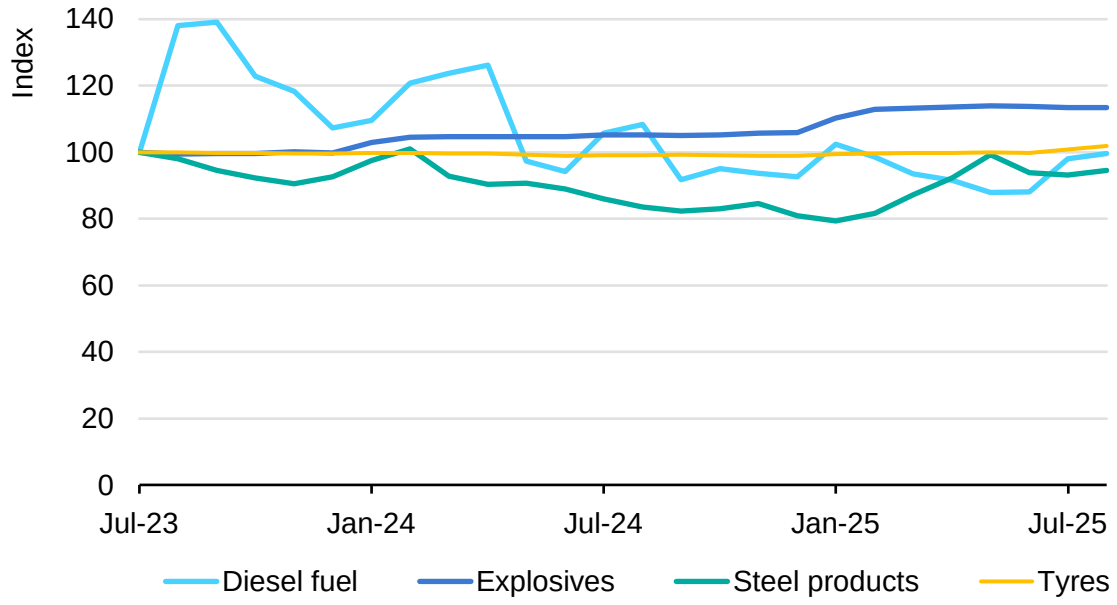
Input costs drive the coal supply cost curve, displaying varying volatility

The cost structure of coal mines is primarily shaped by operating expenses, which include labour, fuel, taxes and royalties. Transport-related costs include inland logistics, port charges and, unless sold FOB, seaborne freight. These cost components vary depending on the mining method, particularly the difference between surface and underground operations, as well as by producer, country and site-specific characteristics.

Globally traded input materials such as diesel fuel, explosives, tyres and steel products continue to be influenced by international market dynamics. Between 2023 and August 2025, price movements across these categories remained uneven. Explosives recorded a cumulative increase of 13%, while tyre prices remained broadly stable over the period. In contrast, diesel fuel prices declined by

2%, and steel products saw a more pronounced drop of 7%. The decline in diesel and steel product prices was largely driven by falling oil market prices and persistent overcapacity in the global steel industry.

Nominal price of selected commodities and input factors used in coal mining, 2023-2025



Source: IEA analysis based on US Bureau of Labor Statistics (2024), Producer Price Indexes.

Export currencies experience contrasting fortunes against the US dollar

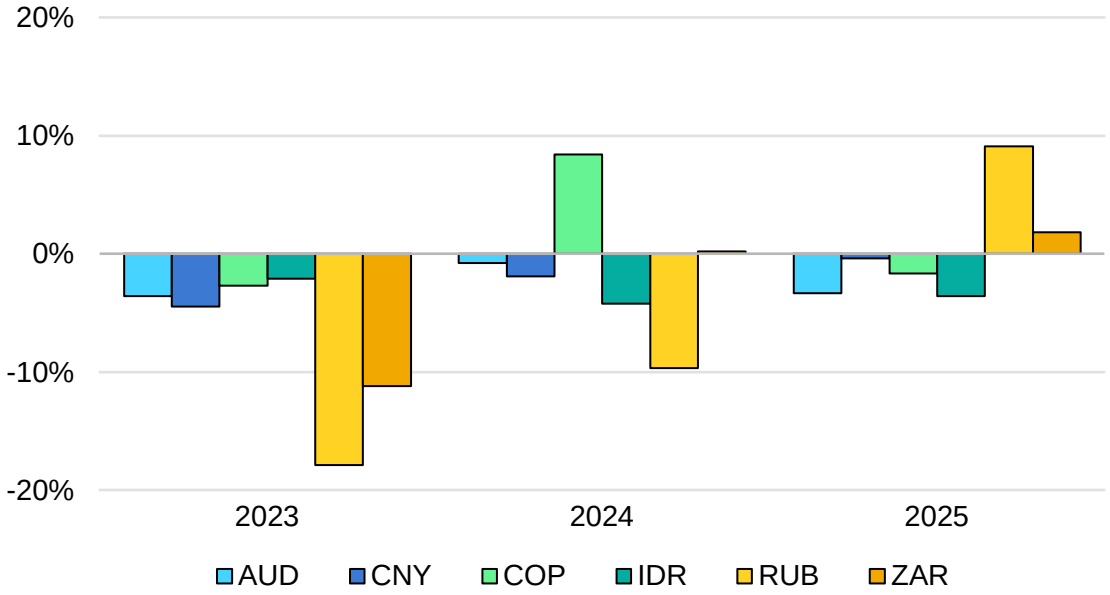
Currency exchange rates continue to influence the global competitiveness of coal exporters. Although international coal transactions are primarily settled in US dollars, a substantial proportion of mining operating costs, such as labour, are incurred in local currencies. Consequently, when local currencies depreciate against the US dollar, the dollar-denominated cost of production declines, improving the cost efficiency and competitiveness of producers in international markets.

Between 2022 and 2024, most coal-exporting countries experienced currency depreciation against the US dollar, largely driven by elevated interest rates in the United States. This trend has continued into 2025 for several key exporters. The Australian dollar has fallen by 4% in 2025, following a cumulative depreciation of 13% over the previous three years. The Indonesian rupiah has declined by 3% in 2025, extending its downward trend. The Russian rouble, which had weakened considerably in 2023 and 2024, has appreciated by 8% in 2025, partially offsetting previous losses. However, this appreciation is exerting renewed pressure on the

profitability of Russian coal producers by increasing the dollar-equivalent cost of local expenditure. South Africa's rand has also strengthened slightly, gaining 1%.

In 2024, the Colombian peso stood out as the only major coal-exporting currency to appreciate against the US dollar. However, it has depreciated by 3% in 2025.

Y-o-y development of China's and exporting countries' currencies against the US dollar, 2023-2025



Notes: AUD = Australian dollar; CNY = Chinese yuan renminbi; COP = Colombian peso; IDR = Indonesian rupiah; RUB= Russian rouble; ZAR = South African rand. The chart displays the y-o-y average exchange rate development of the selected currencies expressed as the change from the previous year. 2025 represents average exchange rates to October 2025.

Source: OECD (2025), Monthly Monetary and Financial Statistics (MEI): Exchange rates (USD monthly averages).

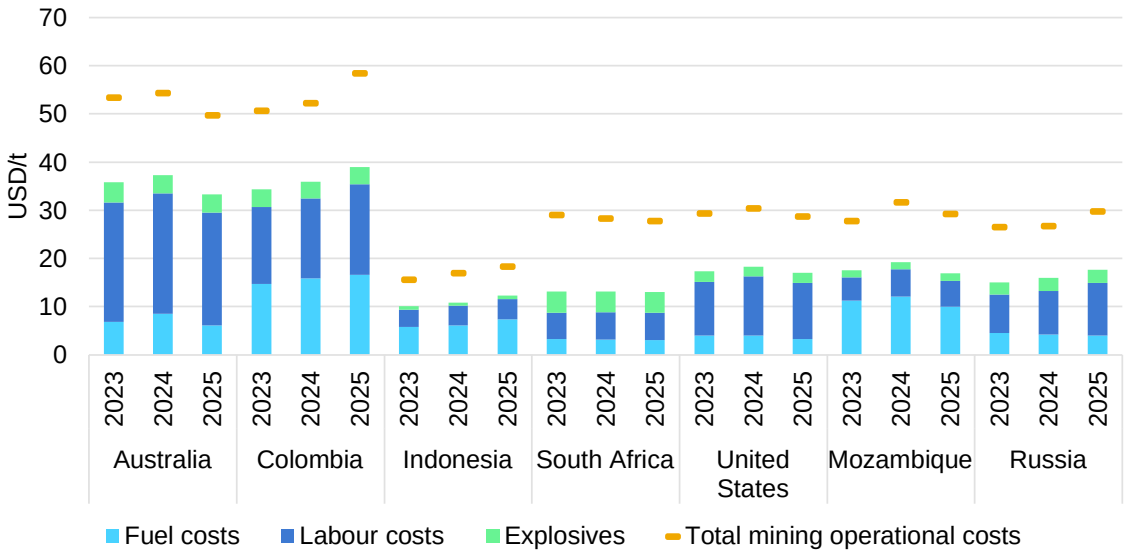
In 2025, operational costs for coal mining destined for export continued to vary significantly across regions, reflecting differences in mining practices, input prices and productivity. While some countries achieved cost reductions, others faced increases driven by higher labour or fuel expenses.

Fuel costs remained a major component in countries with extensive opencast mining, such as Indonesia and Mozambique, accounting for around 40% and 34% of total mining costs, respectively. As oil markets eased in 2025, fuel expenditure generally declined. The notable exception was Indonesia, where mandatory biofuel blending in mining operations pushed fuel costs up by around 20%. In countries with high wage levels, such as Australia and the United States, labour costs continued to dominate overall expenses. Because these costs are paid in local currencies, currency appreciation against the US dollar, as occurred in Russia in 2025, significantly increases labour costs when expressed in US dollars. Blasting-related costs remained relatively stable across most countries, typically

representing between 4% and 9% of total costs. South Africa stood out for its high share of blasting-related costs at 16%, reflecting its continued reliance on blasting in hard rock mining environments.

Looking at total operational costs, Colombia recorded the highest level in 2025 at USD 59/t, up by 12% from 2024. Australia, while still the second most expensive, saw a notable decline, with costs falling from USD 54/t in 2024 to USD 50/t in 2025, reversing earlier increases thanks to reductions in both fuel and labour inputs. In contrast, Indonesia maintained the lowest costs globally at USD 18/t, despite upward pressure from biofuel obligations.

Indicative cost split of mining operational costs, 2023-2025



Note: Calculated average production-weighted fuel costs and total operating costs.
Source: IEA analysis based on CRU (2025), DataLab.

Royalties vary strongly by jurisdiction, but have been declining further in 2025

Governments typically impose royalties on each tonne of coal produced or sold in exchange for mining licences. These royalties have been adjusted in recent years, particularly in response to high coal prices in 2022, with significant variation across countries and regions.

Queensland has recorded the highest royalty levels globally. In June 2022, Queensland amended its coal royalty regime, applying six progressive coal royalty tiers depending on prices. In 2024 the state collected an average of USD 31/t under its progressive royalty scheme that links rates to coal prices. As prices moderated, average royalties declined to around USD 20/t in 2025. In May 2024,

the Queensland government introduced the Progressive Coal Royalties Protection Bill 2024 to establish a floor in royalty rates for future years.

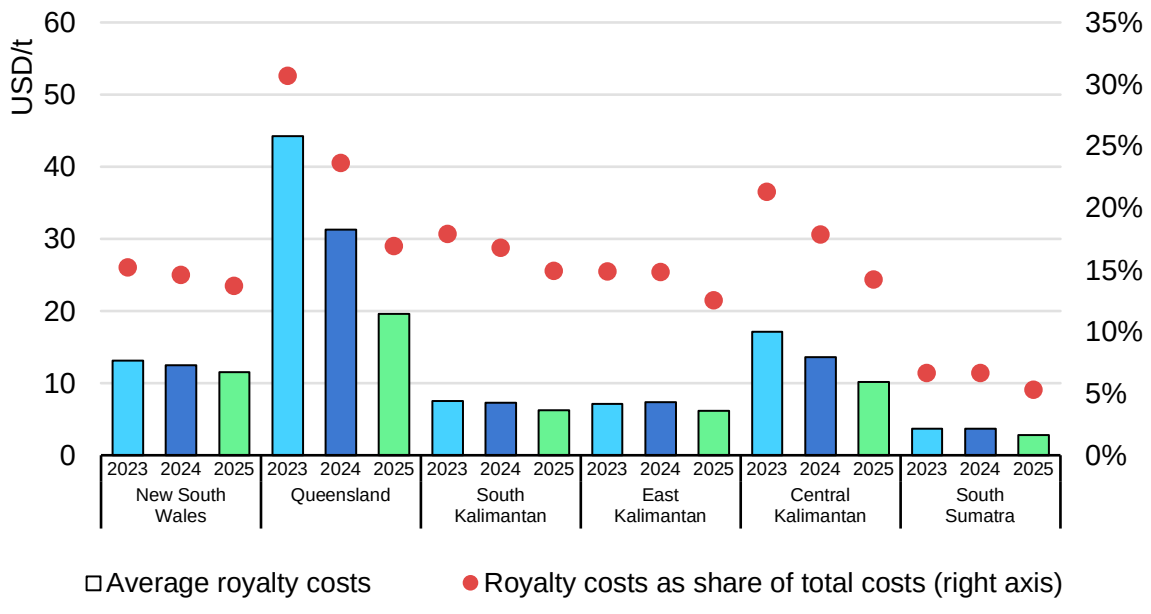
Other Australian states apply different schemes. In New South Wales rates vary by extraction method, using three tiers: surface, shallow underground and deep underground mining, while Western Australia maintains significantly lower royalty shares reflecting the lower value of their coal resources. Overall Australian royalties in 2025 remain higher than before the crisis.

Indonesian provinces raised royalty rates during the energy crisis of 2022, increasing them from 13.5% to a range of 14-28 %, with the highest rate applying when prices exceed USD 100/t. The highest royalties per tonne are paid in Central Kalimantan, with an estimated average of USD 10/t in 2025.

In the United States, the One Big Beautiful Bill Act lowered the royalty for existing and new coal leases on federal lands from 12.5% to 7%.

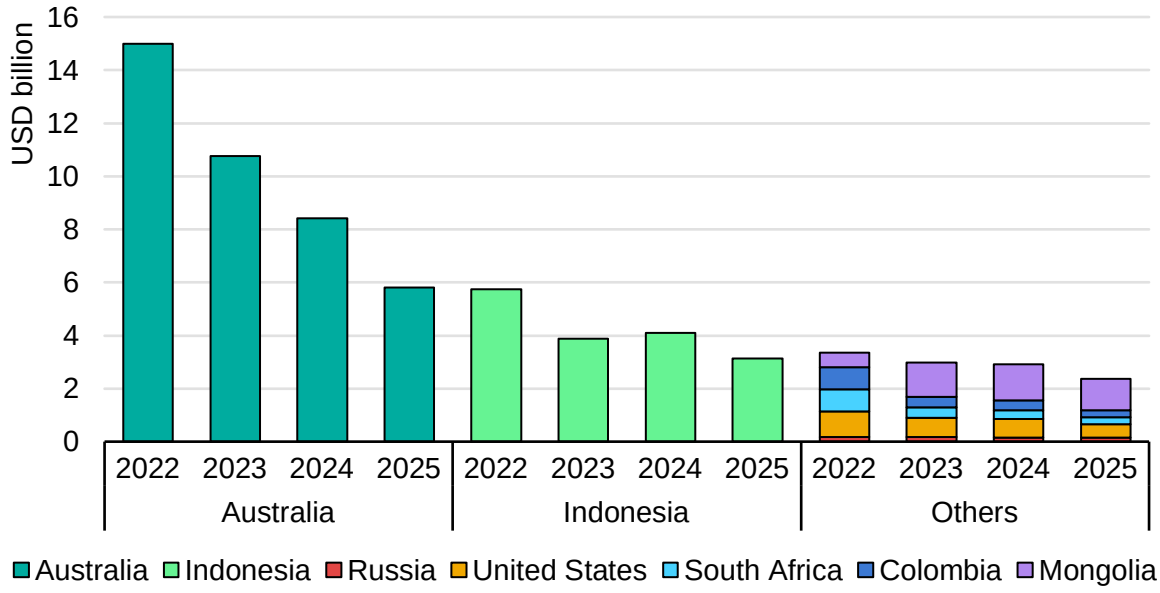
Overall, the drop in coal prices in 2025 has reduced total government revenues from coal exports. Royalties in Australia are estimated to fall by USD 2 billion to USD 6 billion in 2025, while in Indonesia estimates are a 24% decline to USD 3 billion. In other coal-exporting countries, revenues from export-related royalties are estimated to be 20% lower in 2025 compared with 2024.

Average royalties and royalties as a share of total costs, selected countries, 2023-2025



Note: The 2025 figures are an estimation based on the averages from January to September.
Source: IEA analysis based on CRU (2025), DataLab.

Total royalties on exported coal, selected countries, 2022-2025



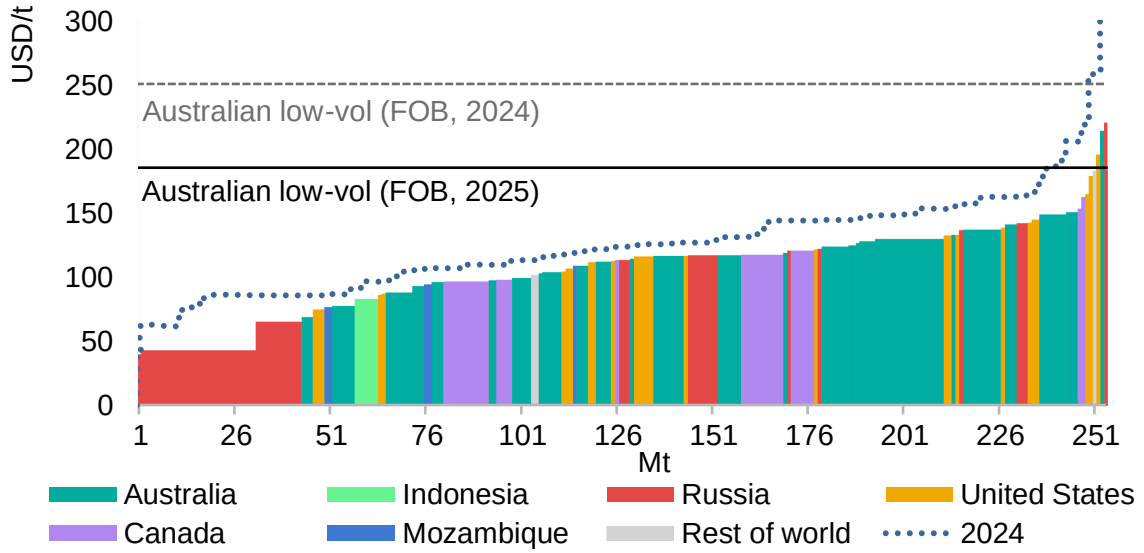
Note: The 2025 figures are an estimation based on the averages from January to September.
Source: IEA analysis based on CRU (2025), DataLab.

Supply cost curves are once again lower in 2025

Met coal mining generally incurs the highest production costs because it is predominantly extracted from underground operations, often at smaller sites, and requires more extensive preparation. These additional expenses are offset by the superior quality of met coal and its higher market price, which justify the elevated production costs. In 2025, the short-run marginal cost curve for hard coking coal seaborne exports declined compared with the previous year, falling from a volume-weighted average of USD 182/t to USD 149/t. This reduction was mainly driven by lower transport costs resulting from lower oil prices. In addition, lower market prices reduced royalty payments in jurisdictions with progressive royalty schemes, such as Queensland. At the lower end of the cost curve, the sharpest decrease occurred at the Elga mine in Russia following the opening of a private rail line. While the use of a private rail line reduced the short-run marginal costs of the mine, its capital expenditure requirements increased.

Global trade in met coal has eased in 2025, resulting in an estimated overall reduction in seaborne supply of coking coal of 10 Mt. Despite this decline, some regions recorded higher export volumes. For instance, mines in West Virginia increased shipments by around 60%.

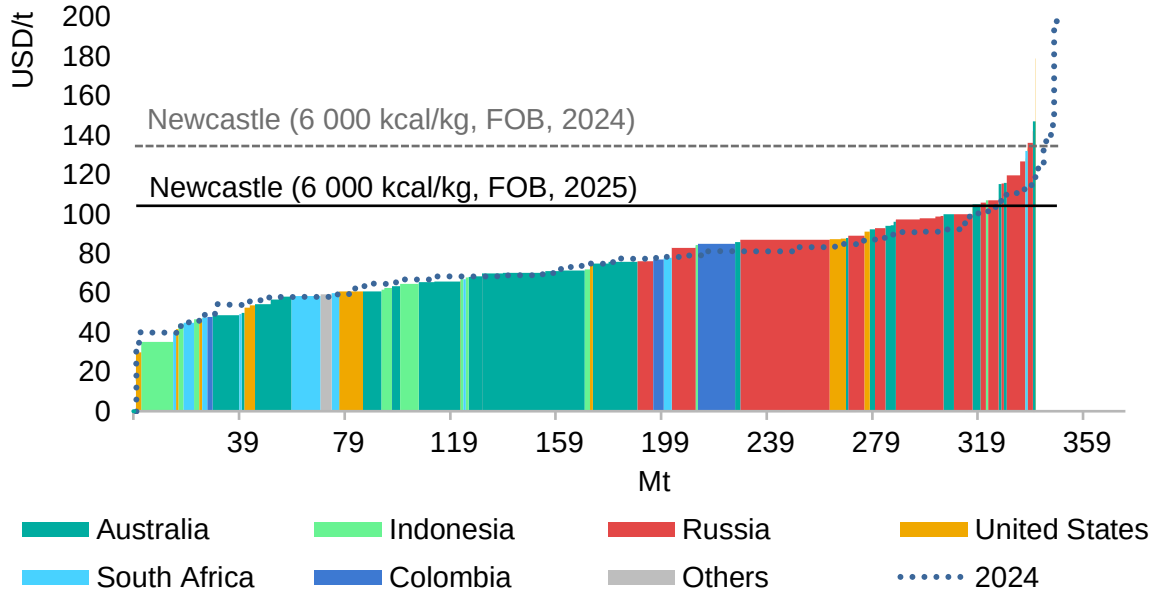
Indicative short-run marginal cost curve for hard coking coal, FOB seaborne, 2025, and average FOB price markers, 2024-2025



Notes: low-vol = low-volatile; FOB = free on board. Cost curves account for variable production costs, overburden removal, inland transport, royalties and port usage fees. All capital costs are excluded. The annual average FOB price marker is based on the monthly average index for Australian prime hard coking coal. The 2025 price is based on the average from January to September.

Sources: IEA analysis based on Argus Media Group (all rights reserved) and adapted from CRU (2025), DataLab.

Indicative short-run marginal cost curve for high-CV thermal coal, FOB seaborne, 2025, and average FOB price markers, 2024-2025



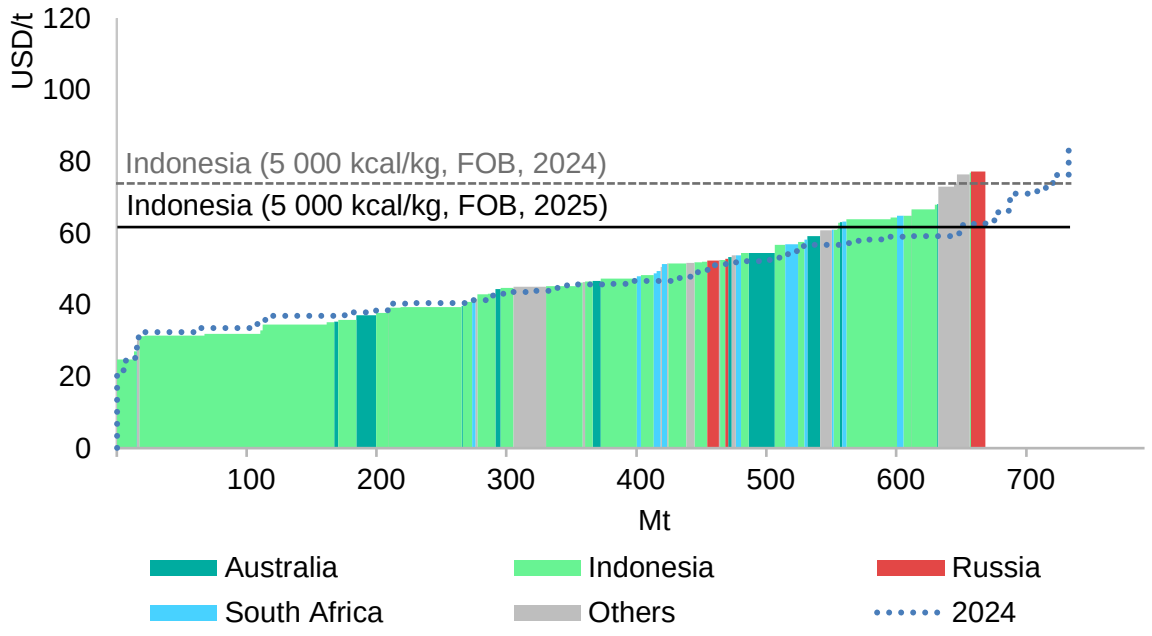
Notes: FOB = free on board. The cost curves account for variable production costs, overburden removal, inland transport, royalties and port usage fees. All capital costs are excluded The cost curve is not adjusted for different qualities of coal. The transport costs given are to the closest port, so the FOB costs of Russian producers in Asia may be somewhat higher than shown in the figure. The 2025 price is based on the average from January to September.

Sources: IEA analysis based on Argus Media Group (all rights reserved) and adapted from CRU (2025), DataLab.

Similar to developments in the hard coking coal cost curve, the short-run marginal cost curve for seaborne exports of high-CV thermal coal declined in 2025. The volume-weighted average cost decreased by about 10% y-o-y to USD 79/t. Higher costs for Russian mining operations were more than offset by lower costs for Australian exports. However, prices as indicated by the Newcastle high-CV marker fell more sharply, dropping by 40% to USD 102/t in 2025. This price decline was accompanied by a reduction in the supply curve of approximately 20 Mt.

The low- and mid-CV market segment is largely dominated by Indonesia, whose reserves are rich in these coal types. As noted earlier, production costs in the country were pushed up by higher fuel expenses within mines, although this was offset by lower transport costs. As a result, the volume-weighted average for the segment declined, with the overall short-run marginal cost of low- and mid-CV thermal coal seaborne exports remaining at USD 65/t in 2025. With imports and prices falling during the year, the length of the supply curve contracted by 60 Mt, mainly in Indonesia, which recorded the largest reduction among all segments.

Indicative short-run marginal cost curve for low- and mid-CV thermal coal, FOB seaborne, 2025, and average FOB price markers, 2024-2025



Notes: FOB = free on board. The cost curves account for variable production costs, overburden removal, inland transport, royalties and port usage fees. All capital costs are excluded. The cost curve is not adjusted for different qualities of coal. The transport costs given are to the closest port, so the FOB costs of Russian producers in Asia are somewhat higher than shown in the figure. The 2025 price is based on the average from January to September.

Sources: IEA analysis based on Argus Media Group (all rights reserved) and adapted from CRU (2025), DataLab.

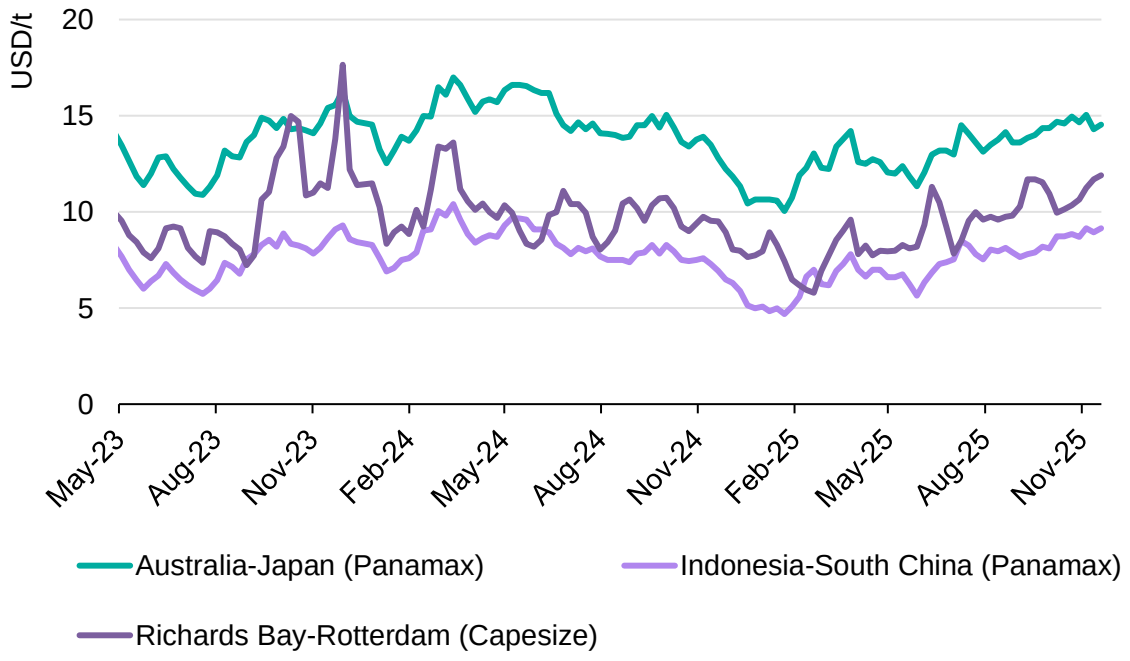
Freight rates average lower in 2025

Global coal trade is predominantly seaborne, with more than 90% of volumes transported by sea. Dry bulk vessels are the primary mode of transport, with Capesize vessels -above 80 000 deadweight tonnage (dwt)- and Panamax vessels (between 60 000 and 80 000 dwt) being the most commonly used. Freight rates are influenced by vessel type, trade route, fuel costs, and the balance between supply and demand.

Coal accounts for roughly one-quarter of total dry bulk trade, second only to iron ore, which represents nearly one-third. After a sharp decline in freight rates in 2023, prices recovered moderately in 2024, but the rebound was short-lived. Average rates in 2025 are lower than in 2024.

On the Australia to Japan route using Panamax vessels, freight rates averaged USD 14.5/t in 2024 and declined by 13% to USD 12.7/t in the first nine months of 2025. On the South Africa to Rotterdam route using Capesize vessels, rates fell by 12%, from USD 9.8/t to USD 8.6/t over the same period. On the Indonesia to South China route, also using Panamax vessels, rates dropped by 15%, from USD 8.1/t to USD 6.8/t.

Freight rates on selected routes, 2023-2025

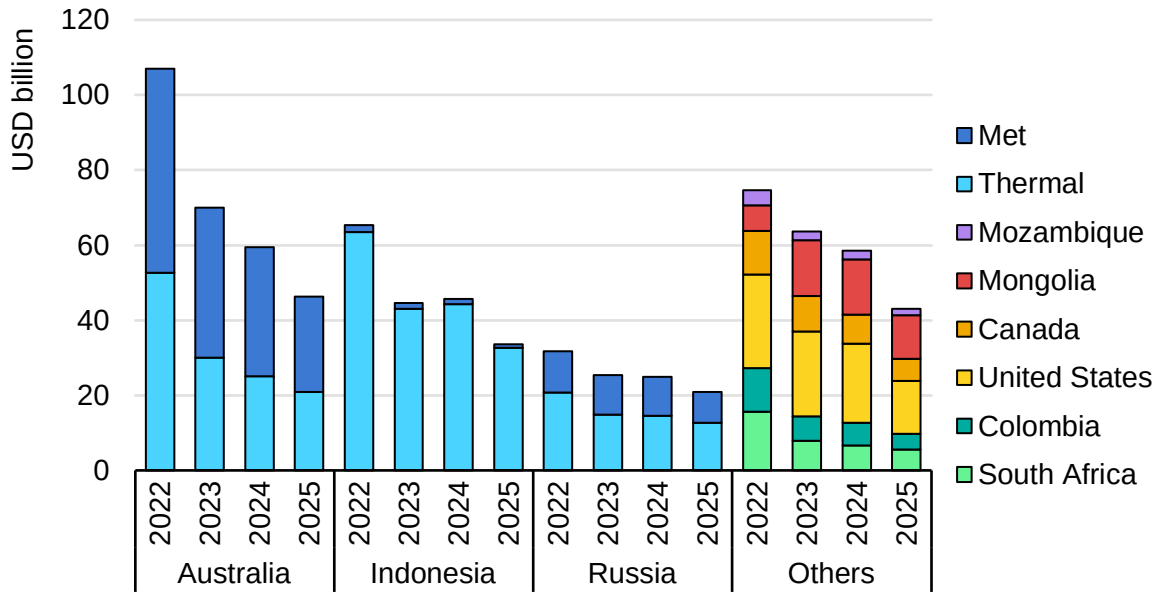


Source: IEA analysis based on Argus Media Group (all rights reserved).

Revenues for coal-exporting countries fall amid low prices

Global coal exports continue to generate substantial revenues for the 11 major exporting countries, with total earnings estimated at around USD 140 billion in 2025. However, this represents a decline of approximately 25% compared with 2024, driven by both falling trade volumes and lower coal prices. As a result, revenues are projected to have decreased across most market segments. Global coal trade is now valued at roughly two-thirds of the global LNG market. And while LNG trade is expected to expand in the coming years, coal trade is projected to continue to contract.

Coal revenues by coal type and exporter, 2022-2025



Notes: Revenue for Australia, Indonesia and Russia calculated using weighted average realised prices (FOB). The 2025 figures are an estimation based on the averages from January to September. Canadian realised prices are based on US realised prices. Revenues include land-based trade assuming the same realised prices as FOB.
Source: IEA analysis based on CRU (2025), DataLab.

Over 70% of global coal export revenues are concentrated in just three countries, which dominate the market in both volume and value: Australia, Indonesia and Russia. Australia leads in export revenue, accounting for around USD 45 billion or 32% of the global total in 2025. Although Indonesia surpasses Australia in terms of export volume, Australia maintains its lead in revenue due to its substantial share of high-value met coal exports. Prior to the invasion of Ukraine, Russia's coal export revenues were comparable to those of Indonesia, each representing close to 20% of the global total. Since then, Russian coal has required significant discounts to remain competitive, resulting in estimated export revenues of USD 19 billion in 2025, well below Indonesia's USD 33 billion.

Coal exports also play a critical role in the economies of certain countries. In Australia, coal exports represent a small single-digit share of GDP. In contrast, Mongolia's coal exports accounted for over USD 8 billion in a total GDP of USD 26 billion in 2024, underscoring the sector's outsized importance to the national economy.

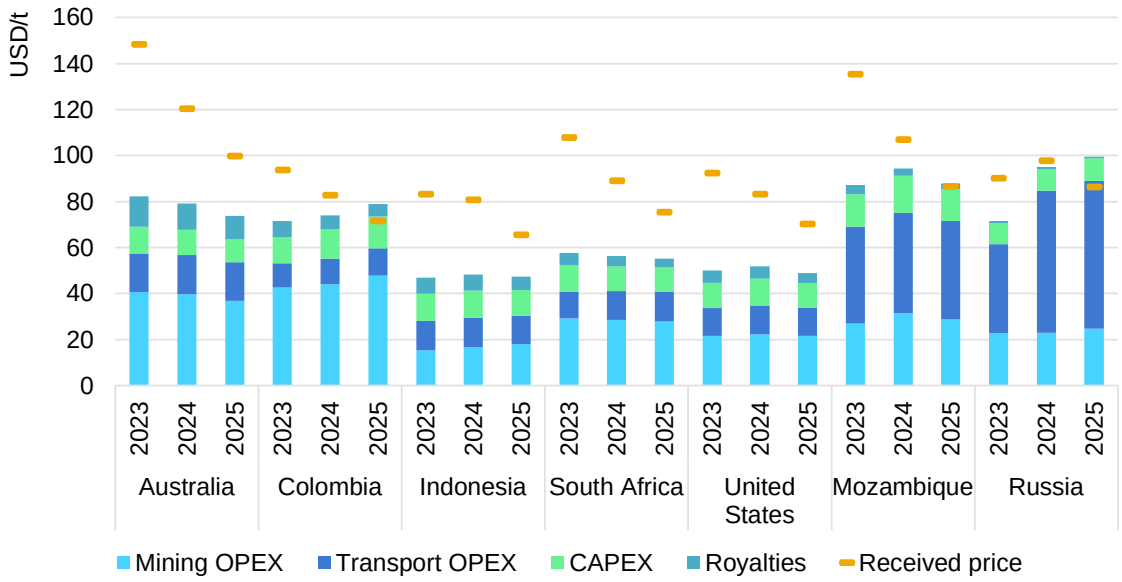
Coal mining profitability is under pressure in 2025

Margins on thermal coal exports, excluding overheads such as marketing, contracted sharply in 2025 as falling prices outpaced cost reductions. Average revenues across major exporting regions declined by about 16% y-o-y, reflecting weaker international prices. In contrast, aggregate costs, which include mining, transport, royalties and capital charges, decreased only marginally, leaving producers with significantly lower profitability.

Margins fell in all regions, with several turning negative. Australia, Indonesia and South Africa maintained positive margins, excluding overhead costs, although these narrowed substantially compared with 2024. Australia remained the strongest performer with a margin of about USD 26/t, down from USD 41/t a year earlier. Margins in Indonesia and South Africa were reduced by half. Margins in the United States fell to USD 33/t, though this figure should be interpreted cautiously due to significant regional disparities. More severely, Colombia, Mozambique and Russia moved into loss-making territory, with Russia recording the deepest average negative margin of more than USD 13/t. Thus, we estimate that the Russian coal mining sector lost over USD 4 billion in the nine months to September 2025. As the coal mining industry is important for its social and regional implications, maintaining output may remain an objective for the Russian authorities even when operations are loss-making.

Overall, the average margin across the seven major exporters fell from nearly USD 20/t in 2024 to just above USD 5/t in 2025. Since these margins exclude overhead costs such as general company expenses and marketing, in accordance with our estimates most coal miners have been operating at a loss in 2025. This decline highlights the sensitivity of profitability to price fluctuations and underscores the limited flexibility of cost structures in the short term.

Indicative comparison of received price against costs, seaborne thermal coal, 2023-2025.



Notes: CAPEX = capital expenditure; OPEX = operating expenditure. Calculated average production-weighted fuel costs and total operating costs.

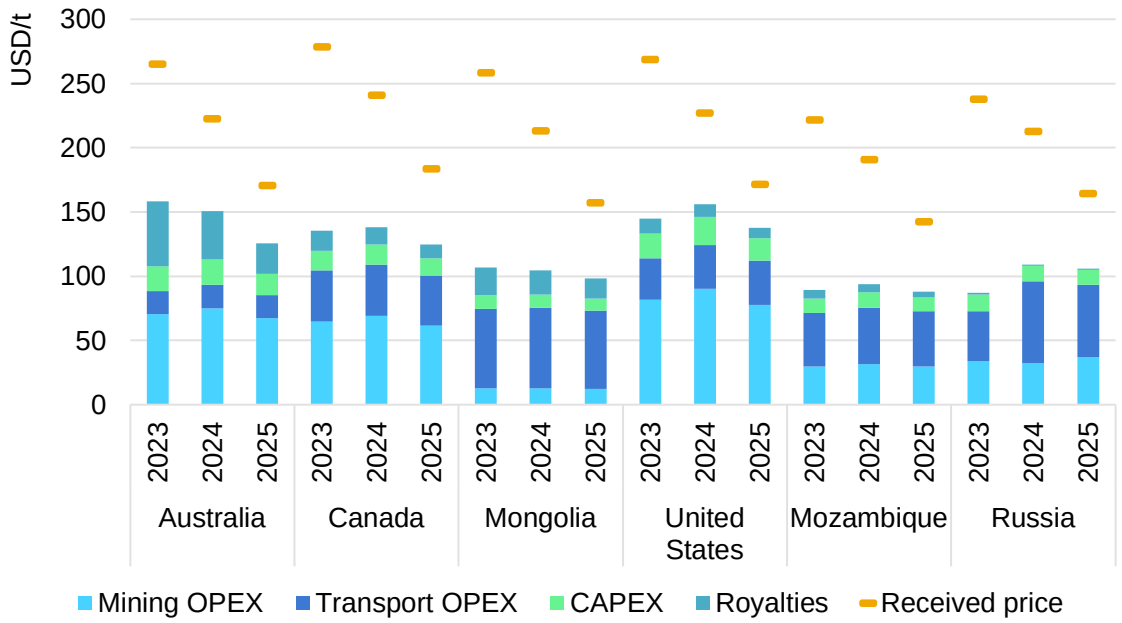
Source: IEA analysis based on CRU (2025), DataLab.

Similarly to thermal coal, profitability for hard coking coal exporters weakened considerably in 2025 as revenues fell faster than aggregate costs.

Margins contracted across all major exporters. Australia, Canada and Mongolia maintained positive margins, but these narrowed significantly compared with 2024. Australia's margin fell from about USD 72/t to USD 45/t, while Canada dropped from over USD 102/t to around USD 59/t. Mongolia experienced a similar trend, with margins halving to roughly USD 59/t. The United States also saw declines, though they remained positive. Mozambique and Russia recorded the sharpest deterioration, with margins falling by more than 40%, albeit staying above zero.

On average, margins excluding overhead costs across the six exporters decreased from nearly USD 95/t in 2024 to about USD 52/t in 2025.

Indicative comparison of received price against costs, seaborne hard coking coal, 2023-2025.



Notes: CAPEX = capital expenditure; OPEX = operating expenditure. Calculated average production-weighted fuel costs and total operating costs.
Source: IEA analysis based on CRU (2025), DataLab.

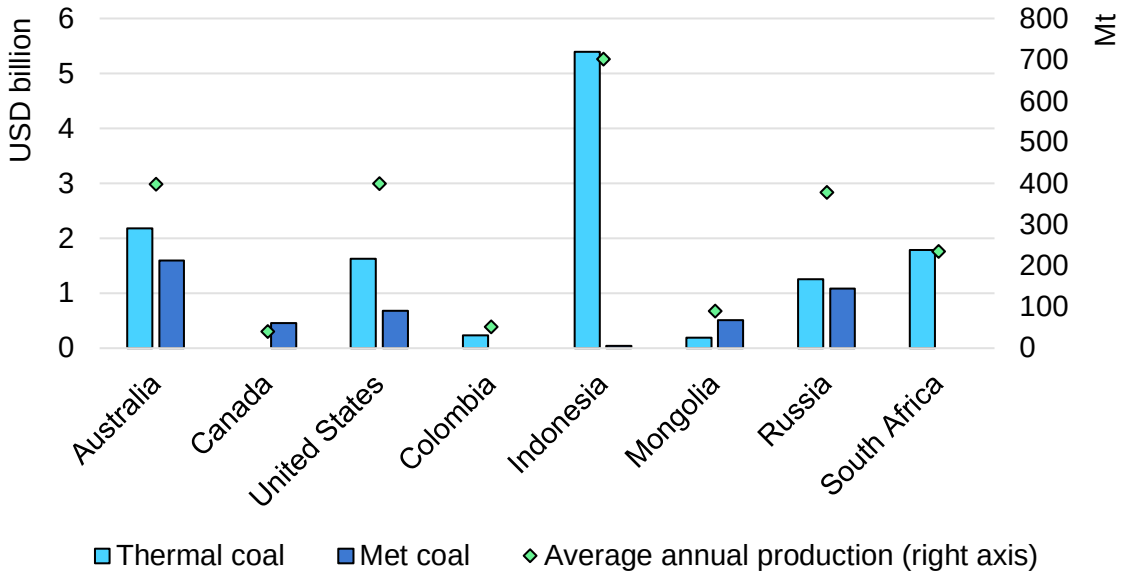
Capital requirements for coal mining remain significant until 2030

Average annual capital expenditure requirements for coal production remain significant across major exporting countries. These figures are IEA estimations and include sustaining capital costs for operating mines as well as expansion capital required to increase production. For expansion projects, annualised capital expenditure calculations are applied using a 20-year time span and weighted average cost of capital of 10%.

To sustain the world's third-largest total production and the highest export volumes, Indonesia requires capital expenditure of over USD 5 billion per year, the largest annual capital investment for thermal coal, far exceeding other producers. Australia follows with more than USD 2 billion for thermal coal and nearly USD 1.6 billion for met coal. Russia and the United States also show substantial capital needs in both segments, each exceeding USD 1 billion for thermal coal and around USD 1 billion or more for met coal. South Africa's thermal coal operations require approximately USD 1.8 billion annually, while Canada and Mongolia have smaller but still significant capital requirements for met coal, at around USD 0.5 billion each. Colombia's capital needs are about USD 0.3 billion, consistent with its smaller production base and lack of expansion plans.

Overall, sustaining and expansion capital expenditure is particularly concentrated in Indonesia and Australia, although met coal investment needs remain significant for countries with specialised production. This analysis focuses only on export-oriented countries.

Average annual capital expenditure need and production in selected countries, 2026-2030



Note: Capital expenditure does not include working capital.
Source: IEA analysis based on CRU (2025), Cost Model (database),

Investments in coal projects and emissions abatement

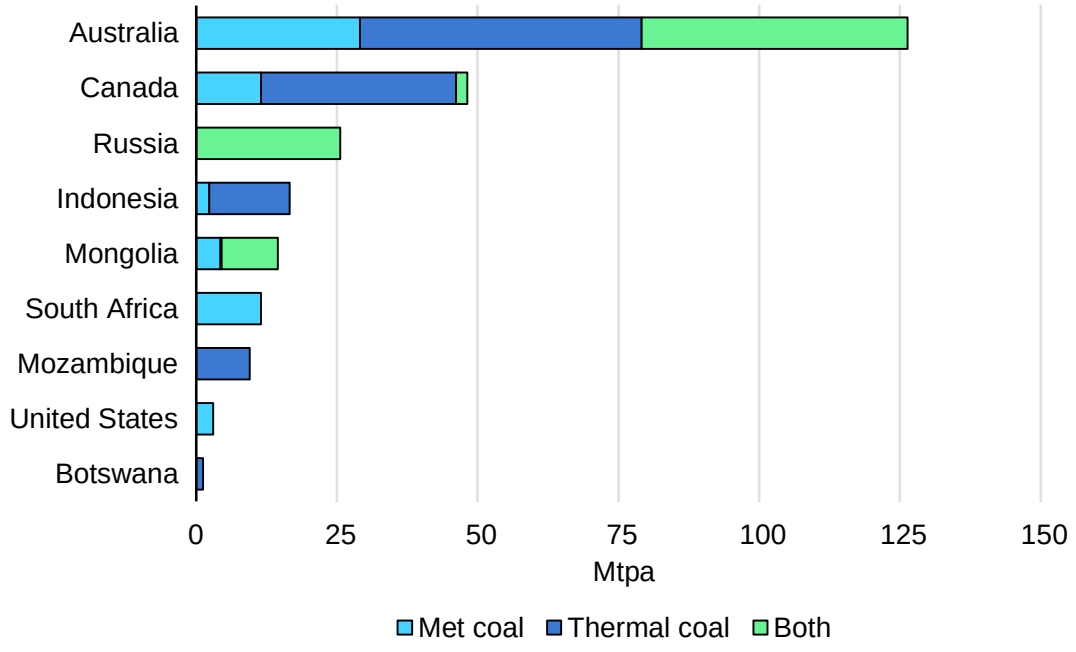
New projects increase the capacity of the project pipeline

Forthcoming export-oriented coal projects in our database have a total capacity of 493 Mtpa at the time of writing, 63 Mtpa higher than in our previous report. This increase in the project pipeline is due to improved research on Indonesia rather than more projects actually being developed. This report classifies projects as either more advanced or less advanced based on whether they have received the necessary approvals and permits in their respective countries. The capacity of less-advanced projects declined from 275 Mtpa to 210 Mtpa. Some projects failed to obtain environmental approvals due to legal challenges and public opposition. From the 2024 list, 15 projects have been cancelled or shelved in 2025.

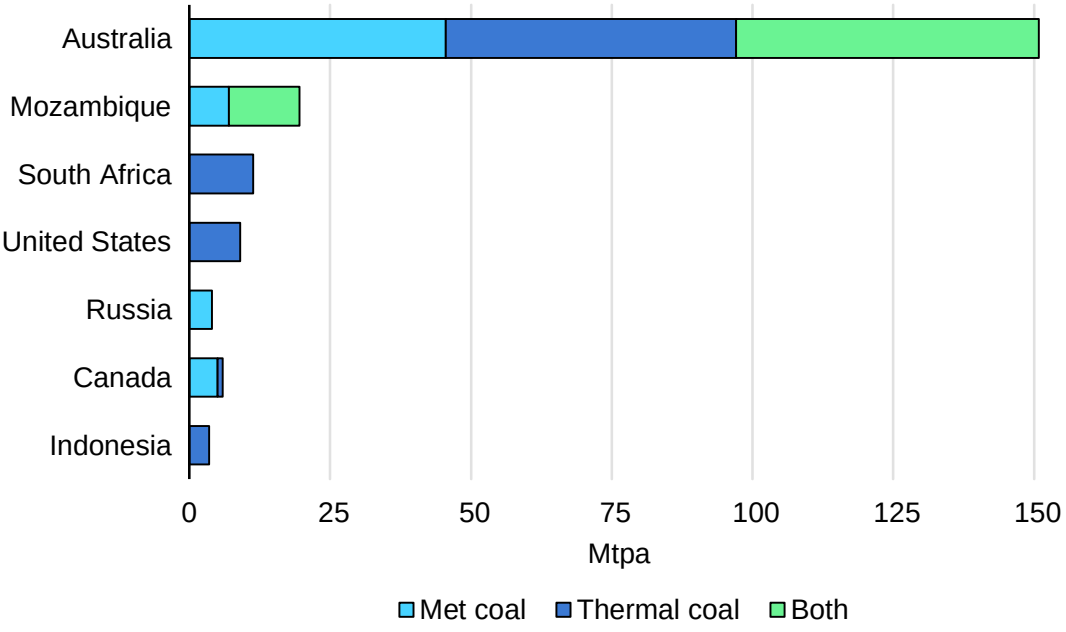
Several less-advanced projects have transitioned into more-advanced stages, as many were awaiting administrative approvals and environmental licences. This transition, combined with the addition of new advanced projects in Indonesia, has increased the project pipeline by 127 Mtpa. In 2025, seven projects became operational, adding a total capacity of 26 Mtpa. As a result, the net growth of the more-advanced pipeline amounts to 101 Mtpa.

In terms of annual tonnage capacity, the projects are concentrated in Australia (58%), followed by Russia (13%) and Indonesia (8%). Due to the still limited transparency in some countries, these figures should be interpreted with caution.

Capacity of more-advanced export coal mining projects, 2025



Capacity of less-advanced export coal mining projects, 2025



Some trends observed last year have continued. In Russia producers are advancing infrastructure development in the Far East to support specific coal projects. In Africa there is renewed interest in projects in Mozambique. Australia is progressing with met coal developments, while market conditions have driven the sale of several assets to larger mining firms. In the United States the new

administration has adopted a more favourable stance towards coal, introducing measures to promote production and demand, which is expanding the project pipeline.

Activity in mergers and acquisitions, which was driven by high coal prices between 2022 and 2024, slowed significantly in 2025. Nevertheless, some transactions have gone ahead, notably in Queensland, Australia. In 2024, BHP and Mitsubishi divested from the Blackwater and Daunia met coal mines and sold them to Whitehaven Coal Ltd, which later sold 30% of its stake in Blackwater to Nippon Steel (20%) and JFE Steel (10%). Stanmore also sold part of the southern section of its Wards Well coal deposit to Peabody in late 2024 and acquired Eagle Downs in August 2024, an asset that is undergoing further development studies prior to construction.

In June 2024, Anglo American began the divestment of its met coal assets in Queensland. Zashvin agreed to purchase one-third of Anglo's share in Jellibah Group, concluded in January 2025. Peabody agreed to buy Anglo American's Queensland mines; however, this was terminated on 19 August 2025, as was the related sale of the Dawson mine to PT Bukit Mandur Mandiri Utama.

In Indonesia, Adaro Energy has rebranded as AlamTri Resources and officially transferred 75% of its ownership of PT Adaro Andalan Indonesia, which includes Adaro Indonesia and Balangan Coal Companies, through a public offering to existing shareholders.

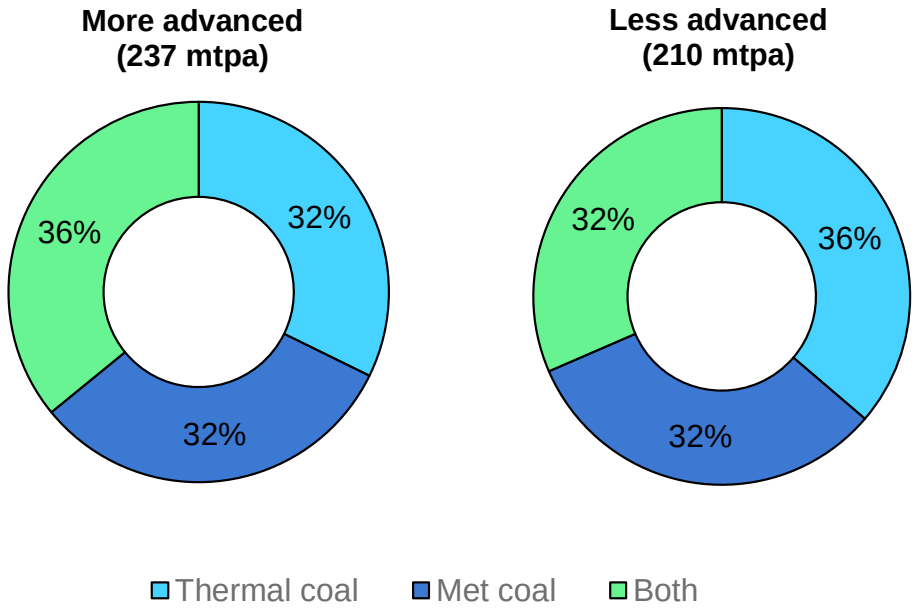
Met coal and mixed coal projects more attractive than thermal coal projects

The proportion of thermal coal in more-advanced projects has slightly decreased while remaining unchanged in less-advanced projects. The share of thermal coal projects at the more-advanced stage would have been smaller if not for improved data transparency on projects in Indonesia. The reduction in capacity for less-advanced thermal coal projects is attributed to cancellations or shelving; the remaining thermal coal projects are located in Australia, Indonesia and Mozambique, targeting the Chinese and Indian markets.

Met coal's share of less-advanced projects has declined due to their transition into more-advanced stages. The announcement of a coal mine expansion in Mozambique has increased the pipeline of less-advanced projects with a combined met and thermal coal output. In the short to medium term, steel production from iron ore will continue to rely on met coal, as alternative inputs are not expected to achieve large-scale adoption yet. This reliance is driving continued

development of met coal projects. Currently, two-thirds of the more-advanced pipeline is focused on met coal extraction, although many of them will also produce thermal coal.

Coal grades in coal export mining projects, 2025



Australia approves new projects, and one coal project becomes operational

Australia remains the predominant location for new and expanding export-oriented coal mining projects, with a total of 44 projects at both the less-advanced and more-advanced stages. Projects at the more-advanced stage are categorised as mixed coal developments, followed by thermal and met coal. Less-advanced and newly proposed projects are dominated by thermal and mixed coal. Australia accounts for 56% of the global coal project pipeline, although this figure should be interpreted with caution due to the high level of transparency in project reporting compared with other major coal exporters. Five projects have recently moved from the less-advanced to the more-advanced stages: Caval Ridge Mine Horse Pit Extension, Jellinbah Central North Extension, Lake Vermont Meadowbrook Project, Mandalong Southern Extension and Mount Thorley Warkworth Extension.

In April 2024, the Queensland government approved the environmental impact statement for the Lake Vermont Meadowbrook Project, an extension of Lake Vermont mine, with an expected capacity of 5.5 Mtpa, and mine operations are

planned to start in December 2028. Similarly, after securing all mining licences in early 2024, Mount Thorley entered phase two of construction and aims to begin operations in 2029.

Three new mines were added to the IEA database at the more-advanced level. Plumtree North Mine, a project in Queensland, is meant to expand the capacity of Bowen Coking Coal's Burton Complex by 5.5 Mtpa. According to Bowen's 2025 mid-year report, construction is ahead of schedule and it is expected to be operational in 2026. The Moorlands coal project was also recently acquired by Wintime and TerraCom, with a clear timeline to develop and construct the mine during 2025 and 2026. Lastly the New South Wales government approved the extension of the Boggabri mine in early 2024 to produce up to 8.6 Mtpa, with reports of construction underway to bring the project online by 2026.

Low thermal coal prices are affecting the development timeline for thermal projects. Stanmore halted operations at its Marvis Downs mine within the Millenium complex due to a challenging ramp-up and low production volumes. Moreover, environmental policies and legal decisions have stalled the construction and permitting of projects. The New South Wales Court of Appeal blocked the Mount Pleasant life extension on a technicality relating to the Independent Planning Commission's planning consent failing to assess adequately the effect of Scope 3 emissions on the mine's locality. Others, such as the Newstan Mine Extension that would have produced up to 3.2 Mtpa, were withdrawn from consideration as a State Significant Development Project. Despite these conditions, one project did progress in 2025: the construction of the Carborough Downs Extension was completed and began operations, producing up to 5 Mtpa.

Russian projects oriented to Asian markets

In response to punitive sanctions from Western countries, Russia remains committed to supporting its coal industry by redirecting exports to China and India. Currently, 63% of its coal-hauling rail traffic is directed to the eastern route. Reflecting a more favourable market outlook, the share of met coal projects has grown rapidly compared with thermal coal projects. Due to a challenging financial environment, Russian Railways has delayed construction of phase three of the Eastern Polygon Expansion, aimed at facilitating the movement of freight from Siberia to China and the Far East. This project would increase transport capacity from 180 Mtpa to 270 Mtpa by 2032.

In southern Siberia bordering Mongolia, the Elegest project – intended to produce 8 Mtpa of met coal – was shelved in 2021 during construction. However, plans for the Elegest-Kyzyl-Kuragrino railway line, which would connect Russia, Mongolia and China, are still under consideration by local authorities. In the Russian Far East, the Elga Expansion 2 was approved in 2025 and is set to add capacity of

25 Mtpa. As part of the proposals, the Pacific Railway has been built to link the mine to the Port Elga Coal Terminal on the Sea of Okhotsk. The railway was completed in November 2024 and has continued to ramp up coal transport from the Elginsky deposit throughout 2025. The project was officially inaugurated in September 2025. This railway is now the longest privately owned railway in Russia, spanning 531 km and capable of transporting up to 50 Mtpa if a track doubling project proceeds.

In the Khabarovsk region of eastern Russia, additional railway chords for the northern and southern sections of the Pravoberezhny coal mine are being developed to deliver thermal coal directly to Urgal and Chegdomyn railway stations. In the north, the development of the Taymyr Industrial Cluster has led to the construction of the Yenisei Seaport Coal Terminal and two deepwater ports, Chaika and Severny, with a capacity of 5 Mtpa and 20 Mtpa respectively. Further projects include a three-stage plan to restore and extend sections of the Skovorodino-Reynovo railway, creating a new line on the Gorely-Skovorodino section, and the construction of an international bridge to China across the Amur River to support traffic following the reopening of the Dzhalinda-Mohe land crossing.

Due to limited transparency, there is no public confirmation that any ongoing coal mining projects have been completed in 2025. However, several projects have transitioned from less-advanced to more-advanced status: Pravoberezhny Stage 2, Tikhova 2 Expansion and the Taymyr Sryradasaysky coal mine. The plan to expand the Pravoberezhny coal mine to produce up to 13 Mtpa by 2029 was confirmed in August 2024. Similarly, MMK-Ugol has already begun construction to expand Tikhova to 3 Mtpa in 2024. The Sryradasaysky coal mine is part of the Taymyr Industrial Cluster and has started production during construction, shipping 0.5 Mtpa to China in 2023. AEON Corporation continues to extend the mine's resources and export capacity by developing supporting infrastructure to ramp up production to the intended 7 Mtpa by 2026.

African countries progress infrastructure projects

South Africa leads the project pipeline on the African continent with 12 ongoing projects totalling 31 Mtpa of combined capacity. Among these, advanced projects are primarily focused on met coal, while less-advanced projects are concentrated on thermal coal. Two projects came online between late 2024 and early 2025: the Elders coal mine extension and the Ikoti coal mine. The Elders coal mine extension, an underground mine in Mpumalanga owned by a subsidiary of Thungela Resources, began thermal coal production in Q4 2024 and is expected to ramp up to 3 Mtpa in 2025. The Ikoti coal mine produced its first thermal coal from its underground section on 6 December 2024.

Several projects have transitioned from less-advanced to more-advanced stages, including Gila (Koppie) coal mine, Kusipongo (Udomo) mine, Makhado Phase 2, and Ukwenama coal mine. Kusipongo and Gila have received permits and are expected to begin construction soon, with operations starting in mid-2026 and 2027, respectively. MC Mining has announced significant progress on the second phase of the Makhado mine and expects operations to commence in 2026.

The Khwezela South extension owned by Thungela Resources will not proceed according to their end-of-year annual report in 2024. The Gugulethu coal mine that became operational last year has commenced phase 2 of its construction, which is the development of its underground operations. The Zibulo extension is a new more-advanced mine that is going to extend Thungela's underground operations until 2038, producing up to 5 Mtpa. Other projects on the horizon may be the restart of Tim Tebeila's coal mining operation in the Waterberg coalfield in Limpopo, with an estimated 30 billion tonnes of coal reserves, announced on 26 May 2025.

The deep water port – jointly announced last year by Mozambique, Zimbabwe and Botswana for a location at Techobanine Point in Mozambique − has been undergoing profitability studies since Q3 2025. If constructed, the port would help reduce congestion at Durban and Richards Bay ports. Early feasibility reports indicate that, to remain viable, the port would need to handle 20 Mtpa of coal, a volume that the three countries combined currently cannot supply. The corresponding Mmambula-Lephalale Railway would connect Botswana's Mmambula coalfields with South Africa's Lephalale region. In March 2025, Botswana Railways organised the Mmambula-Lephalale Rail Link Investor Forum to attract investment for the project. Meanwhile, expansion of the Matola coal terminal and the Macuse port and rail projects is underway. Lastly, since the Steel Authority of India's announcement in September 2024 to expand the Benga coking coal mine in Mozambique, there have been no updates or reports on the progress of this expansion.

Plans for production expansion drive new projects in Indonesia

It is difficult to fully assess the number and capacity of new mining projects in Indonesia, as many are not identified until they begin operations. A rough estimate indicates that the current number of projects stands at 14, with a total capacity of 62 Mtpa, which is significantly higher than in last year's report. However, these figures should be interpreted with caution due to still relatively weak transparency.

PT Maruwai coal expansion by Adaro Minerals has recently been approved for a feasibility study around the Lampunut deposit in Central Kalamantan to increase production. PT Indo Bara Pratama has also begun hiring staff for the Indo Bara

Pratama mine in East Kalamantan, indicating that it has obtained the permits applied for in 2022. Other projects identified at the more advanced stage include the Kaltim Mineral coal mine and stage 2 of the SDE coal mine. Kaltim Mineral, owned by Resource Alam Indonesia, is reported to be in the construction phase since acquiring its mining permit in 2013. Stage 1 of the SDE coal mine, owned by Qinfa Mining Industri and Widyanusa Mandiri, was completed in 2024 and is now producing 6 Mtpa. The second stage, which involves the underground segment, is underway and will increase the mine's capacity to 15 Mtpa by 2026. Finally, Geo Energy revealed plans to raise the production capacity of the Triaryani coal mine to 25 Mtpa over the coming years.

Infrastructure development continues to support specific mining projects. The Pari coal mine is complemented by the construction of a hauling road and a coal loading port on the Mahakam River. The MBJ Integrated Infrastructure Project, consisting of a 95 km hauling road and a river jetty, is also progressing. In 2025, Geo Energy signed two lease contracts with TRV and Astaka coal mining companies to use the MBJ haul road. The MBJ project is designed to support the growth plans of the Triaryani mine, and Geo Energy has secured additional investment from ResInvest ranging between USD 50 million and USD 100 million. PT Bukit Asam is accelerating the construction of train loading stations and coal handling facilities 6 and 7 in Tanjung Enim, South Sumatra, with completion targeted for Q2 2026. Meanwhile, Bayan Resources is building floating transshipment facilities, with two expected to become operational by the end of 2025.

Canada and the United States ease regulatory approval processes

In the North American region most projects are focused on met coal production. The total number of mines in the project pipeline has risen to 15 with an aggregate capacity of 34 Mtpa.

Various projects have made progress in Canada during 2025. In Alberta the moratorium on coal exploration was removed in the Grand Cache and has allowed projects like the Blackstone project to come back into contention. Valory Resources considers it of high priority to develop this mine, which is currently in the exploration phase. Valory also acquired Summit Mine 14 from Summit Coal in April 2025, and swiftly resubmitted applications for mining licences and permits, which await approval. Grassy Mountain was granted environmental approval by the Alberta Energy Regulator in May 2025. HD Mining's Murray River mine project is substantially under development and plans to be operational by 2029. The Tenas coking coal project in British Columbia was recently fully acquired by Bathurst Resources. Anglo American has pulled many of its projects, including Roman Mountain in British Columbia, to focus its portfolio solely on its remaining

Australian assets. Lastly, the Quintette mine, owned by Conuma Resources and with a capacity of 1 Mtpa, came online in September 2024.

The support of the US Administration is among the drivers of new investment. US producer Ramaco Resources has recently purchased the Maben Coal property in West Virginia. Ramaco has already started one new surface mine on this property, Maben Highwall Mine No. 3, and is also permitting and designing additional deep mines at this complex: the Beckley Crystal Mine, Slick Rock Sewell Mine, Allen Creek No. 1 Mine and the Maben No. 1 Mine. Once fully developed, the Maben Coal property could produce as much as 2 Mtpa of met coal from this complex. Alliance Resources' River View Complex in Kentucky is a met mine that started operations at the end of 2024, acting as an extension of the Henderson Mine. In the second quarter of 2025, Warrior Met Coal commenced sales from its Blue Creek project in Alabama, which is designed to reach production capacity of 4 Mtpa and is the only greenfield mine adding capacity.

Other projects progress slowly

In Mongolia the project pipeline has grown to 16 Mtpa with a total of three projects. Erdenes Tavan Tolgoi, a subsidiary of Erdenes Mongol, came under fire in 2024 due to claims of embezzlement and was under investigation throughout 2024. A change of management resulted in bringing two coalfields online. Three remaining mines are in development phases and plan to be operational in 2026, producing up to 10 Mtpa.

In Poland a dispute between GreenX Metals and the Polish government over its two blocked projects, Jan Karski and Debiensko, was finally settled in October 2024, with the court providing a concession for Jan Karski and ruling against GreenX with respect to Debiensko. It is unclear whether GreenX will continue with the Jan Karski project, but the Polish coal producers JSW and Silesian Coal have separately applied for exploration permits for the Debiensko site. The Polish government recently approved an investment in the construction of underground infrastructure to transport coal from the mining sites to the Jaworzno power plant.

Lastly, the Escarpment Project in New Zealand has been brought out of care and maintenance and an application to expand the mine has been lodged under the country's new fast-track approval process.

Unabated coal is still the current standard practice

Coal remains the most carbon-intensive fossil fuel and the largest contributor to anthropogenic CO_2 emissions. In 2024, coal combustion was responsible for approximately 15.8 Gt of CO_2, accounting for over 40% of energy-related

emissions, including those from industrial processes. Of this, around 11.3 Gt originated from coal-fired power generation, which consumes roughly two-thirds of global coal production.

Beyond CO_2, coal combustion emits a range of pollutants, including particulates, sulphur dioxide and nitrogen oxides, contributing to local air pollution. While most emissions occur during combustion, coal mining also releases CO_2 and methane directly. The latter is a potent greenhouse gas on its own, with significantly higher warming potential than CO_2. Methane emissions from coal seams, unless captured or flared, are released directly into the atmosphere. Capturing methane prevents the release of this potent greenhouse gas and allows additional revenues if the gas can be sold or used. Flaring converts methane to CO_2, reducing its climate impact by an order of magnitude in CO_2-equivalent terms.

In most cases, the carbon in coal is released as CO_2 when burned, except for small amounts retained in products (e.g. coal-based plastics) or lost through incomplete combustion. To estimate emissions, the key factor is carbon content: assuming complete combustion and excluding feedstock use, one tonne of coal emits its carbon content multiplied by 3.7 as CO_2.

Relating coal's energy content to CO_2 emissions is more complex due to coal's heterogeneity. The IPCC provides default average emission factors: 95 kg CO_2/GJ for bituminous coal and 101 kg CO_2/GJ for lignite.

Another metric is the CO_2 intensity of electricity generated from coal, which depends on both the fuel's emissions factor and the plant's efficiency. For instance, a plant operating at 43% efficiency using bituminous coal emits approximately 795 kg CO_2/MWh, while a 35% efficient lignite plant emits around 1 039 kg CO_2/MWh. Co-firing with low-carbon fuels such as biomass or ammonia can reduce overall emissions per MWh, although in IEA accounting, biomass and ammonia produce no CO_2 emissions and the remaining emissions are allocated to coal.

Carbon capture, utilisation and storage (CCUS) offers a pathway to reduce emissions from coal use. However, current deployment remains limited. Overall, global CO_2 capture capacity across all sectors and fuels is around 50 Mt CO_2/year, with two-thirds of this capacity located at natural gas processing facilities. As of October 2025, global operational CO_2 capture capacity at coal-using facilities stands at approximately 10 Mtpa. representing just 0.06% of total coal-related emissions. In effect, nearly all coal consumed globally remains unabated. Around half of this capacity is linked to power and heat generation, while roughly 40% is associated with coal gasification plants used for fuel production.

North America continues to lead in total installed capture capacity, accounting for more than half of the global total. The region hosts three of the four largest

operating projects: in United States, the Great Plains synfuel project, with a capacity of 3 Mt CO_2 per year, and the Petra Nova coal power project, which resumed operations in 2023 and captures 1.4 Mt CO_2 annually; and in Canada, the Boundary Dam coal power project capturing 1 Mt CO_2 per year.

China ranks second in total installed capacity, but currently leads in new installations. Between 2024 and 2025, China increased its installed capture capacity by nearly 50%, highlighted by the commissioning of the Huaneng Longdong Energy Base project in September 2025. This facility, with a capture capacity of 1.5 Mt CO_2 per year, is now the world's largest carbon capture project at a coal-fired power plant. Most operational commercial-scale capture projects (> 100 000 t CO_2/year) are located in China, with a combined target capacity of 2.35 Mt CO_2/year.

Looking ahead, announced projects may add 51 Mtpa of CO_2 captured from coal-based plants by 2030. Most projects are in the United States (32 Mtpa) and China (17 Mtpa), with power generation as the main use case (38 Mtpa). However, the majority of this capacity remains at an early stage of development, with only China constructing around 1.4 Mt currently.

Despite this, CCUS is expected to play a critical role in the energy transition, particularly in hard-to-abate sectors such as iron and steel and cement. Without significant CCUS deployment, coal's role in a low-carbon future will be severely constrained.

General annex

Tables

Table 1: Total coal consumption (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	7265	7264	7295	7325	0.0%	0.2%
China	4952	4953	4879	4772	0.0%	-0.7%
India	1313	1297	1383	1522	-1.2%	3.3%
Japan	160	159	139	109	-0.8%	-7.3%
ASEAN	496	516	573	644	4.1%	4.5%
North America	404	440	393	322	8.9%	-6.1%
United States	373	410	369	304	9.9%	-5.8%
Central and South America	49	46	43	41	-6.3%	-1.9%
Europe	494	483	377	288	-2.2%	-9.8%
European Union	311	306	223	153	-1.5%	-12.9%
Eurasia	387	408	406	391	5.4%	-0.8%
Africa	197	195	202	202	-0.6%	0.6%
Middle East	10	10	9	10	-5.1%	0.6%
World	**8805**	**8845**	**8724**	**8579**	**0.5%**	**-0.6%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 2: Thermal coal and lignite consumption (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	6346	6331	6377	6436	-0.2%	0.3%
China	4218	4211	4166	4108	-0.2%	-0.5%
India	1233	1212	1289	1412	-1.7%	3.1%
Japan	123	123	105	80	0.4%	-8.4%
ASEAN	470	486	534	593	3.4%	4.1%
North America	387	422	375	304	9.1%	-6.3%
United States	359	396	355	289	10.3%	-6.1%
Central and South America	31	28	25	23	-10.6%	-3.5%
Europe	434	425	324	239	-2.0%	-10.9%
European Union	260	257	178	113	-1.2%	-15.2%
Eurasia	305	326	325	310	7.0%	-1.0%
Africa	192	190	196	197	-0.8%	0.7%
Middle East	8	7	7	7	-6.9%	-0.2%
World	**7703**	**7731**	**7630**	**7518**	**0.4%**	**-0.6%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 3: Metallurgical coal consumption (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	919	933	917	889	2.1%	-1.0%
China	734	742	713	665	1.1%	-2.2%
India	80	85	94	110	5.6%	5.5%
Japan	38	36	34	29	-6.3%	-4.2%
ASEAN	26	30	39	51	7.6%	10.7%
North America	17	18	17	18	-4.7%	0.1%
United States	14	14	14	14	-4.7%	0.2%
Central and South America	18	18	18	18	-0.8%	0.5%
Europe	60	58	53	49	-8.1%	-3.3%
European Union	51	49	45	41	-11.8%	-3.7%
Eurasia	82	81	81	81	-0.4%	-0.1%
Africa	5	5	5	5	3.1%	-2.1%
Middle East	2	2	2	2	-14.6%	3.2%
World	**1102**	**1114**	**1094**	**1061**	**1.0%**	**-1.0%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 4: Total coal production (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	7311	7274	7096	7079	-0.5%	-0.5%
China	4666	4730	4563	4439	0.8%	-1.2%
India	1082	1089	1154	1283	0.6%	3.3%
Australia	474	446	438	409	-6.0%	-1.7%
Mongolia	104	105	97	102	1.6%	-0.7%
Indonesia	836	778	713	671	-6.9%	-2.9%
North America	513	529	510	436	3.0%	-3.8%
United States	461	473	456	386	2.7%	-4.0%
Central and South America	82	67	58	49	-17.7%	-6.0%
Europe	378	370	303	237	-2.1%	-8.5%
European Union	242	242	183	132	-0.1%	-11.4%
Eurasia	564	607	599	580	7.6%	-0.9%
Russia	426	427	425	422	6.3%	-1.4%
Africa	265	263	264	258	-0.6%	-0.4%
Middle East	2	2	2	2	0.0%	0.0%
World	**9114**	**9111**	**8832**	**8641**	**0.0%**	**-1.1%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 5: Thermal coal and lignite production (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	6443	6414	6251	6258	-0.4%	-0.5%
China	4050	4091	3946	3845	0.4%	-1.1%
India	1077	1083	1147	1276	0.6%	3.3%
Australia	311	294	280	255	-5.3%	-2.8%
ASEAN	928	873	811	790	-5.9%	-2.0%
Indonesia	829	771	707	665	-7.0%	-2.9%
North America	417	431	412	340	3.5%	-4.6%
United States	396	408	394	324	3.1%	-4.5%
Central and South America	70	59	50	41	-16.5%	-7.1%
Europe	365	357	291	225	-2.3%	-8.9%
European Union	230	230	171	120	-0.3%	-12.1%
Eurasia	449	477	469	449	6.3%	-1.2%
Russia	318	304	303	300	3.8%	-1.9%
Africa	249	246	248	243	-1.1%	-0.3%
World	**7993**	**7985**	**7721**	**7556**	**-0.1%**	**-1.1%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 6: Metallurgical coal production (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	868	860	845	821	-1.0%	-0.9%
China	615	638	616	593	3.7%	-1.5%
India	6	6	7	7	0.0%	3.2%
Australia	164	151	158	155	-7.5%	0.4%
ASEAN	7	7	7	6	0.0%	-2.8%
Indonesia	7	7	7	6	0.0%	-2.9%
North America	97	98	97	96	1.0%	-0.3%
United States	65	65	63	62	0.1%	-0.9%
Central and South America	11	8	8	9	-25.5%	0.6%
Europe	12	13	13	13	3.9%	-0.4%
European Union	12	12	12	12	3.3%	-0.5%
Eurasia	115	129	130	131	12.7%	0.2%
Russia	108	122	122	122	13.4%	-0.1%
Africa	16	17	16	15	6.6%	-2.2%
World	**1121**	**1126**	**1111**	**1086**	**0.5%**	**-0.7%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 7: Total coal imports (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	1317	1250	1218	1133	-5.1%	-1.9%
China	548	489	448	394	-10.7%	-4.2%
India	237	235	248	250	-0.6%	1.2%
Japan	162	158	138	108	-2.2%	-7.3%
Korea	107	101	88	72	-5.9%	-6.6%
ASEAN	182	183	212	230	0.9%	4.7%
North America	16	8	9	9	-52.4%	2.5%
United States	2	2	2	2	0.0%	0.0%
Central and South America	30	28	27	25	-5.6%	-2.5%
Europe	117	118	90	74	0.5%	-8.9%
Eurasia	31	30	30	30	-3.3%	0.0%
Africa	21	22	24	26	5.9%	3.2%
Middle East	8	8	7	8	-9.8%	0.7%
World	**1541**	**1463**	**1404**	**1304**	**-5.1%**	**-2.3%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 8: Thermal coal and lignite imports (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	1016	956	909	822	-5.8%	-3.0%
China	416	367	328	290	-11.8%	-4.6%
India	164	159	160	146	-3.2%	-1.7%
Japan	123	122	105	79	-1.2%	-8.3%
Korea	82	78	67	54	-4.9%	-7.1%
ASEAN	156	154	172	180	-1.2%	3.1%
North America	12	6	7	7	-53.3%	3.3%
Central and South America	19	19	15	14	-1.7%	-6.1%
Europe	67	69	46	34	3.1%	-13.0%
Eurasia	28	27	27	27	-3.6%	0.0%
Africa	20	21	23	25	6.0%	3.3%
Middle East	8	7	7	7	-10.7%	-0.2%
World	**1171**	**1106**	**1035**	**936**	**-5.5%**	**-3.3%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 9: Metallurgical coal imports (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Asia Pacific	302	293	309	311	-2.8%	1.2%
China	131	122	120	104	-7.0%	-3.2%
India	73	76	89	104	5.3%	6.3%
Japan	39	37	34	29	-5.5%	-4.4%
Korea	25	23	21	18	-9.2%	-5.0%
ASEAN	26	29	40	50	-96.4%	11.5%
North America	4	2	2	2	-49.5%	-0.2%
Central and South America	11	10	11	11	-12.3%	3.2%
Europe	51	49	44	40	-2.9%	-4.2%
Eurasia	3	3	3	3	0.0%	0.0%
Africa	0	0	0	0	2.0%	0.7%
Middle East	0	0	0	1	13.9%	14.8%
World	**370**	**357**	**369**	**368**	**-3.5%**	**0.6%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 10: Total coal exports (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Australia	363	359	358	352	-1.1%	-0.4%
Mongolia	83	86	84	87	3.6%	0.2%
Indonesia	555	505	443	368	-9.0%	-6.1%
United States	98	86	89	84	-12.3%	-0.4%
Colombia	61	50	42	33	-18.1%	-8.0%
Russia	198	197	191	187	-0.5%	-1.0%
South Africa	70	69	69	66	-1.4%	-0.9%
World	**1547**	**1473**	**1404**	**1304**	**-4.8%**	**-2.4%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 11: Thermal coal and lignite exports (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Australia	209	210	203	200	0.5%	-1.0%
Indonesia	549	499	436	363	-9.1%	-6.2%
United States	46	40	40	36	-13.0%	-2.4%
Colombia	59	48	40	31	-18.7%	-8.4%
Russia	149	147	141	135	-1.3%	-1.7%
South Africa	68	67	67	64	-1.5%	-0.9%
World	**1182**	**1116**	**1035**	**937**	**-5.6%**	**-3.4%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Table 12: Metallurgical coal exports (Mt), 2024-2030

Region/country	2024	2025	2027	2030	2024-25	CAAGR 2025-2030
Australia	154	149	155	152	-3.2%	0.5%
Mongolia	56	56	56	59	0.0%	1.0%
United States	52	46	50	48	-11.6%	1.2%
Canada	29	30	31	31	3.5%	1.0%
Russia	49	50	51	52	2.0%	0.8%
Mozambique	10	10	10	9	5.2%	-2.3%
World	**365**	**357**	**369**	**368**	**-2.3%**	**0.6%**

Notes: CAAGR = compound average annual growth rate. Data for 2024 are preliminary; 2025 are estimated; 2026 to 2030 are forecasts.

Coal mining projects: Export

Country	Company	Project	Type	Earliest start-up	Full capacity (Mtpa)	Resource	Status
Australia	Whitehaven Coal Ltd. 70%, Nippon Steel 20%, JFE Steel 10%	Blackwater South	N	2029	8	CC, TC	LA
Australia	Idemitsu Australia Resources 80%, Chugoku Electric Power Australia Resources Pty Ltd 10%, NS Boggabri Pty Limited 10%	Boggabri Coal Expansion	E	2026	8.6	PCI, TC, CC	MA
Australia	Glencore PLC	Bulga (Mod 3 and Mod 7)	E	2029	6.6	TC	MA
Australia	Qcoal 85%, JFE Holdings Inc 15%	Byerwen Coal Project Stage 2	E	2028	2.2	TC, CC	LA
Australia	Baoshan Iron and Steel Co., Ltd. 43%, Mineral Resources 8%, Stanmore Resources Ltd. 50%	Eagle Downs	N	2025	4.5	CC	MA
Australia	Thungela Resources Ltd 75%, Audley Energy Ltd 12.5%, Mayfair Corporations Group Pty. Ltd 12.5%	Ensham Life of Mine Extension Project	E	2028	4.5	TC	MA
Australia	Bowen Coking Coal Ltd	Isaac River	N	2026	0.5	CC	MA
Australia	The Lake Vermont Joint Venture	Lake Vermont Meadowbrook Project	N	2028	5.5	CC, PCI, TC	MA
Australia	Centennial Coal	Mandalong Southern Extension	E	2028	6	TC	MA
Australia	Glencore PLC	Mangoola Coal Continued Operations Project	E	2026	5	TC	MA
Australia	Stanwell Corporation	Meandu King 2 East Project	E	2025	4	TC	MA
Australia	TerraCom, Wintime	Moorlands	N	2026	1.9	TC	MA
Australia	Anglo American PLC 25%,	Moranbah South	N	2026	18	CC	LA

Country	Company	Project	Type	Earliest start-up	Full capacity (Mtpa)	Resource	Status
	Exxaro Resource Ltd. 50%, Peabody Energy Corp 25%						
Australia	Nippon Steel Corporation 6%, Other 4%, POSCO Holdings Inc. 7%, Yancoal Australia 83%	Mount Thorley Warkworth Extension	E	2029	2	CC, TC	MA
Australia	Bowen Coking Coal Ltd.	Plumtree North Mine	E	2026	5.5	CC	MA
Australia	Whitehaven Coal 77.5%, J-Power Australia Pty Limited 7.5%, Upper Horon Investments Pty. Ltd 7.5%, Posco International Narrabri Investment Pty Ltd. 5%, Kores Narrabri Pty Limited 2.5%	Narrabri Stage 3	E	2026	9	TC	MA
Australia	Bowen Coking Coal Ltd - 90%, Formonsa Plastic 10%	Lenton Deposit	N	2027	1.4	CC	LA
Australia	Coronado Global Resources Inc	Curragh Underground Expansion	E	2025	1.75	CC, TC	MA
Australia	Pembroke Resources	Olive Downs South Stage 2	E	2030	15	TC	MA
Australia	Malabar Resources Ltd	Spur Hill	N	2026		TC, CC	LA
Australia	Magnetic South	Walton	N		1.3	CC, TC	LA
Australia	Glencore PLC - 75.00%, Private - 25.00%	Wandoan	N			CC	LA
Australia	Bowen Coking Coal Ltd	Plumtree North Mine	N	2026	5.5	CC	MA
Australia	Malabar Resources Ltd	Maxwell Underground Expansion	E	2026	3.6	CC	MA
Australia	NRW Holdings Ltd	Jellinbah Central North Extension	E	2025	1	CC, PCI	MA
Botswana	Jindal Steel and Power Ltd	Jindal Mmambula Coal Mine	N	2026	1.2	TC	MA
Canada	Valory Resources	Blackstone Project	N			TC	LA
Canada	Jameson Resources 77.9% ,	Crown Mountain	N	2026	2	CC	MA

Country	Company	Project	Type	Earliest start-up	Full capacity (Mtpa)	Resource	Status
	Bathurst Resources Ltd. 22.1%						
Canada	Conuma Resources Ltd.	Wolverine-Hermann Amendment Project	E	2027	1	CC, TC	MA
Canada	Hancock Propsecting Pty. Ltd.	Grassy Mountain	N	2027	4.5	CC	MA
Canada	HD Mining International Ltd	Murray River	N	2029	6	CC	MA
Canada	Valory Resources	Summit Mine 14	N		1.3	CC	LA
Canada	Bathurst Resources Ltd	Tenas Project	N	2027	0.75	CC	LA
Canada	Conuma Resources Ltd.	Rocky Creek Coal Mine	N	2030	3	CC	LA
Indonesia	PT Altas Resources Tbk	Ratah Coal Mine	N			TC	LA
Indonesia	AlamTri Resources	Bhakti Energi Persada	N			TC	LA
Indonesia	PT Bayan Resources Tbk 92.7%	PT Gunungbayan Pratamacoal (GBP) Coal Mine	E	2025	8	TC	MA
Indonesia	PT Altas Resources Tbk	Kelbara Energi Pratama (KEP) Coal Mine	N		0.6	TC	MA
Indonesia	Geo Energy Group	Triaryani (TRA) Coal Mine	E	2026	17	TC	LA
Indonesia	PT Resource Alam Indonesia Tbk - 75.00%, Private - 25.00%	Kaltim Mineral Coal Mine	N			CC	MA
Indonesia	AlamTri Resources	PT Pari Coal Project	N		3.5	TC	LA
Indonesia	Geo Energy Group	Surya Tambang Tolindo (STT) Coal Mine	N	2031		TC	MA
Indonesia	PT. Resource Alam Indonesia TBK	PT Loa Haur	N		0.03	TC	MA
Indonesia	PT Qinfa Mining Industri 70%, PT Widyanusa Mandiri 25%, PT Lintas Timur Investama 5%	SDE Coal Mine - Stage 2	N	2026	9	TC	MA
Indonesia	PT Adaro Minerals Tbk.	PT Maruwai Coal - Expansion	E			CC	LA
Mongolia	Aspire Mining Ltd.	Ovoot	N	2026	3	CC	MA

Country	Company	Project	Type	Earliest start-up	Full capacity (Mtpa)	Resource	Status
Mongolia	Erdenes Mongol LLC - 51.00%, Private - 49.00%	Tavan Tolgoi Expansion	E	2026	10	CC	MA
Mozambique	Tata Steel Ltd 35%, Steel Authority of India 32.2%, NMDC Ltd 16.1%, Rashtriya Ispat Nigam Ltd. 16.1%	Benga Coking Coal Mine	E		12.6	CC, TC	LA
Mozambique	Stonecoal CA 92%	Revuboe	N	2026	7	CC, TC	LA
Poland	GreenX Metals Ltd.	Dekiensko	N			CC	LA
Poland	GreenX Metals Ltd.	Jan Karski Project	N		6.3	TC	LA
Russia	Triple A Property Co. Ltd.	Elga Expansion 2	E	2027	25	CC	MA
Russia	Kolmar	Inaglinsky-2	E		8	CC	MA
Russia	SUEK	Pravoberezhny - Stage 2	E	2029	6	TC	MA
Russia	MMK-Ugol	Tikhova Stage 2	E	2026	2.8	CC	MA
Russia	AEON Corporation	Taymyr Sryradasaysky Coal Mine	E	2026	7	CC	MA
Russia	AEON Corporation	VostokUgol-Dikson Coal Mine	E		4	CC	LA
Russia	Tigers Realm Coal Ltd	Amaam	E	2026	5	CC	MA
South Africa	Canyon Coal	Gila Coal Mine (Koppie)	N	2025	1.8	TC	MA
South Africa	Kangra Coal	Kusipongo (Udumo Mine)	N	2026		TC	MA
South Africa	Thungela Resources 50%, Exxao 50%	Mafube Life Extension	E		3.8	TC	LA
South Africa	MC Mining	Makhado Phase 1	E	2026	1.1	CC	MA
South Africa	MC Mining	Makhdo Phase 2	E	2026	1.2	CC	MA
South Africa	Liberty Coal	Optimum Coal Mine	N		11	TC	LA
South Africa	Canyon Coal	Sukuma Coal Mine	N		7	TC	LA
South Africa	Canyon Coal	Thuso Coal Project	N		1.2	TC	MA
South Africa	Canyon Coal	Ukwenama Coal Mine	N	2025	0.6	TC	MA
South Africa	Thungela Resources Ltd.	Zibulo Extension	E	2026	5	TC	MA

Country	Company	Project	Type	Earliest start-up	Full capacity (Mtpa)	Resource	Status
South Africa	Canyon Coal	Gugulethu Coal Project - Phase 2	N	2030	3	TC	MA
Ukraine	Lubel Coal Co. Ltd	Lubel	N	2028	5.2	CC, TC	LA
United Kingdom	New Age Exploration Ltd -	Lochinvar	N	2026	1.4	CC	MA
United States	Warrior Met	Blue Creek No. 1	N	2026	4	CC	MA
United States	Ramaco Resources LLC	Monarch Deep Coal Mine	N			TC	MA
United States	Ramaco Resources LLC	Maben Property	N	2028	9	TC	LA
United States	Ramaco Resources LLC	RAM Mine	N	2025	0.5	CC	MA

Notes: N = New project. E = Expansion. R = Reopening. TC = Thermal coal. CC = Coking coal. PCI = Pulverised coal injection

CCUS project

Coal-based CCUS projects in operation

Project	Country	Year	Annual capacity (Mt)	Sector
Boundary Dam CCS (Saskatchewan)	Canada	2014	1	Power and heat
CEIC-CNPC CCUS-EOR demonstration (Ningxia) Phase 1	China	2024	0.4	Coal conversion
China Energy Guohua Jinjie Power (Shaanxi)	China	2021	0.15	Power and heat
China Energy Taizhou power (Jiangsu)	China	2023	0.5	Power and heat
Great Plains Synfuel Plant (North Dakota) Weyburn-Midale (Saskatchewan)	United States-Canada	2000	3	Coal conversion
Guanghui Energy CCUS integration project Phase 1 (Xinjiang)	China	2023	0.1	Chemicals
Huaneng Longdong Energy base/Zhengning coal power plant (Gansu)	China	2025	1.5	Power and heat
Jiling Petrochemical CCUS (Nanjing refinery) (Jiangsu) Phase 1	China	2023	0.1	Coal conversion
Jinjiang Chemical CCUS Project (Xinjiang)	China	2023	0.1	Fertiliser
Petra Nova Carbon Capture (Texas)	United States	2016	1.4	Power and heat
Sinopec Nanjing Chemical Industries CCUS Cooperation Project (Jiangsu)	China	2021	0.2	Coal conversion
Sinopec Qilu Petrochemical Shengli (Shandong)	China	2022	1	Fertiliser
Xinjiang Guoneng Chemical Co CCU Phase 1 (Xinjiang)	China	2024	0.1	Chemicals
Xinjiang Jinlong Shenwu Thermal Power Plant (Xinjiang)	China	2024	0.2	Power and heat
Yulin Coal Chemical CCUS (Shaanxi) Phase 1	China	2022	0.3	Coal conversion

Coal-based CCUS projects under construction

Project	Country	Year	Annual capacity (Mt)	Sector
CEIC-CNPC CCUS-EOR demonstration (Ningxia) Phase 2	China	2025	0.5	Chemicals
CEIC-CNPC CCUS-EOR demonstration (Ningxia) Phase 3	China	2027	1.5	Chemicals
CEIC-CNPC CCUS-EOR demonstration (Ningxia) Phase 3 (dedicated storage)	China	2027	0.5	Chemicals
CNPC 3 Mt Songliao basin demonstration (Heilongjiang)	China	2026	3	Power and heat
CPNC coal power Baijiantan Karamay (Xinjiang) Phase 1	China	2027	0.5	Power and heat
CPNC coal power Baijiantan Karamay (Xinjiang) Phase 2	China	-	1.5	Power and heat
CRP Haifeng Project (Guangdong)	China	2030	1	Power and heat
Dry Fork Integrated Commercial CCS/Wyoming CarbonSafe (Wyoming)	United States	2026	3	Power and heat
Duke Energy Edwardsport Integrated Gasification Combined Cycle plant (Indiana)	United States	-	3.6	Power and heat
Four Corners Power Plant Integrated Carbon Capture and Storage (New Mexico)	United States	-	10	Power and heat
Gerald Gentleman Station Carbon Capture (Nebraska)	United States	2026	3.8	Power and heat
Great Plains Synfuel Plant to sequestration (North Dakota)	United States	-	1.5	Coal conversion
Prairie State Generating Station Carbon Capture (Illinois)	United States	2026	6.05	Power and heat
Project Tundra at Milton R Young Station (North Dakota)	United States	2028	4	Power and heat
Shaanxi Coal Group Yulin Chemical CCUS Phase 1 (Shaanxi)	China	2026	0.4	Coal conversion
Shaanxi Coal Group Yulin Chemical CCUS Phase 2 (Shaanxi)	China	2029	0.6	Coal conversion
Shaanxi Coal Group Yulin Chemical CCUS Phase 3 (Shaanxi)	China	2033	3	Coal conversion
Sinopec Shengli Power Plant CCS (Shandong)	China	2030	2	Power and heat
Xinjiang Guoneng Chemical Co., Ltd CCU Phase 2 (Xinjiang)	China	-	0.2	Chemicals
Yanan Energy Chemical (Shaanxi)	China	2030	0.8	Coal conversion
Yulin Energy Chemical (Shaanxi)	China	2030	1.6	Coal conversion

Abbreviations

AI	artificial intelligence
ARA	Amsterdam Rotterdam Antwerp
ASEAN	Association of Southeast Asian Nations
BOF	basic oxygen furnace
CCGT	combined-cycle gas turbine
CCS	carbon capture and storage
CCUS	carbon capture, utilisation and storage
CFR	cost and freight
CIF	cost, insurance and freight
CIL	Coal India Ltd
CO_2	carbon dioxide
CV	calorific value
DME	dimethyl ether
DOE	Department of Energy
DOI	Department of the Interior
DRI	direct reduced iron
EAF	electric arc furnace
EOR	enhanced oil recovery
FOB	free on board
FY	financial year
GDP	gross domestic product
HPAL	high-pressure acid leach
IPCC	Intergovernmental Panel on Climate Change
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MDO	mining developer and operator
met	metallurgical
PCI	pulverised coal injection
PDP8	8th National Power Development Plan
PPA	power purchase agreement
PRB	Powder River Basin
PRC	peak rated capacity
PV	photovoltaic
RKEF	rotary kiln-electric furnace
SNG	synthetic natural gas
SCCL	Singareni Collieries Company Ltd
TTF	Title Transfer Facility
y-o-y	year-on-year

Units of measure

bcm	billion cubic metres
bcm/yr	billion cubic metres per year
dwt	dead weight tonnes
GJ	gigajoule
Gt	gigatonne
GW	gigawatt
kcal/kg	kilocalorie per kilogram
kg	kilogramme
km	kilometre
MBtu	million British thermal units
Mt	million tonnes
Mtpa	million tonnes per annum
MWh	megawatt hour
t	tonne
tpa	tonnes per annum
TWh	terawatt hour

Definitions

Coal: A solid, combustible fossil sedimentary rock. Coal comes from buried vegetation transformed by the action of strong pressure and high temperatures over millions of years.

Coal rank: The degree of transformation from the original plant source. It is loosely related to the age of the coal and is mainly determined from random reflectance of the vitrinite, one of coal's organic components. The ranks of coal, in decreasing order of transformation from high to low, are: anthracite, bituminous coal, sub-bituminous coal, lignite and peat. This report distinguishes between hard coal (anthracite, bituminous and sub-bituminous coal) and lignite, while peat is not considered.

Coal classification: Refers to a range of coal age, composition and other properties. Many classifications are used around the world with the main parameter being the coal rank, supplemented by its intended use, i.e. thermal or metallurgical applications.

Coal quality: Represents a variety of properties exhibited by coal when it is used. Calorific value and impurity content are the main parameters defining the quality of thermal coal, whereas caking properties, resistance and impurity content are the distinguishing characteristics for coking coal.

Thermal (or steam) coal: Refers to hard coal used for purposes other than metallurgy in this report.

Coking coal: High-quality coal to produce coke used in blast furnaces to make pig iron. Coking coal and metallurgical coal are terms sometimes used interchangeably.

Semi-soft coal: High-quality steam coal mixed with coking coal to produce coke for blast furnaces.

Pulverised coal injection (PCI) **coal**: A high-quality steam coal injected into a blast furnace to reduce coke consumption.

Metallurgical coal: Refers to coking coal, semi-soft coal and pulverised coal injection coal in this report. Although anthracite is often used for metallurgical purposes, it is classified as thermal coal in this report.

Run-of-mine coal: Raw coal as it is mined before any processing.

Tonne of coal equivalent (tce): A unit of energy widely used in the international coal industry. It is defined as 7 million kilocalories (kcal). Therefore, the relationship between tce and physical tonnes depends on the net calorific value of the coal. One tonne of coal with a net calorific value of 7 000 kcal per kilogramme (kcal/kg) represents 1 tce.

Coal mining: A technique used to remove coal from a natural deposit. Coal deposits in the Earth's crust occur at various depths and seam configurations, which determine the mining method used. Generally, deep deposits are mined underground and shallow deposits are exploited through opencast mines. The strip ratio largely determines whether an opencast mine is profitable or not.

Strip ratio: The overburden or waste material removed, usually expressed as cubic metres per tonne of coal extracted. High strip ratios make opencast mining unprofitable.

Opencast mining: A method in which the overburden is first drilled, then blasted, and when the deposit is accessible, coal is removed in a similar way to the overburden. To remove the coal, power shovels, conveyor belts and trucks may be used, as well as some extremely large machinery such as draglines and bucket wheels. Opencast mining is usually less labour-intensive than underground mining, but has higher consumable costs, e.g. for tyres, diesel and explosives. Generally, opencast methods imply greater environmental impact than underground mining.

Underground mining: A method in which access to coal seams is gained through underground shafts, galleries and tunnels. Although there are many ways to mine an underground deposit, coal is usually stripped by automatic shearers or continuous mechanical miners using either short/long walls or room-and-pillar exploitations. Underground mining is generally more labour-intensive and requires higher capital investments than opencast mining.

Coal washing/upgrading: A process in which impurities (i.e. ash, moisture) are partially removed from raw coal to produce a higher-quality coal.

See the IEA glossary for a further explanation of many of the terms used in this report.

Regional groupings

Africa: Algeria, Angola, Benin, Botswana, Cameroon, Republic of the Congo (Congo), Côte d'Ivoire, Democratic Republic of the Congo, Egypt, Eritrea, Ethiopia, Gabon, Ghana, Kenya, Libya, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, South Africa, South Sudan, Sudan, United Republic of Tanzania (Tanzania), Togo, Tunisia, Zambia, Zimbabwe and other African countries and territories.

Asia Pacific: ASEAN regional grouping and Australia, Bangladesh, the People's Republic of China and Hong Kong (China), Chinese Taipei, India, Japan, Korea, Democratic People's Republic of Korea (North Korea), Mongolia, Nepal, New Zealand, Pakistan, Sri Lanka, and other Asian countries and territories.

Central and South America: Argentina, Plurinational State of Bolivia (Bolivia), Brazil, Chile, Colombia, Costa Rica, Cuba, Curaçao, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, Bolivarian Republic of Venezuela (Venezuela), and other Central and South American countries and territories.

China: The People's Republic of China and Hong Kong.

Eurasia: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation (Russia), Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

Europe: European Union regional grouping and Albania, Bosnia and Herzegovina, Iceland, Gibraltar, Kosovo, Montenegro, Norway, Republic of North Macedonia, Serbia, Switzerland, Republic of Türkiye and the United Kingdom.

European Union (EU): Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain and Sweden.

Middle East: Bahrain, Islamic Republic of Iran (Iran), Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic (Syria), the United Arab Emirates and Yemen.

North America: Canada, Mexico and United States.

ASEAN: Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic (Lao PDR), Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.

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