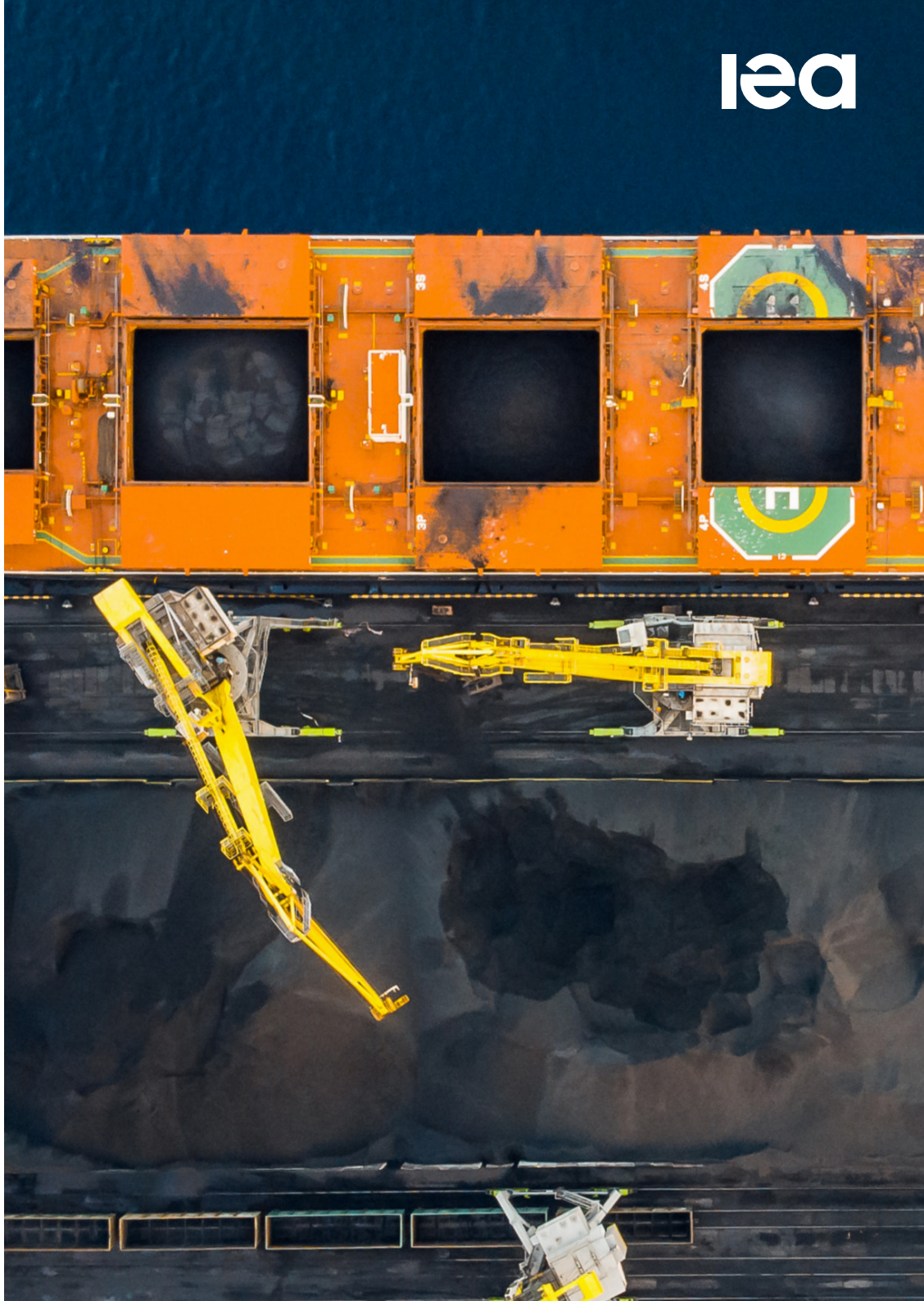
Coal 2020

Analysis and forecast to 2025



Abstract

Coal 2020 highlights recent global and regional trends in coal demand, supply and trade, and an outlook to 2025. The extraordinary circumstances in 2020 impacted coal markets and lend uncertainty to how they will be tailored in a post-Covid-19 economic recovery. Therefore, *Coal 2020* spotlights developments in 2020 and expected conditions in 2021. It also provides an analysis of the evolution of coal supply costs, prices and investment in mining projects. China – the world's largest coal producer and importer as well as consumer of more than half of global coal – is highlighted. In addition, *Coal 2020* includes forecasts of coal demand, production and trade by region and coal grade, and a compilation of coal mining projects in the main exporting countries in its annexes. *Coal 2020* is an integral component of the International Energy Agency's annual market report series that also includes oil, natural gas, renewables, electricity and energy efficiency.

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Executive summary

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An electricity-driven decline in coal demand in 2019

In 2019, global coal demand decreased 1.8% after two years of growth. Power generation from coal declined 3%, and coal use in industry increased only slightly. Two trends affected coal-fired power generation in 2019: weak electricity demand growth and low natural gas prices. Global electricity generation grew 1% in 2019, the lowest rate since 2009 and almost one-third of the average annual increase since then.

Electricity generated from renewables increased in 2019, squeezing coal and gas generation. Expanding LNG supply put pressure on natural gas prices, which fell by two-thirds in Europe from January to September 2019. In the United States, where natual gas is generally cheap, prices in 2019 were 30% lower on average than the previous year. This spurred significant coal-to-gas switching in the power sector. In the European Union, coal-fired power generation saw its largest drop ever, both in relative and absolute terms. In the United States, it experienced its largest drop in percentage terms and second-largest in absolute terms. In India, 2019 marked the first year in four decades in which coal-fired power generation declined, reflecting the country's economic slowdown, above average hydropower output, and expanding wind and solar PV capacity. Only China and Southeast Asia saw significant growth in coal-fired power generation in 2019, but not enough to offset declines elsewhere. In China, growth in coal-fired power generation, increased steel production and shrinking coal use in small industrial and residential boilers resulted in an overall increase in coal consumption of 1%. Across members of the Association of Southeast Asian Nations (ASEAN), coal use rose 14% in 2019, mainly reflecting demand growth in Viet Nam and, to a lesser extent, in Indonesia.

A pandemic-driven drop in coal demand in 2020

In 2020, global coal demand will experience its largest drop since the Second World War, falling 5% from 2019 levels. Coal's decline is only slightly sharper in power generation than in industrial applications. Except for China, industrial output has been severely subdued by the Covid-19 crisis. In China, switching away from small coal boilers for air quality reasons continues. Both of these factors weighed on non-power coal demand in 2020.

Measures to slow the transmission of Covid-19, notably in the first half of 2020, resulted in an unusual drop in electricity demand. This in turn significantly affected the use of coal for power generation – a trend that was compounded by low natural gas prices.

The overall decline in global coal demand in 2020 has turned out to be lower than was estimated in the early months of the year as the pandemic spread and intensified around the world. This can be attributed to a smaller decrease in global electricity demand than was predicted earlier in the year and to the robust economic recovery in China, where more than half of global coal is consumed.

Coal's partial recovery is set to fade after 2021

Global coal consumption is estimated to have fallen by 7%, or over 500 million tonnes, between 2018 in 2020. A decline of this size over a

two-year period is unprecedented in IEA records, which go back as far as 1971. Based on the assumption of a global economic recovery in 2021, we expect both electricity demand and industrial output to increase. As a result, we forecast a rebound in global coal demand of 2.6%, led by China, India and Southeast Asia. Higher natural gas prices and electricity demand are set to slow the structural decline of coal use in the European Union and the United States, which both might see their coal consumption grow for the first time in nearly a decade.

By 2025, global coal demand is forecast to flatten out at around 7.4 billion tonnes. Trends are expected to vary by region over the next five years. In Europe and North America, coal continues its decline after a temporary uptick in 2021. Given that the combined coal consumption of the European Union and the United States now represents around 10% of global coal use, further declines in those markets will have a limited effect at a global level. In China, coal demand is reaching a plateau, although our 2025 forecast will need to be reviewed following the release of the Chinese government's 14th Five-Year Plan. China's pledge of reaching carbon neutrality before 2060 requires a long-term roadmap to enable the smooth transition of an economy which consumes 4 billion tonnes of coal each year. India and some other countries in South and Southeast Asia are forecast to increase coal use through 2025 as industrial production expands and new coal-fired capacity is built. In India, however, the demand outlook to 2025 is considerably lower than it was a year ago as a result of the pandemic. By 2025, ASEAN will become the third-largest coal-consuming region, surpassing the United States and the European Union. In 2020, some countries made pledges that involve reducing coal use in the coming years (Korea, Japan), downsizing planned coal expansion (Viet Nam, Bangladesh, Philippines), and cancelling plans for coal development (Egypt).

Strategies vary for managing future coal supply

China and India – the two most coal-reliant major countries – are taking steps to ensure adequate coal supply to fuel their economies and rein in imports. In China, the government is continuing efforts to increase the competitiveness and profitability of the coal sector. In 2020, the Coal Trading Centre opened in Beijing and two big new corporations were formed, Jinneng Holding Group (in Shanxi) and Shandong Energy Group. These companies, together with China Energy Investment Corporation, will produce more than 1 billion tonnes of coal each year. In India, the government intends to transform its coal sector by increasing efficiency and competitiveness, and, notably, by introducing commercial mining. In November 2020, 50 million tonnes of annual coal mining capacity was allocated via an auction process.This initial offering is still small in volume relative to the production level of Coal India (600 million tonnes a year) and India's total domestic production (about 800 million tonnes a year).

In the United States, despite the easing in competitive pressures as a result of higher natural gas prices and the expected pickup in coal demand in 2021, coal's prospects do not improve in the medium term. Some of the big US mining companies are now increasingly shifting away from thermal coal, which is mostly used for power generation, and focusing on metallurgical coal, which is mainly used in iron and steel production. The few coal-producing countries that remain in Europe are largely preparing for orderly closures to minimise the social impacts on communities that rely heavily on the industry.

Lower import volumes affect some major exporters more than others

The international coal trade was seriously disrupted in 2020 by the Covid-19 crisis. Exports contracted by around 11%, with more than two-thirds of the decline coming from thermal coal. New import quotas in China compounded the uncertainty in the coal trade. Imports in India and Europe experienced the largest drops, but they also declined in Japan, Korea and elsewhere. Very few big markets increased their imports in 2020.

A combined reduction of over 25 million tonnes of thermal coal exports from the United States and Colombia balanced the Atlantic Basin market. It took more time to balance the Asia Pacific market, which came at the expense of Indonesian and Australian producers.

After the adjustments on the supply side, which have also included some cuts in coal exports from the Russian Federation and South Africa, thermal coal prices at the end of 2020 are just about where they were a year ago.

In the near-term outlook, another factor driving uncertainty is lower imports of Australian coal by China. While we expect a recovery in the international coal trade in 2021, supported by increased global demand, the medium-term outlook is highly uncertain. This is particularly the case with regard to the evolution of Chinese import policies and developments in India's indigenous thermal coal production.

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Demand

Coal demand plummets in 2020 following a drop in 2019, yet looks to rebound in 2021

Demand for coal to produce electricity dropped by 3.3% in 2019 reflecting weak electricity demand growth, stronger contributions from renewables and lower natural gas prices. This pushed total coal demand down 1.8% to 7 627 million tonnes (Mt). Coal demand in non-power sectors rose slightly.

The strongest declines in coal-fired power generation were in the European Union (-19%, -111 Mt) and the United States (-14%, -87 Mt). By contrast, coal consumption increased 1.2% (+69 Mt) in the Asia Pacific region. This was despite an unusual decline in India due to exceptionally high hydropower output and an economic slowdown.

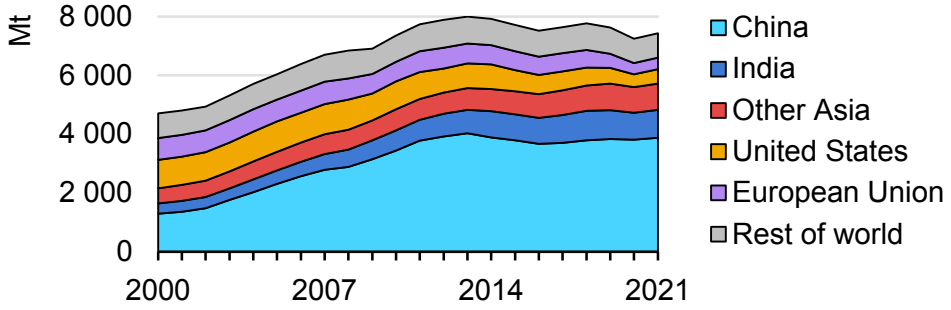
Clearly, 2020 is a very different year. The IMF estimates a global economic contraction of 4.4%, reflecting government measures to control the spread of the Covid-19 pandemic. We expect coal demand to decline 5% in 2020 as lower electricity consumption (-1.5%) impacts demand for coal in a disproportionate way because nuclear and renewable sources have largely priority dispatch in the electricity system. In addition, cement and steel production were depressed due to the confinements and economic slowdown.

Considerable geographical divergence is evident as was the case in 2019. Large drops in coal demand (more than 15%) are estimated in the European Union and North America, while smaller but significant decreases (5-10%) are expected in some Asian countries, including Korea, Japan and India. China, the world's primary coal consumer, is expected to maintain its 2019 consumption level in 2020.

Global coal consumption will drop two years in a row (from 7 766 Mt in 2018 to 7 243 Mt in 2020), a record collapse in IEA records of almost 7% (more than 500 Mt) in two years.

Our 2021 forecast assumes global GDP growth of 5.2% based on the IMF World Economic Outlook, which will boost electricity demand and industrial production, the main drivers of coal demand. Coal consumption will rise 2.6% to 7 432 Mt (still less than in 2019) as a result of increased demand in China, India and Southeast Asia. The 2021 outlook includes strong GDP growth of 8.2% in China that will drive additional coal use, particularly in the electricity sector. Likewise, the rebound of electricity demand in Europe in 2021 will put a temporary brake on the structural decline of coal. Higher natural gas prices for power generation in the United States could make annual coal demand increase for the first time since 2013.

Global coal consumption by region, 2000-2021



Coal demand falls or rebounds in line with the power sector

Worldwide electricity consumption rose 1.0% in 2019, less than one-third of 2018 growth. This weak growth rate was one of the main reasons for a record 3.0% (-305 TWh) fall in coal-fired power generation, with resultant drops in consumption of both thermal coal (-2.4% to 4 341 Mt) and lignite (-9% to 657 Mt).

Changing market conditions and environmental policies in areas such as the United States, Europe and Korea depressed coal-fired electricity generation. Lower global natural gas prices owing to expansion of LNG supply made gas-fired power plants more competitive than coal plants. This was the case particularly in the European Union coupled with rising costs of CO_2. Coal-fired power generation fell 23% in the European Union in 2019 and 17% in the United States. In contrast, it rose 1.8% in China and 13% in Southeast Asia.

Global electricity demand is estimated to drop 1.5% in 2020 – the largest decline in IEA records – and global coal-fired power generation by 5.2%, the largest drop in decades and the first time to decline two years in a row. Estimates for 2020 are a decline of 5% for steam coal and 13% for lignite. Lignite use is concentrated in Europe, where the decline is bigger than elsewhere.

Mild winter weather in 2019-20 combined with low natural gas prices in the United States and the European Union prevailed when Covid-19 containment measures slowed economies and electricity demand declined. In most power systems, coal and gas are marginal suppliers, so lower electricity demand impacts these fuels more than others. By altering not only electricity demand but gas use in industry, the pandemic has pushed gas prices even lower. This has impacted coal use, particularly in the European Union, where we expect a 23% decline in coal power generation and in the United States (-18 %) in 2020.

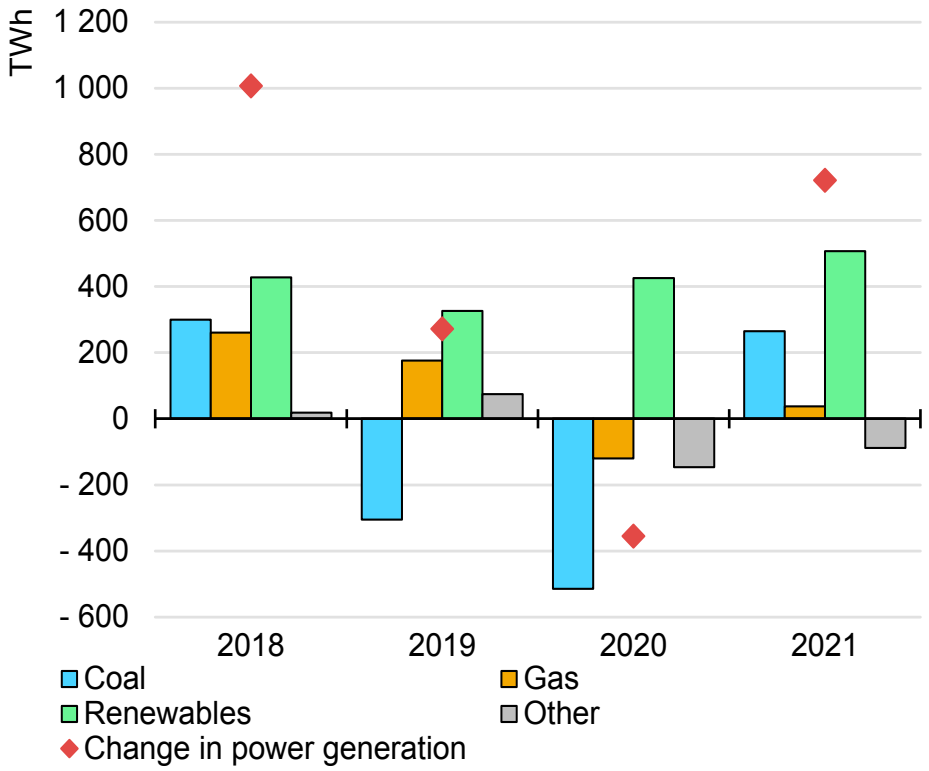
Drops in coal power generation of 3.2% in Japan and 10% in Korea are anticipated for 2020. In India, coal-based power generation will gain some ground in the fourth-quarter 2020 after two-digit declines in the first-half of the year, to end with an overall 4.5% drop for the year. In contrast, coal-fired power generation in China and Southeast Asia is expected to slightly decline in 2020.

Global electricity consumption is forecast to rebound 2.9% in 2021, exceeding the 2019 level. While coal-fired power generation is set to increase 2.8% in 2021, this is below the 2019 level as its share of electricity production falls from 36.5% in 2019 to 35% in 2021 – the lowest share in IEA records.

In 2021, renewable energy sources will meet a larger share of the increase in electricity demand than coal. Although higher gas prices support coal-based power generation somewhat, especially in the European Union and the United States, where there has been a structural decline in coal use for years.

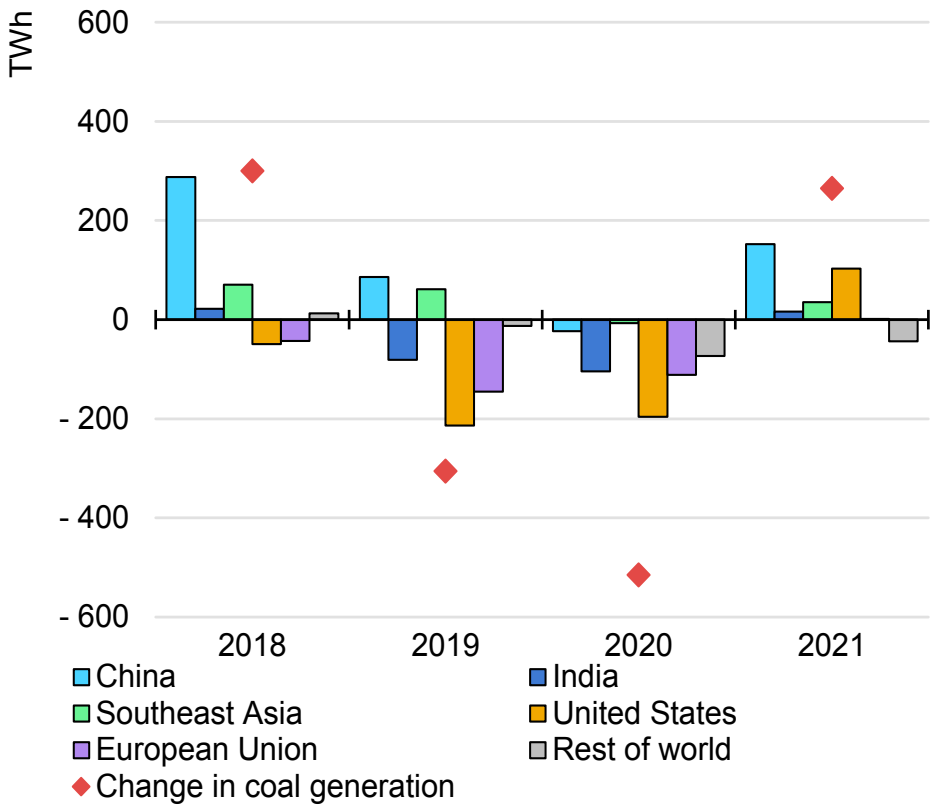
EU coal demand in 2021 is expected to increase only marginally, but it would be the first uptick since 2012, and the anticipated rebound in the United States would be the first since 2014. Conversely, coal is the cornerstone of electricity supply in India, China and some Southeast Asian countries, with estimated 2021 increases for power generation of: +1% in India, +3.1% in China and +7% in Southeast Asia.

Annual changes in global power generation by source, 2018-2021



Notes: TWh = terawatt hour. Generation does not include pumped-storage hydropower. *Other* includes nuclear, oil, etc.

Annual changes in coal-fired power generation by region, 2018-2021



Note: Generation does not include pumped-storage hydropower.

Resilient demand in China sustains metallurgical coal consumption

Metallurgical (met) coal, which includes coking coal (hard, medium and semi-soft) and pulverised coal for injection (PCI) is a primary ingredient in steelmaking. Coke is also used to produce carbides, ferroalloys and other compounds. Correspondingly, the World Steel Association projections are a key base of our forecast for met coal.

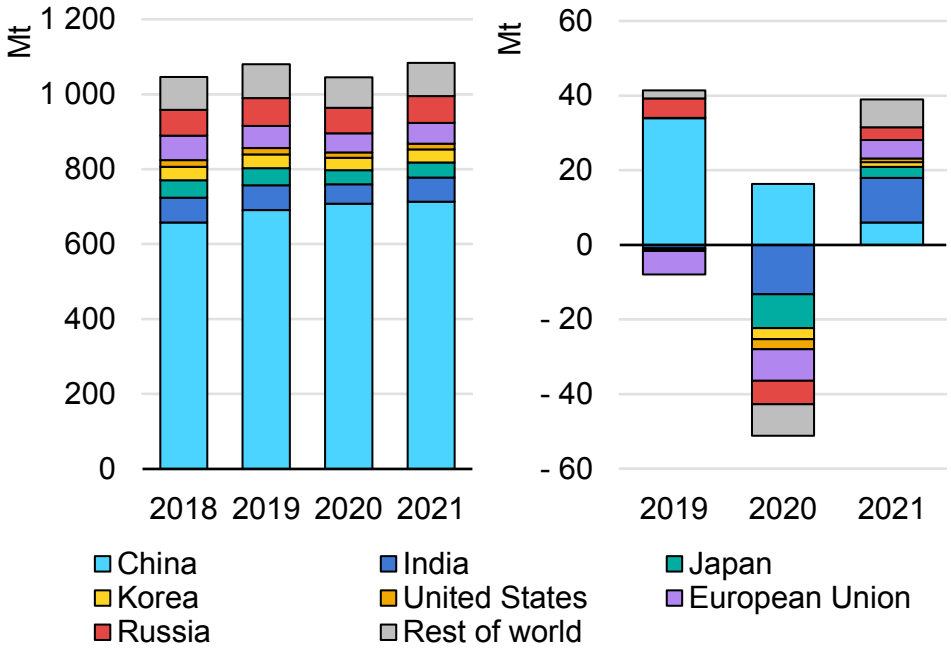
In 2019, global met coal consumption rose 3.2% to 1 080 Mt. By far, China is the largest met coal consumer accounting for 64% (691 Mt) of the global total in 2019. Other significant met coal consumers were the Russian Federation (hereafter "Russia") (7%), European Union (5%) and India (6%).

Global metallurgical coal consumption is expected to decline 3.2% to 1 045 Mt in 2020 as steel production (outside of China) decreases due to pandemic-related affects as well as emerging structural changes that were evident before the pandemic. Yet in China demand will increase 2.4% for 2020, reflecting its resilient steel industry which is underpinned by government stimulus measures. Production surpasses demand, delivering record levels of steel stock.

Other main met coal consuming countries are expected to register significant declines in demand in 2020; with the largest absolute drops in India (-13 Mt), Japan (-9 Mt) and Russia (-6 Mt). In India, decline rates for sponge iron (which uses thermal coal) were similar to pig iron throughout the year. Japan, the world's third-largest coking coal consumer, is expected to produce about 83 Mt of crude steel – its lowest amount since the 1960s.

The forecast is for met coal consumption to recover in 2021, rising by 3.7% to 1 084 Mt. While consumption in China flattens, in other countries it climbs as economies recover and global steel demand expands 4.1%, relative to a drop of 2.4% in 2020.

Metallurgical coal consumption and annual change by region, 2018-2021



Coal use plateaus through to 2025 on the heels of the drop in 2020 and a rebound in 2021

Looking ahead to 2025, coal demand is expected to flatten even though three factors exert downward pressure on demand.

First, coal-fired power plant retirements in developed countries accelerate. This reflects lower electricity demand related to the pandemic and economic slowdown and lower natural gas prices.

Second, low-carbon generation technologies, e.g. wind and solar, gain momentum as costs continue to fall and policy support is sustained. This dims the prospects for coal-fired generation.

Third, the perception that coal is the cheapest source of dispatchable electricity has been shaken by low gas prices. This mindset change is evident even in some Asian countries where coal's primary position in power generation has been undisputed. For example, in 2020, Viet Nam, Bangladesh, the Philippines and Egypt downgraded their plans for coal reflecting lower cost renewables and cheaper natural gas, amid increasing concerns about CO_2 emissions and building anti-coal pressure on many fronts. Korea and Japan continue to take steps to reduce reliance on coal.

Regional differences in the outlook to 2025 continue to widen. In the European Union, stagnating (if not declining) electricity demand, expanding renewables and robust CO_2 prices will continue to reduce coal demand, with the phase-out of nuclear power by 2022 in Germany partially counteracting the effect. In the United States, the shale revolution and expanding renewable-based capacity continue to constrain coal consumption. Globally, construction of new coal-fired power plants is in decline; other than those currently under construction, few new plants are expected to be built other than in China.

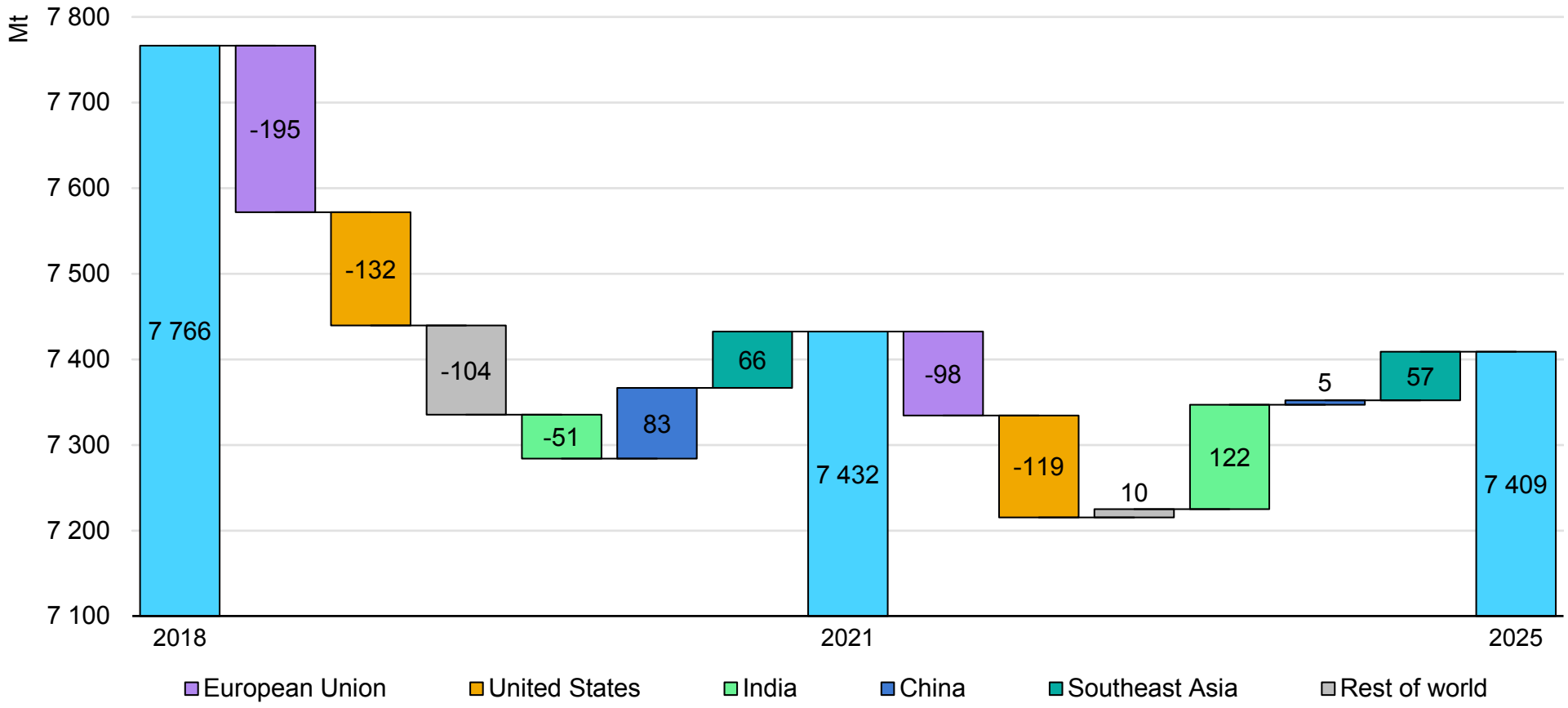
Yet, coal demand is expected to rise in some parts of the world, especially in South and Southeast Asia as electricity demand and infrastructure expand. This region, which includes India, Pakistan, Bangladesh and ASEAN countries, contains 2.4 billion people with per-capita electricity consumption at one-quarter the global average, has strong economic growth prospects, and relies on coal to supply part of the additional energy needs, especially for power generation.

In China, the president's recent announcement of carbon neutrality before 2060 is a notable target that sets up a long-term trajectory. Though in this report to consider coal demand to 2025, China's 14th Five-Year Plan due to be released in 2021 is most relevant. China's use of coal is of paramount relevance at the global level. Coal consumption in China entered a decade-long plateau (with some economic and weather-driven fluctuations) in 2013 after more than a decade of astonishing growth.

Unless there are unforeseen developments that significantly boost coal demand in emerging Asian economies and China, it is likely that global coal demand peaked in 2013 at just over 8 Bt.

More coal use in Asia is offset by declines in the European Union and United States

Changes in global coal consumption by region, 2018-2025



China's coal consumption falls only slightly in 2020

Coal consumption in China was 3 834 Mt in 2019, mostly thermal coal for electricity and heat production (2 276 Mt), followed by thermal coal for non-power applications (867 Mt). The rest was metallurgical (met) coal, used mostly in steel production.

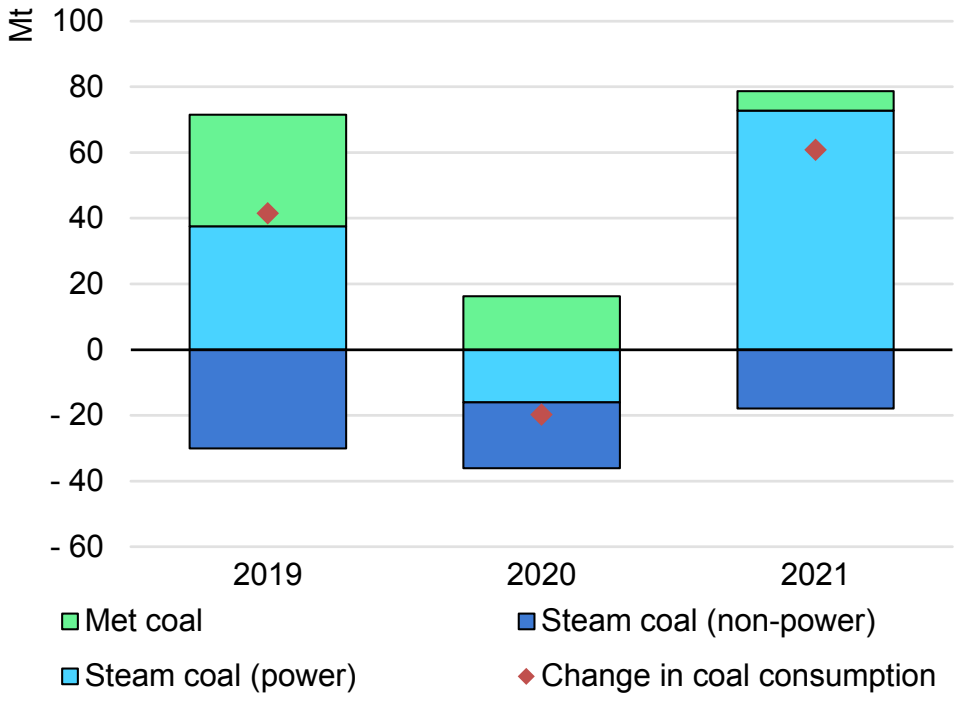
Overall consumption in China increased 1.1% from 2018 to 2019 with differences in coal grade and applications. Consumption of thermal and met coal was up to serve increasing electricity and steel production. Thermal coal use for non-power applications (e.g. residential, commercial and small-scale industry) decreased as a result of ongoing efforts to reduce air pollution by replacing small, inefficient coal boilers with gas-fired and electric options.

As happens every year in China, coal consumption dropped during the 2020 New Year holidays, but it did not rebound as usual due to the Covid-19 outbreak and consequent lockdown. However, following the first-quarter with very weak demand, coal consumption picked up along with the economy, but consumption patterns differed by sector.

Overall, we expect coal consumption for power generation in China to decline by less than 1% in 2020 as increased electricity demand is met by other sources (i.e. nuclear and renewables). Consumption of thermal coal for non-power applications is lower as coal use in small boilers decreases owing to air quality policies and weaker economic activity. Conversely, met coal demand is expected to increase 2.4% in 2020 with steel production being the main driver.

Economic recovery in 2021 (8.2% according to the IMF forecast) and the related increase in electricity demand are expected to boost thermal coal demand for power generation (+3.2%). However, the trend of falling coal demand for non-power applications is expected to continue in 2021 as coal boiler replacements outweigh increased use in other sectors.

Annual changes in coal consumption by type and use in China, 2019-2021



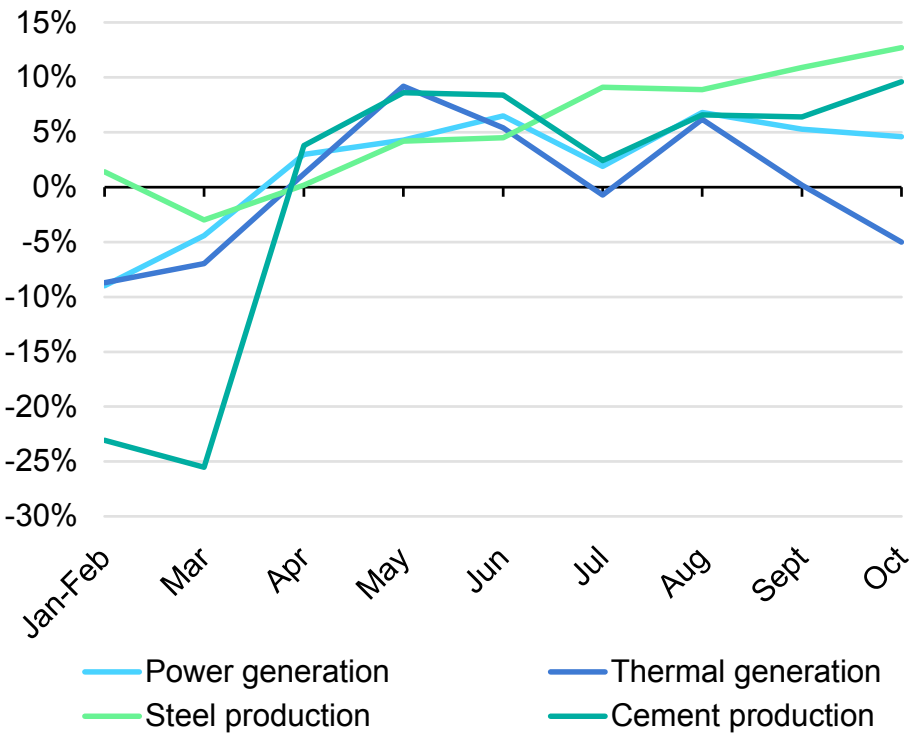
China's economy grows in 2020, affected only temporarily by Covid-19

Because the Covid-19 pandemic started in China, the first measures to contain the virus impacted coal consumption there. Regional lockdowns of cities and entire provinces to prevent the spread of the virus were implemented in January 2020, affecting various industrial value chains. Cement production, one of the key consumers of thermal coal in the industry sector, was 24% lower in the first-quarter 2020 than in the same period in 2019. Power generation was also affected, down 6.8% year-on-year (y-o-y) in the first-quarter. The overall decline in electricity demand led to a decrease in coal-fired power generation. Steel production, and hence met coal demand, showed more resilience owing to expectations of strong post-Covid stimulus.

After a first-quarter of negative growth (GDP declined 6.8% y-o-y) the economy recovered with 3.2% growth in the second-quarter and 4.9% in the third-quarter. The recovery was supported by government stimulus using fiscal and monetary instruments, including direct government spending, tax cuts, issuance of special government treasury bonds for the first time since the financial crisis of 2008, and a more relaxed monetary policy.

These measures spurred a rebound in industrial production as well as in infrastructure and real estate investment, with electricity, steel and cement production showing positive growth since April. In fact, steel production is reaching record high levels because domestic steel demand has proved very robust. As a result, overall coal demand in 2020 in China is expected to fall by only around 0.5%.

China year-on-year percentage changes for various economic indicators, 2020



Note: Coal-fired power generation values are not available on a monthly basis.

Source: National Bureau of Statistics of China (2020), Statistical Database.

Coal continues to be a vital part of China's energy strategy

Four pillars of Chinese government policy – economic growth, air pollution, energy security and climate change – have direct ramifications for coal. Those policies are being implemented at the same time as the government is addressing the social implications surrounding the coal supply chain (e.g. mines, rails, ports, ships, steel mills and coal-fired power plants) and dealing with the environmental impact of coal mining (e.g. landscape alteration, subsidence, water resource stress and pollution).

Economic growth continues to be an essential target, which in the year of Covid-19 has meant the need for powerful government stimulus to guarantee jobs and expand domestic demand. The government intends to avoid overheating the economy and focussing too much on heavy industry as it did during the economic crisis of 2008, and instead to concentrate on cutting-edge technologies such as the "internet of things", 5G networks and big data. In addition, the traditional economy will also receive momentum from the "Two New and One Major" policy aimed at new infrastructure construction, new urban construction and major project construction, which will boost coal demand in the short term. Coal still supplies more than half of China's primary energy supply and is therefore important for the competitiveness of its economy.

Whereas air pollution has been a major policy focus for almost a decade, in 2017 a comprehensive plan put the focus on heating in northern China's 26+2 cities, targeting the phase-out of coal stoves and small boilers in 12 million households. Policy attention in this area is ongoing. In September 2020, a new regulation was enacted ordering boilers of less than 35 t/h to be shut down and 7 million households to convert to natural gas. On 30 October, a comprehensive management action plan on air pollution for Beijing-Tianjin-Hebei and the Fenwei Plain for autumn-winter 2020-21 was issued. As a result, coal use in small, inefficient, polluting boilers in both the residential and industrial sectors is declining and will continue in coming years. The action plan also proposes to reduce emissions by retrofitting coal-fired power plants, steel mills, sintering plants, cement kilns and other industries.

Energy security is a policy focus that has been gaining attention as natural gas and oil import reliance – already over 45% for gas and 70% for oil – continues to rise. Using domestic coal to replace imported gas and oil might be a solution, as it can be used as a raw material to produce a variety of products. Coal by-products obtained from coal pyrolysis in coke ovens can also be used to manufacture cosmetics and other chemicals, and coal tar pitch is used to produce anode material for aluminium smelting. Most importantly, coal conversion processes, generally involving coal gasification, produce synthetic liquid fuels (gasoline or diesel), synthetic natural gas (methane) and a variety of chemicals such as methanol, which can be processed to produce olefins (ethylene and propylene), the basis of most plastics. Other valuable coal conversion products are ethylene glycol, fertilisers (ammonia) and soda ash.

China's announced coal conversion projects will involve over 500 Mt of additional annual coal consumption if they are eventually built, but it is difficult to track their status. These projects could reinforce energy security and reduce China's import bills, as well as create local jobs as the entire supply chain is domestic. Moreover, these projects are a good way to boost short-term economic growth, and in coal-rich provinces to monetise stranded coal assets. For example, Inner Mongolia's Plan for

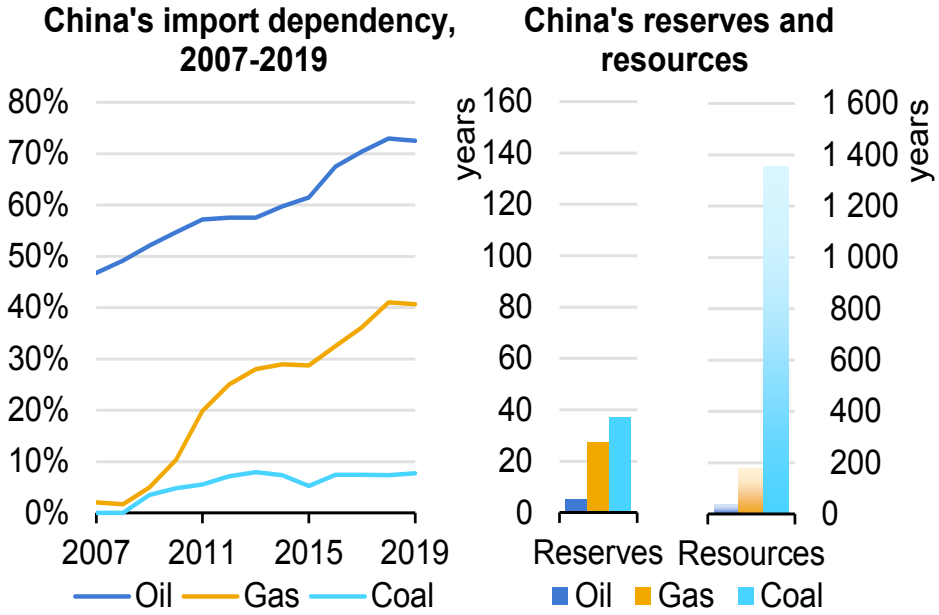
High-Quality Development of Traditional Industries (January 2020) targets 5.4 Mt of coal-to-liquids, 7 bcm of coal-to-gas, 4.4 Mt of coal-to-olefins and 2.7 Mt of coal-to-ethylene glycol production per year by 2022, mostly from new plants. These operations would use around 75 Mt of coal per year.

Coal conversion is very capital intensive, which poses investment risks. It is also very CO_2-intensive, which contradicts China's policy to reduce CO_2 emissions and become carbon neutral before 2060, as well as being water-intensive – and some of the projects are in water-stressed regions. Last, but not least, the economics of the projects depend on oil and gas prices, which are currently not encouraging.

Reported progress on announced projects is very slow so far, except for chemicals. It is difficult to envisage how the supporting drivers, constraining factors and potential risks will play out in the coming years, and this is why the development of coal conversion is more uncertain than any other sector. China's 14th Five-Year Plan, however, should offer a good indication of the plans for its future.

Climate change policies, reinforced by the announcement of carbon neutrality before 2060, are reducing the share of coal in the energy mix by promoting energy efficiency as well as generation based on nuclear, wind, solar, hydro and gas sources. Although China's sheer scale and growing demand make it difficult to rein in coal consumption, coal's share in the energy mix has been falling every year for the past decade, and the country's policies aim to sustain this decline.

Oil, gas and coal import dependency, reserves and resources in China



Notes: Reserves = proven energy resources economically exploitable at current prices and using today's technology. Resources = proven energy resources as well as unproven but geologically possible resources that may be exploitable in the future. Years of reserve and resource availability based on 2019 consumption levels.

Source: BGR (2020), Data and Developments Concerning German and Global Energy Supplies.

China continues to build coal-fired power plants, but in a more selective way

China has half of the world's installed coal-fired power capacity. Despite robust construction of new hydro, wind, solar and nuclear plants in recent years and slower electricity demand growth, China continues to build coal-fired power plants. Consequently, the capacity factor of coal plants is being eroded (49% in 2019) and so, too, is their economic viability. Nevertheless, in 2018 China commissioned 31 GW of new coal-fired power capacity and another 30 GW came online in 2019. In the first eight months of 2020, 21 GW were commissioned, and over 100 GW are currently at various stages of development. Moreover, 27 GW of new capacity were approved in the first three-quarters of 2020, a considerable jump compared with the 8 GW approved in 2018 and only 4 GW in 2019.

At first glance, some of these numbers – particularly the approvals in 2020 – appear to profoundly contradict the broader direction of China's energy policy, which targets lower air pollution, CO_2 emissions reductions and diversification away from coal and towards carbon neutrality before 2060. Already in 2016, aware of its coal-fired overcapacity, the government issued a "traffic-light" policy for new coal plants to stem the rush caused by its 2014 decision to pass coal plant approvals to the regions. Then, in February 2020, China's National Energy Administration (NEA) published an update of risks and warnings on coal plant construction by provinces and states, softening the criteria for approvals. This could be interpreted merely as a mechanism to stimulate the economy and boost recovery in light of the Covid-19 crisis, but this would be an oversimplification. This measure must be analysed within its proper context.

China had around 1 030 GW of coal capacity at the end of 2019, so annual capacity additions of 30 GW are equivalent to 3% of coal capacity. While electricity consumption has stagnated in most developed countries, in China it continues to rise, although at a slower pace than in the past. It will increase even in 2020 despite the Covid-19-induced lockdowns and economic slowdown.

Moreover, China is increasingly electrifying transport and other sectors, which requires that it has secure power supplies, and peak demand continues to rise on its grids. Other aspects also contribute: the capex for ultra-supercritical (USC) plants in China is very low, on the order of USD 500-600/kWh and state-owned utilities have easy access to financing.

While this combination of circumstances is stimulating investment, analysing the new plants case-by-case reveals some interesting patterns. For example, among the 2020 approvals (we have identified 27.2 GW for the first three-quarters), 65% (18 GW) are located in just two regions: Shaanxi and Inner Mongolia, an indication that coal plants are being sited closer to the coal producers rather than to the electricity consumers.

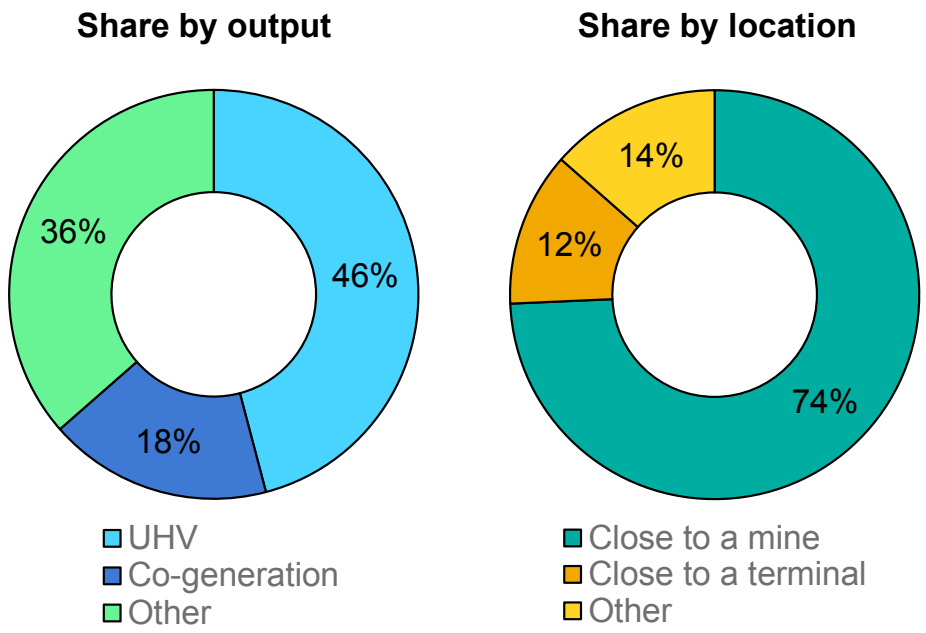
Plus, mine-mouth plants (or plants close to a coal mining hub) account for 74% (20 GW) of the approved capacity. A complementary observation is that plants connected to ultra-high voltage (UHV) lines account for 46% (13 GW) of approved capacity. Furthermore, co-generation plants (which produce both heat and power), plants using washing plant rejections and plants to replace outdated capacity account for the majority of new construction.

These new coal-fired power plants are more efficient and less polluting than previous units. Average efficiency has increased to 40%, up from 32% in 2002 (this means they use over 500 Mt less coal and CO_2 emissions are more than 1 Gt lower annually), and efforts towards higher efficiency continue. Pingshan Phase II (1 350 MW) which is under construction has an efficiency target of 49.8% (net lower heating value), which would be a world record for a coal-fired power plant.

In short, even though China is reducing its reliance, coal will continue to be the cornerstone of its electricity supply in the coming decades. As existing capacity is more than sufficient to meet current electricity demand, new plant approvals are very selective:

- Only a few provinces or autonomous states account for most of the new plants.
- Mine-mouth plants are increasingly being selected.
- Majority of the plant output will connect to UHV lines or be part of co-generation.
- USC is the default technology design.

Coal plant approvals in China, January-September 2020



Note: UHV = connected to ultra-high voltage lines.

India's coal demand is set to expand despite plummeting in 2020

Coal consumption in India amounted to 979 Mt in 2019, with the largest share being thermal coal (including lignite) for electricity generation (687 Mt), followed by thermal coal for non-power applications (226 Mt). The remainder was metallurgical coal used mainly for steel production.

Compared with 2018, coal consumption fell 1.8%, or 18 Mt in 2019, almost exclusively due to lower thermal coal use for power generation. Declining coal demand reflects India's slower economic growth and significant hydropower output with heavy monsoon rains in 2019. While India's economy grew 6.1% in 2018, GDP growth in 2019 was just 4.2%.

Coal consumption in India is expected to fall sharply in 2020. This applies to thermal coal (including lignite) for power generation (-4.5%, -31 Mt;), thermal coal for other applications (-10%, -23 Mt) and met coal (-20%,-13 Mt).

This drastic drop results mainly from the Covid-19 pandemic effects. Measures to contain the virus in India were taken at the end of the first-quarter 2020. A complete lockdown that began 25 March had a drastic effect on key coal consumers. In April, crude steel production fell by more than 90% y-o-y after the collapse of steel demand from construction and automobile production.

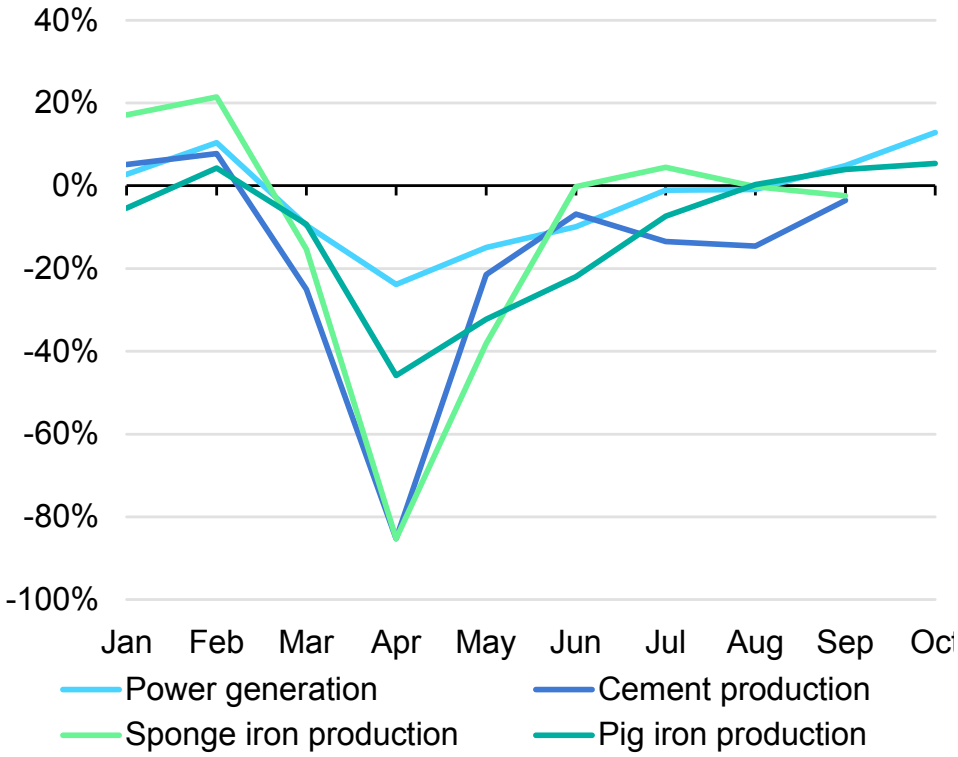
In the second-quarter, y-o-y production drops were 33% for pig iron, 43% for sponge iron and 38% for cement. The effects of the restrictions remained evident in the third-quarter. In addition, coal-fired power generation will decline in 2020 (-4.5%) due to lower demand for electricity and preferential dispatch for nuclear and renewables. Gas-fired generation was boosted by low LNG prices.

In April 2020, coal-fired power generation was more than 30% lower than in the previous year. Recovering power demand boosted coal-fired generation in September, accounting for the first y-o-y growth since the start of the pandemic. Assuming that the recovery continues until the end of the year, coal-based power generation will shrink by 4.5%.

For 2021 the IMF expects a recovery of India's economy, with annual GDP growth of 8.8%. With electricity demand as well as industrial production rebounding, coal use is anticipated to increase 3.8%, or by 35 Mt. In the medium term (to 2025), India has one of the highest potentials to increase coal consumption as electricity demand rises and more steel and cement are required for infrastructure projects. Additionally, the government aims to expand coal gasification considerably, targeting 100 Mt of coal gasification by 2030. Methanol production (with four coal-to-methanol projects already lined up) is a major focus of its policy.

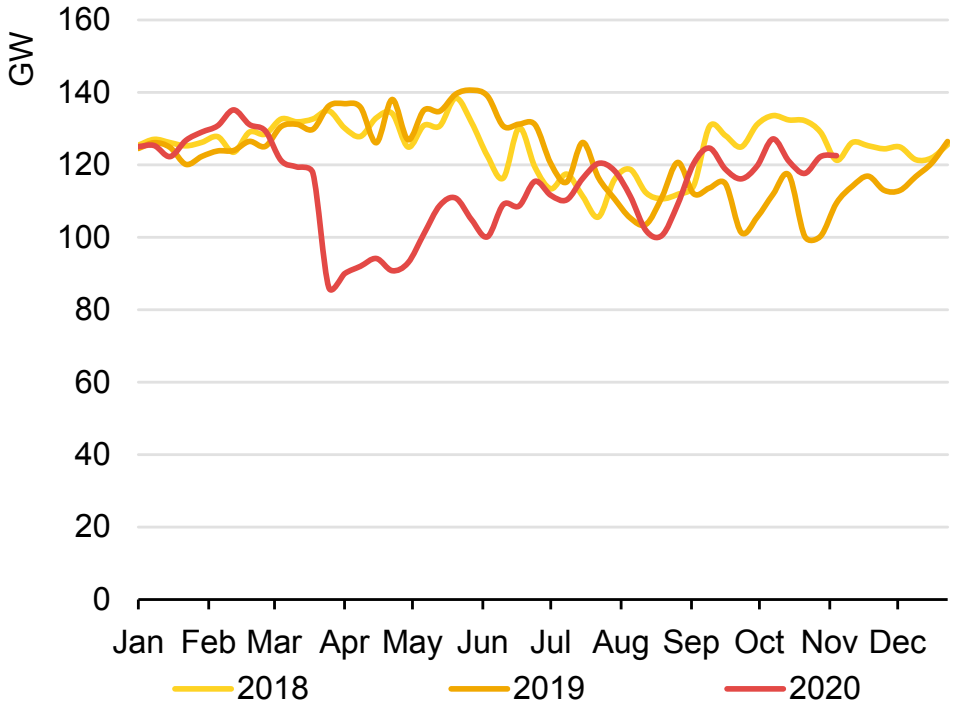
India's lockdown to contain the Covid-19 virus curtails 2020 coal demand

Year-on-year percentage change for various economic indicators in India, 2020



Sources: Department of Industrial Policy and Promotion and Office of Economic Advisor (2020), Eight Core Industries; Joint Plant Committee of Ministry of Steel (2020), Steel Production.

Coal-fired power generation in India, 2018-2020



Source: POSOCO (2020), Daily Reports.

Natural gas-fired generation became increasingly competitive and challenged coal dominance

Based on their variable cost, coal-fired power plants were generally dispatched before gas-fired plants in many countries. However, gas price drops in 2019 and 2020 changed the competitiveness of coal and gas in some countries, with obvious implications for coal demand.

In the United States, the shale revolution has led to gas replacing coal as the preferred fuel for power generation. Between 2011 and 2019, 49 GW of coal-fired generation capacity were retired, 14 GW converted to burn natural gas and 15 GW replaced with natural gas combined-cycle technology. By 2016, gas had overtaken coal as the primary fuel in the US power mix. In 2019, coal-fired power generation decreased more than 16% to 1 059 TWh, the largest percentage decline in history and the lowest level since 1978. The trend continued in 2020, with a rebound expected in 2021 as a result of higher gas prices and electricity use.

In the European Union, the competitiveness of gas is being reinforced by rising CO_2 emissions certificate prices under the EU Emissions Trading System. In 2019, gas combined-cycle generation (CCGT) became less costly than coal-fired power plants, leading to record lows in coal-based generation. This trend gained strength in 2020 as gas prices dropped further. For some weeks during 2020, the variable costs of gas-fired power plants were even lower than for lignite-fired power plants in Germany[1]. For 2021, a partial gas price recovery will put lignite plants ahead of CCGTs, but it will be difficult for less-efficient coal-fired power plants to compete with gas.

In Japan, coal-fired power generation has proven resilient despite low spot prices for gas, as most gas contracts are indexed to oil prices. Nevertheless, lower electricity demand combined with expanding solar PV use is reducing coal-fired generation (-7% in 2019 and another -3.2% expected in 2020). The Ministry of Economy, Trade and Industry (METI) announced a ruling to close inefficient sub-critical and supercritical coal-fired plants by 2030. This may not have a significant short-term impact but will set the tone for the medium and long term, despite new coal capacity having been commissioned in 2020 (600 MW Noshiro 3 and 600 MW Takehara 1) and under construction (7.4 GW).

In Korea, the recent decline in coal power generation is the result of several developments. Coal-fired power plant output had to be curtailed as the government aims to reduce particulate matter emissions. Some coal generation units were suspended in the spring and winter, and in December 2019 generation was restricted to 80% of power plant capacity. This coincides with higher nuclear output and expansion of renewable generation capacity.

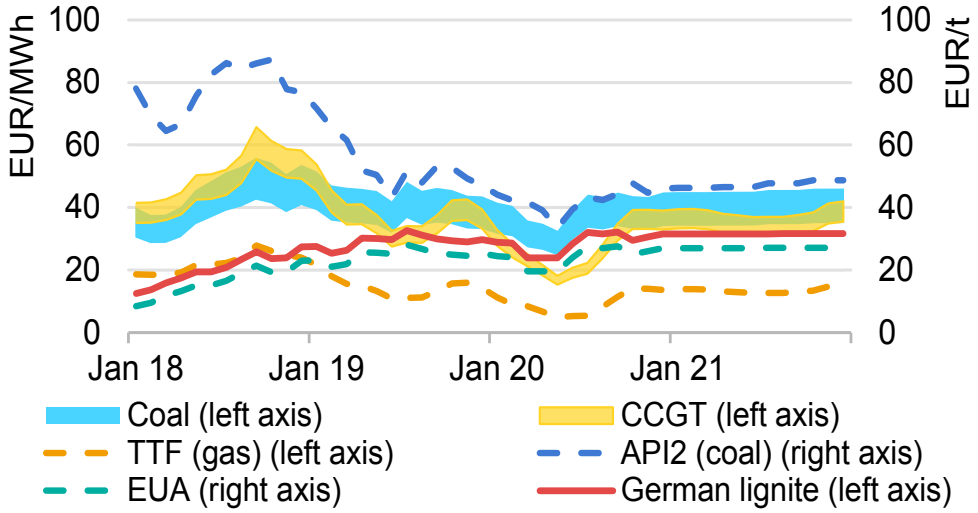
In 2020, air pollution concerns in Korea have continued to prompt the suspension of some plants and have reduced power generation from coal. Furthermore, tax reforms have made gas-fired generation more competitive, as the LNG tax was reduced while coal taxes were raised. LNG prices have also fallen, so the competitiveness of gas-fired power plants in Korea has increased significantly in 2019 and 2020. The third

[1] In some cases, such as for co generation plants, additional revenue streams have to be considered when assessing the profitability of generation units.

phase of Korea's emissions trading scheme (KETS), which runs from 2021 to 2025, could also benefit gas-fired power plants. Under rules adopted in September 2020, the annual emissions certificates issued for the electricity sector will not cover its quantity of emissions in recent years. It is also being debated whether GHG emissions should become a factor in determining the merit order of power plants, which would further weaken the competitiveness of coal-fired power plants provided that LNG prices remain low. However, as in the case of Japan, utilities cannot benefit fully from low spot prices, as most of the gas is procured on long-term contracts.

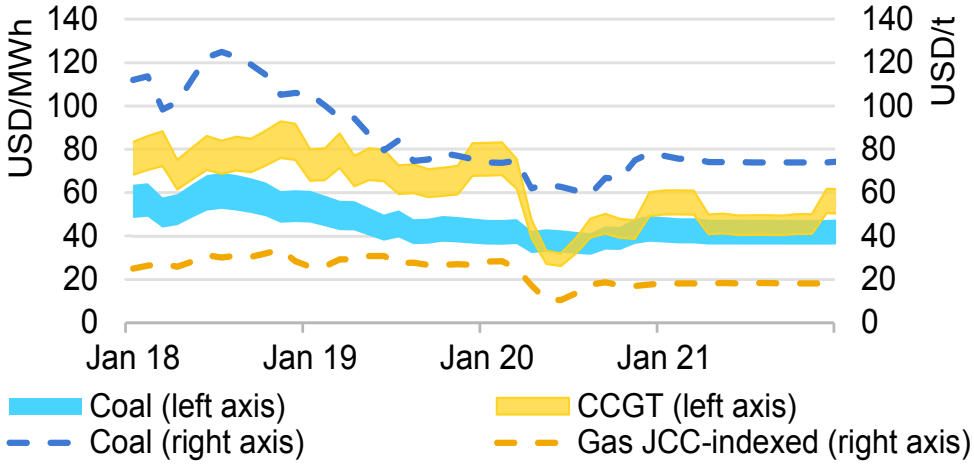
Low gas prices also challenge coal-based generation in other regions.

European Union marginal coal- and gas-fired power generation costs, 2018-2021



Notes: MWh = megawatt hour; API = Argus/McCloskey's Coal Price Index; EUA = European Union Allowance. CCGT net efficiency: 49-58%. Coal net efficiency: 35-46%. Lignite net efficiency: 39%.

Korea marginal coal- and gas-fired power generation costs, 2018-2021



Notes: JCC = Japan Crude Cocktail. CCGT net efficiency: 45-55%. Coal net efficiency: 35-46%.

Southeast Asia's coal demand is set to expand after the pandemic-induced hiatus in 2020

Coal consumption in Southeast Asia has more than doubled in the last decade, with the largest growth in Indonesia and Viet Nam, followed by Malaysia and the Philippines. In 2019, demand in Southeast Asia was 332 Mt, of which 42% was accounted for by Indonesia and 27% by Viet Nam, as in both new coal power plants began commercial operations.

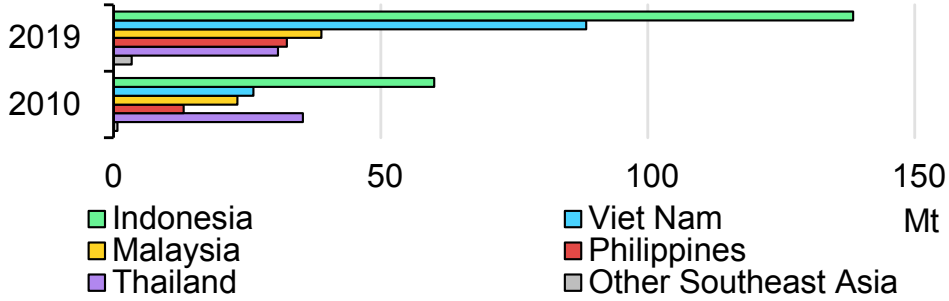
In 2020, coal demand in Viet Nam is proving to be resistant due to strong economic growth, which will push coal demand up around 12%. In contrast, coal demand in Indonesia and the Philippines will fall for the first time in several years as a result of Covid-19 outbreak. Overall demand in Southeast Asia is expected to increase only slightly in 2020. In 2021, however, a 7% rebound in coal demand is expected as economies recover.

A large portion of demand for coal in Southeast Asia originates in the power sector. Indonesia and Viet Nam in particular, as well as the Philippines, are expanding coal-fired power plant capacity. Viet Nam, however, is rethinking its plans for sizeable coal developments and the Philippines announced a moratorium on the approval of new greenfield coal power projects.

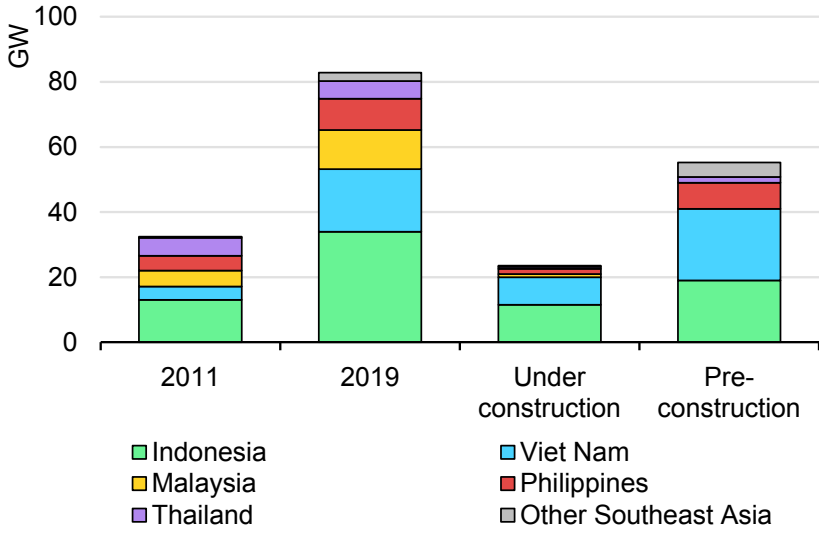
Coal technology and funding traditionally come from Japan, Korea and China, but Japanese and Korean investors are increasingly reluctant to commit to coal investments. Additionally, some projects have been delayed due to the pandemic. Coal's role in the future is therefore becoming more uncertain, and efforts to increase renewable generation and reduced LNG prices are gaining force.

Industrial consumption, especially in the steel, cement and smelting sub-sectors, will maintain coal demand growth once the economies recover. In Indonesia, the government has ruled that coal producers investing in downstream activities will receive a waiver on royalties, which will certainly boost coal demand.

Southeast Asia coal consumption by country, 2010 and 2019



Southeast Asia coal-fired power plant capacity by country, 2011 and 2019, under construction and pre-construction



Coal demand is rising quickly in Pakistan and more slowly in Bangladesh

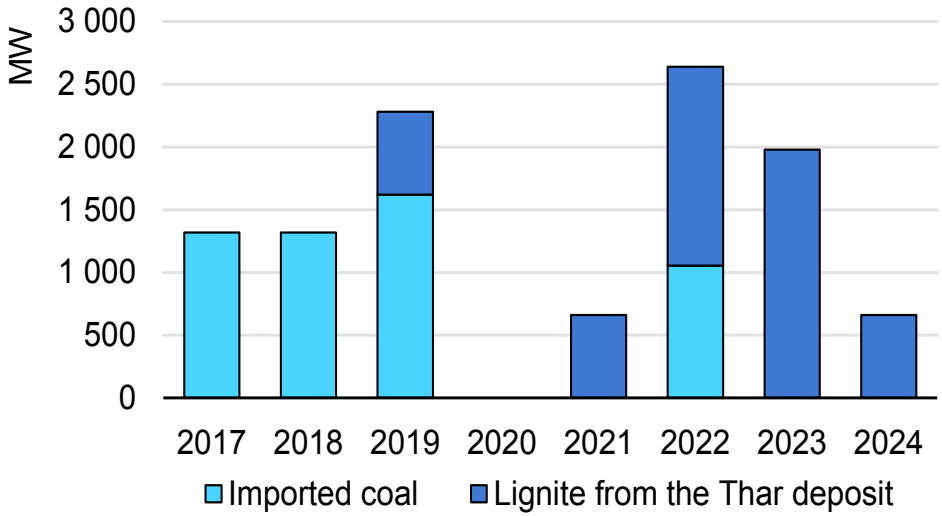
Pakistan had 150 MW of installed coal power capacity in 2015. Since 2017, in addition to a few small plants for industry, Pakistan has commissioned four coal-fired power plants as part of the China-Pakistan Economic Corridor project: the 1 320 MW Sahiwal plant in Punjab; 1 320 MW Port Qasim plant in Sindh; 1 320 MW Hubco plant in Balochistan. All three use imported coal. The 660 MW Engro Powergen plant in Thar (Sindh province) operates on lignite from Thar Block II.

These power plants, together with more than 10 Mt used by the industry sector (mostly for cement), raised coal consumption in Pakistan to 20 Mt in 2019. Coal consumption is estimated at around 25 Mt in 2020 and projected at 30 Mt in 2021. Beyond 2021, another 5 GW of coal-fired power plants are planned, mostly operating on domestic lignite. Moreover, the government has plans to turn Thar lignite into liquid and gas fuels and fertilisers, although some challenges would need to be overcome.

In Bangladesh, the mine-mouth 525 MW Bakapuria power plant was the only coal power plant until, in May 2020, the first unit of two 660 MW USC blocks at Payra power station started operations. This is the first power plant in Bangladesh to depend on imported coal which will increase demand by 3-4 Mt per year. So far, demand has been dominated by brick kilns, which account for 80% of Bangladesh's coal consumption.

Plans for expansion of coal-fired generation in Bangladesh have been shelved: most of the more than 30 GW of proposed coal capacity will not be built reflecting lower gas prices, increasing anti-coal pressure and lower expectations for power demand growth. Nevertheless, the 1 320 MW SC Maitree plant (Rampal), expected to be operational by 2021, the 1 200 MW USC Matarbari, the 307 MW Barishal power plant and the 1320 MW Patuakhali power plant, all under construction, would increase coal consumption to over 30 Mt per year before 2025. The future of Bangladesh's other coal plants is very uncertain.

Pakistan commissioned and planned coal capacity by initial operating year, 2017-2024



Africa perspective indicates no major shifts for coal consumption

Overall countries on the African continent consumed 197 Mt of coal in 2019, 12 Mt less (-6%) than 2018.

South Africa, the continent's primary coal consumer, accounted for most of this decline. While coal consumption for power generation in South Africa decreased 2.7%, non-power thermal coal consumption dropped by 11%. Sasol Limited used 2.5 Mt less coal to produce synfuel and a variety of chemicals. The distressed state of the construction sector and reduced spending on infrastructure also resulted in lower coal consumption by cement and brick producers in South Africa.

The decline in South Africa's coal consumption is expected to continue throughout 2020 as a result of the Covid-19 pandemic and load-shedding due to poor coal plant performance. Demand will not recover by 2025 and is expected to remain below 200 Mt, in spite of the second unit (800 MW) of the 4 800 MW Kusile power plant having started commercial operations in October 2020 (other units will come online later). South Africa's GDP is expected to contract severely (by 8%) in 2020 and to recover only mildly (by around 3%) in 2021. Consequently, South Africa's power generation (especially coal-fired) and non-power coal consumption are expected to remain subdued through 2021.

In addition, Eskom, South Africa's largest utility, remains in a difficult financial and operational situation while South Africa has recently suffered frequent power cuts, as its two massive coal-fired power plants – Medupi power station at Limpopo (4.8 GW) and the Kusile power plant at Mpumalanga (4.8 GW) – are still having technical complications.

After a surge of around 35% in 2019 with introduction of the new 1.4 GW Safi power station, Morocco's coal consumption is expected to remain at 9 Mt per year in 2020 and 2021. In 2020, Morocco's National Office for Electricity and Drinking Water extended its power purchase agreement for the 2 GW Jorf Lasfar power plant, which provides 40% of Morocco's electricity generation. No other projects are currently under development, as Nador coal power project has not reported further progress.

In Egypt, the Ministry of Electricity and Renewables cancelled plans for construction of the Hamrawein plant therefore prospects for increased coal imports have vanished. Cement kilns and steel production will get back to 2019 consumption levels once recovered from the big drop in 2020.

Some other coal-fired generation projects, such as the 300 MW KP1 plant in Botswana and the 300 MW Mbeya plant in Tanzania are proceeding after minor reorganisations and licence updates. In Zimbabwe, 8 GW of coal power generation capacity in different projects have been announced, but there is no clarity about how they can progress.

Supply

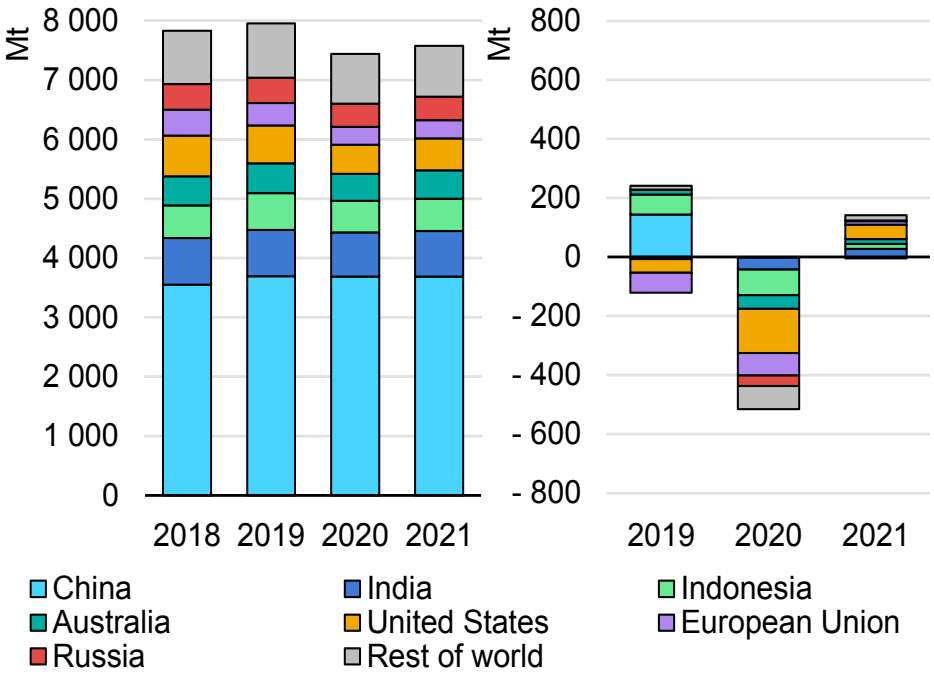
Global coal production slumps in 2020, yet looks to increase in 2021

Worldwide coal production in 2019 increased by 1.5% to 7 953 Mt, compared with a decline in coal demand, and therefore, coal stockpiles expanded. Thermal coal and lignite made up around 86% of this production and the remainder was metallurgical coal. China – the world's largest coal producer – accounted for about 46% of global coal production in 2019. The increase in coal production was driven mostly by countries in the Asia Pacific region (73% of global production), particularly China, India and Australia, while production in the United States and European Union declined.

Estimates indicate that global coal production will slump 6.5% in 2020, primarily in response to falling demand. Coal production destined for domestic consumption largely depends on the extent to which respective consumers of the produced coal are affected. Export-oriented production is influenced by costs, quality and location in a market influenced by the pandemic and shifting landscapes in power generation. Coal demand in the United States and European Union is declining drastically, and both are major markets for US coal. Therefore, US coal production is projected to decline severely (-23%) for 2020. Other regions where coal production is expected to fall strongly are Indonesia (-14%) and the European Union (-21%). Underpinned by stable domestic demand, coal production in China will be flat in 2020, with post-Covid uptick offsetting production cuts in the first-quarter.

Coal production is expected to increase to 7 575 Mt in 2021 in line with an increase in demand.

Global coal production and annual changes by region, 2018-2021



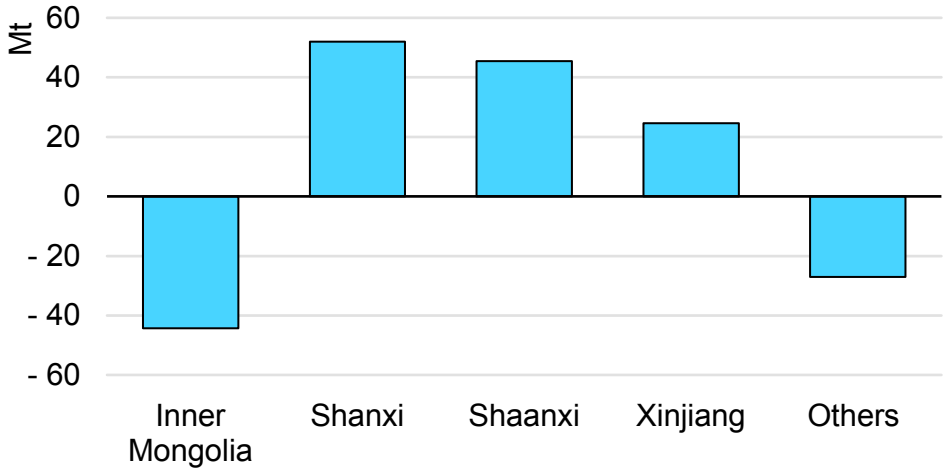
Coal production in China has been reviving its pace in recent years

Coal production in China experienced big declines in the 2014-16 period (down almost 500 Mt from 2013). Since then, output has picked up. While still below the 2013 level, coal production in 2019 was 3 693 Mt, up 4.1% from the 2018 level. Thermal coal accounted for 83% of production and the balance was metallurgical coal[2].

Coal output in China for 2020 is expected to be similar to 2019 levels at 3 690 Mt. Despite a 30% investment increase in coal mining and washing in 2019, the outbreak of the corona virus disrupted coal production during the first months of 2020, declining around 5% in January and February. Workers were not able to return to the coal mines as the New Year holidays were prolonged due to the Covid-19 and lockdowns were imposed. In mid-February only 57% of coal mines were operational. By the beginning of March this increased to 83%, indicating a swift recovery of coal production. The economy's rebound from the second-quarter and the accompanying recovery of domestic coal demand underpinned coal production. The government tightened import restrictions for the second-half of 2020, which are expected to provide additional protection for domestic coal producers. Therefore, overall coal production in China is expected to remain at similar levels in 2020 as in 2019. In the first three-quarters of 2020, coal production decreased 11% in Inner Mongolia, while it increased in Shanxi (+5%), Shaanxi (+10%) and Xinjiang (+12%).

Based on the expected recovery of coal production in 2020, mine approvals and investment pace, it is projected that coal production in 2021 will be similar to 2020 levels.

Year-on-year change in coal production by region in China, January to September 2019-2020



Source: National Bureau of Statistics of China (2020), Statistical Database.

[2] Coal production in China includes anthracite and lignite, but available data do not report those categories separately.

China's coal sector reforms make progress and production consolidates

China's 13th Five-Year Plan (FYP) (2016-2020) for economic and social development features supply-side reform of the coal sector. Reform objectives aim to increase coal's competitiveness, profitability and safety via a number of policy goals and actions. These reforms will continue in the coming years. One objective is to consolidate mines and companies to rationalise state-owned enterprises by introducing private capital, reducing overcapacity and restructuring assets.

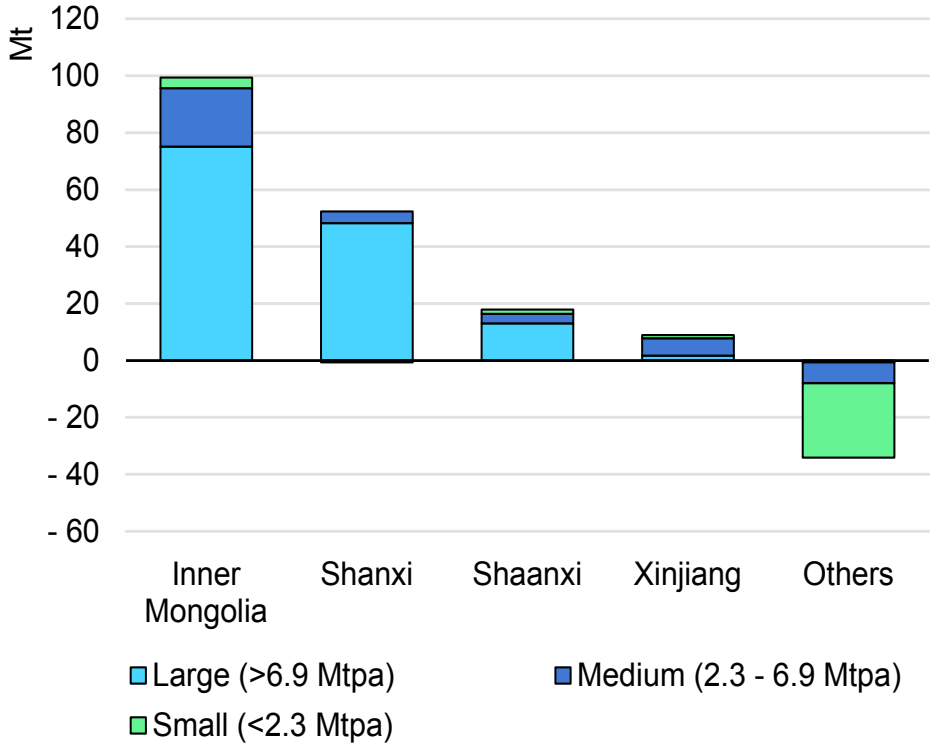
Consolidation efforts are underway. In July 2020, the Shandong government announced the merger of Shandong Energy Group and Yankuang Group to create one of the largest coal producers, accounting for around 8% of China's total production (more than 291 million tonnes per annum [Mtpa] of production capacity). In October 2020, Shanxi province launched the Jinneng Holding Group, which has absorbed most state-owned mines (583 Mtpa capacity, of which more than 100 Mtpa is coking coal) to become one of the three-largest coal producers in the world (with Coal India Ltd and China Energy Investment Corporation). The consolidation of companies and mines is likely to continue.

As part of the supply-side reforms, the first National Coal Trading Centre opened in Beijing in October 2020 after more than two years of preparations. Shareholders of the Trading Centre represent 45% of coal production, 55% of coal consumption and 75% of coal transportation.

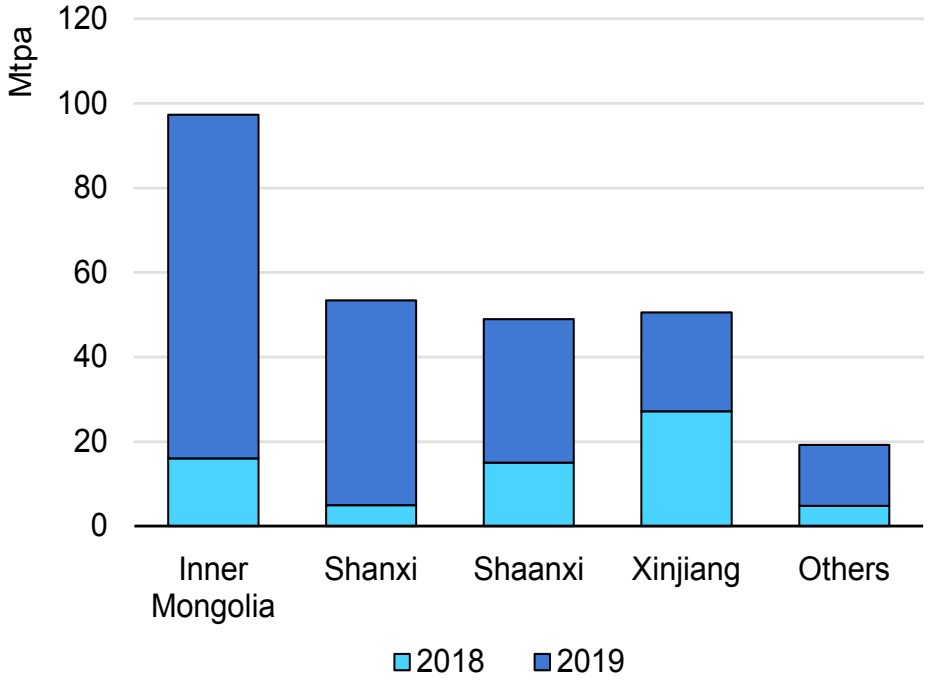
Another target is to improve performance by replacing unsafe, high cost mines with safer, lower cost ones. About 895 Mtpa of coal mine capacity was closed in the 2016-19 period, reaching the target of the 13th FYP two years early. The number of mines halved from around 10 800 in 2015 to about 5 300 by the end of 2019. Small mines continue to be closed to reach the central government target of no more than 5 000 mines. New modern and large-scale opencast and underground mines are being approved, especially in the main coal mining regions of Inner Mongolia, Shaanxi, Shanxi and Xinjiang, where mines representing 190 Mtpa of capacity were approved in 2019. This trend continues. Ordos, a major coal hub in Inner Mongolia plans to fast-track approvals for 18 new mines with a combined capacity of 129 Mtpa in 2020. Xinjiang, a region accounting for around 40% of China's coal resources, although only 6% of production approved ten coal mine projects with a cumulative capacity of 16 Mtpa in the first-half of 2020. New mines started operations in 2018 with capacity of 190 Mtpa and in 2019 of 100 Mtpa. In the first-half of 2020, new mines with cumulative capacity of 80 Mtpa started operations in China.

The three major coal mining regions of Inner Mongolia, Shanxi and Shaanxi provided around 70% of China's coal output in 2019. Counting in the other coal mining regions of Xinjiang, Guizhou, Anhui, Shandong and Henan, the share is about 89%. Production of large and medium-size mines in the three main regions have expanded, while output of smaller mines in the rest of China has declined, reflecting the consolidation of production in larger mines and shifting production to the north and northwest as part of the supply-side reforms.

Year-on-year change in coal production in China's major coal producing regions by mine size, 2018-2019



Annual capacity of approved new mining projects in China's major coal producing regions, 2018 and 2019



Source: Adapted from CRU (2020), Thermal Cost Model (database).

India aims to boost coal production and is opening to commercial mining

India is the second-largest coal producer in the world. Output in 2019 of 783 Mt was down slightly (-0.9%) from 2018 levels – the first drop in coal production since 1998. Coal India Ltd. (CIL), the state-owned and largest producer, curtailed production amid a strong monsoon season that disrupted mining operations and a decline in domestic coal demand.

Coal production in India in 2020 is estimated at about 743 Mt, a decline of around 5% from the previous year, though stockpiles are increasing. To increase the offtake of domestic coal, the national government mandated CIL to replace at least 100 Mt of imports by domestic coal in the 2020-21 fiscal year.

Coal production is expected to increase in 2021 in line with government targets for domestic demand. However, the projected rise in coal production of 3.7% is insufficient to match 2019 production levels.

CIL, the world's largest coal mining company, accounted for about 80% of India's total coal production in 2019. CIL operates 364 mines of which 166 are underground, 180 opencast and 18 mixed mines. Due to higher productivity, more than 90% of production is opencast. One new mining project was completed by CIL in 2019 and 11 projects were approved. CIL has increased coal production by more than 30% over 2014-19 and is the government's main tool to boost domestic production to address supply shortages and to curb import dependency.

The forecast is for coal demand to rise in coming years and India aims to further boost domestic production. The production target for CIL of 1 Bt by fiscal year 2023-24 is maintained.

One approach CIL is taking to achieve the target is to increase production via "mine developer operators" (MDOs), which are contractors that carry out the mining works for CIL. MDOs have been key for ramping up output in recent years, as 13 of the 14 operational coal mines allotted to public sector undertakings between 2015 and 2020 are run by MDOs. CIL plans 15 mines that will be operated by MDOs and have combined capacity of 168 Mtpa of which 12 are opencast and 3 are underground mines. Procedures for tendering and contracting of the MDOs are planned to be completed in 2021-22.

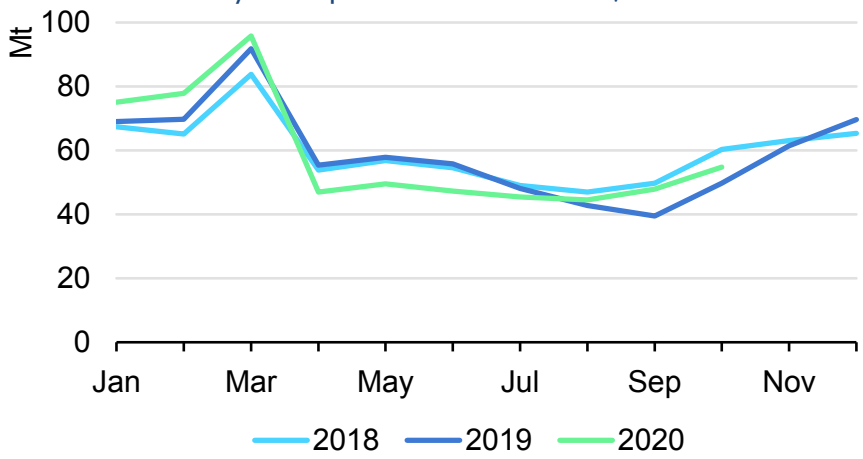
CIL is also planning to restart production at 12 shut-in underground mines in the eastern states of West Bengal and Jharkhand, with mineable reserves of just over 1 000 Mt of coking coal and high grades of thermal coal. Operations at these mines were discontinued 15-20 years ago due to poor economic performance, but the economic viability has improved with advances in mining technology.

In September 2020 CIL acknowledged that 54 projects are delayed of the 123 that it is pursuing. Reasons include delays in obtaining clearance and possession of land as well as issues related to rehabilitation and resettlement.

Singareni Collieries Company Limited (SCCL) is the main producer of coal in India's southern region. In 2019 it accounted for around 9% of total coal production in India. SCCL operates 18 opencast and 27 underground mines. The company increased production by 22% over the 2014-19 period. SCCL aims to ramp up production to 85 Mt in the next five years.

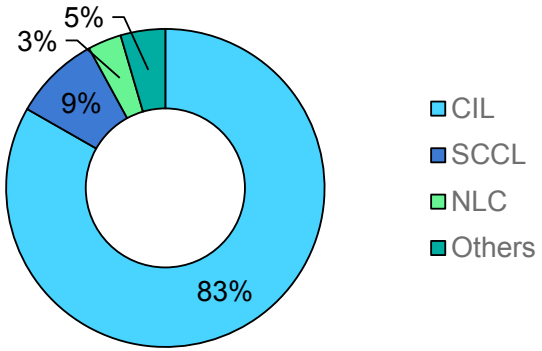
In April 2020, NLC Ltd, a state-owned lignite producer, started operations at the Talabira Opencast Mine, with a production target of 20 Mtpa. This is a milestone for NLC, as it is its first coal operation in Odisha, an eastern Indian state.

Monthly coal production in India, 2018-2020



Source: IHS Markit (2020), Coal Price Data and Indexes.

Share of coal production by company in India, 2019



Notes: CIL = Coal India Limited; SCCL = Singareni Collieries Company Limited; NCL = NLC India Limited. Values are for fiscal year 2019 (April 2019 - March 2020).

Sources: Ministry of Coal (2020), Production And Supplies; NLC India Limited, Production Performance.

A keystone to India's plans to boost domestic coal production is to allow commercial mining, which breaks a four decade monopoly for CIL. An important driver is to reduce coal imports. Contributing factors are to boost revenues for states with coal resources, strengthen employment opportunities, improve economic and social conditions and develop coal gasification for application in transport, and in steel and fertiliser production, while guaranteeing environmental protection.

The final rules guiding the process to allow wider participation in coal mining were finalised in 2020, fleshing out the 2015 special provision that provided for the opening. The prohibitions on 100% foreign direct investment and a requirement of previous coal mining experience were eliminated for the auction process. As the mines are awarded on a revenue-sharing basis, a National Coal Index was rolled out to prevent under-reporting of revenue.

The auction process required both technical and financial assessments and the latter one consisted of two stages of initial and final price offers. Initially, 41 coal mining blocks were identified but 38 blocks were released for auction in September 2020. Fifteen blocks received no bids and four blocks received only one bid, all of which were excluded from the second stage. In November, 19 blocks containing 3.15 Bt of coal resources and annual mining capacity of around 50 Mtpa were allocated to 15 companies, all of them from India.

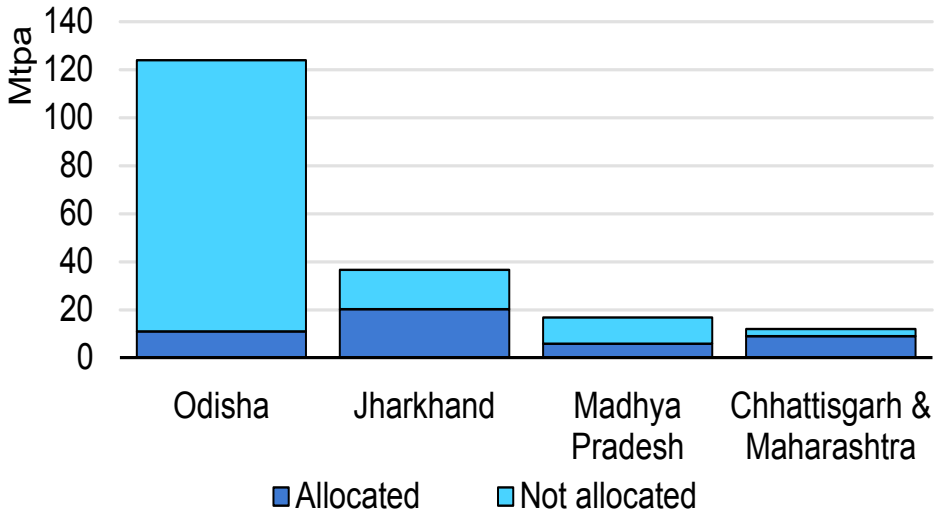
Of the successful bidders, there are coal producers in captive blocks, coal producers as MDOs, coal consumers and companies without previous coal mining experience. Coal quality is middle-grade thermal coal (calorific values 3 400 - 5 500 kcal/kg) with only 150 kt of coking coal suitable for making steel. The blocks are in the states of Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh and Maharashtra. The

government estimates that these commercial mining operations will generate USD 950 million of revenue for the states and create 69 000 jobs.

Opposition to the opening of commercial mining has been ongoing. Mining unions have opposed the policy since it was first announced and they organised a three-day strike at CIL in July 2020. The state of Jharkhand, where a quarter of the auctioned mines are located, filed a lawsuit in July 2020, concerning environmental impacts and displacement of tribal communities.

Whereas it is not clear yet how much output will be produced by private coal mine operators, this is the deepest reform of India's coal sector since the monopoly of CIL was established in the 1970s. Commercial mining is an important step, together with captive producers and e-auctions, to provide flexibility and revitalise a market where long-term fuel supply agreements with CIL dominate. Although no foreign company bid in the first auction, this does not preclude the possibility that foreign companies may participate in coal mining in India through partnerships with domestic companies or in future auctions.

Mining capacity of blocks offered and allocated by state



Note: The Jarekela and Jharpalam Tangargha mines are not included.

Sources: MSTC (2020), Mine Summary for Commercial Mining; IHS Markit (2020), Indian Coal report - June 2020 Issue 259.

Australia and Indonesia are poised to boost coal production in 2021 after a drop in 2020

Coal production in Australia in 2019 was 550 Mt, a 3.4% increase from the previous year. Thermal coal accounted for 54%, metallurgical (met) coal for 38% and 8% was lignite.

A considerable drop of about 9% is estimated for 2020. In the first-half of 2020 thermal coal production in Australia was boosted by high demand from China. However, exports to China declined in the second-half of the year as import quotas tightened and customs clearance of Australian origin coal became more difficult. Thermal coal production in Australia is supported by the resilience of its exports, partially due to its cost structure and take-or-pay contracts. Australian production of met coal is estimated to decline by 9%, despite a strong demand from China in the first-half of 2020. Australia became the largest exporter of coking coal to China in the first-half of 2020, as Chinese steel production increased and Mongolian exports to China were hampered by pandemic restrictions. Australian exports to China are declining in the second-half of the year, but the recovery of steel production in India is pushing up demand for Australian coking coal.

Low demand stimulated temporary mine closures in the second-half of 2020: Peabody closed its Wambo mine in New South Wales for two months from July; and Glencore closed most of its mines for three weeks in September and October. Whitehaven Coal downgraded its sales targets for fiscal year 2020 and deferred its final investment decision for the Vickery project in New South Wales until 2021.

Metallurgical coal production in Australia is expected to rebound strongly in 2021 (+8%) as demand from steel manufacturers recovers. Australia is expected to maintain its dominant position in the met coal market. The announcement of La Niña in progress in 2020 urges caution, as it could disrupt Australian supplies, should extreme weather events occur.

For thermal coal a weaker recovery is expected (+1.0%) in 2021, as any rise in demand is expected to take place in an environment of intense competition between suppliers. Overall, coal production is expected to increase by 3.7%.

Coal production in Indonesia in 2019 increased by more than 12% to a record level of 616 Mt, almost all of which was thermal coal. This volume exceeded the target of 480 Mt set by the government at the beginning of the year. Encouraged by high prices in 2018, many new companies started operations, resulting in a spike in production. As a result, domestic coal prices fell some 28%, which put pressure on state revenues. In response, the national government required mining companies to cut production in 2020 and issued a production target of 550 Mt. Additionally the government continued the policy of Domestic Market Obligations (DMO), which requires coal producers to deliver 25% of output to the domestic market. In August 2020, the Indonesian Coal Mining Association asked the government to temporarily halt the DMO requirements, as weak domestic demand made it difficult for mining companies to fulfil the obligations.

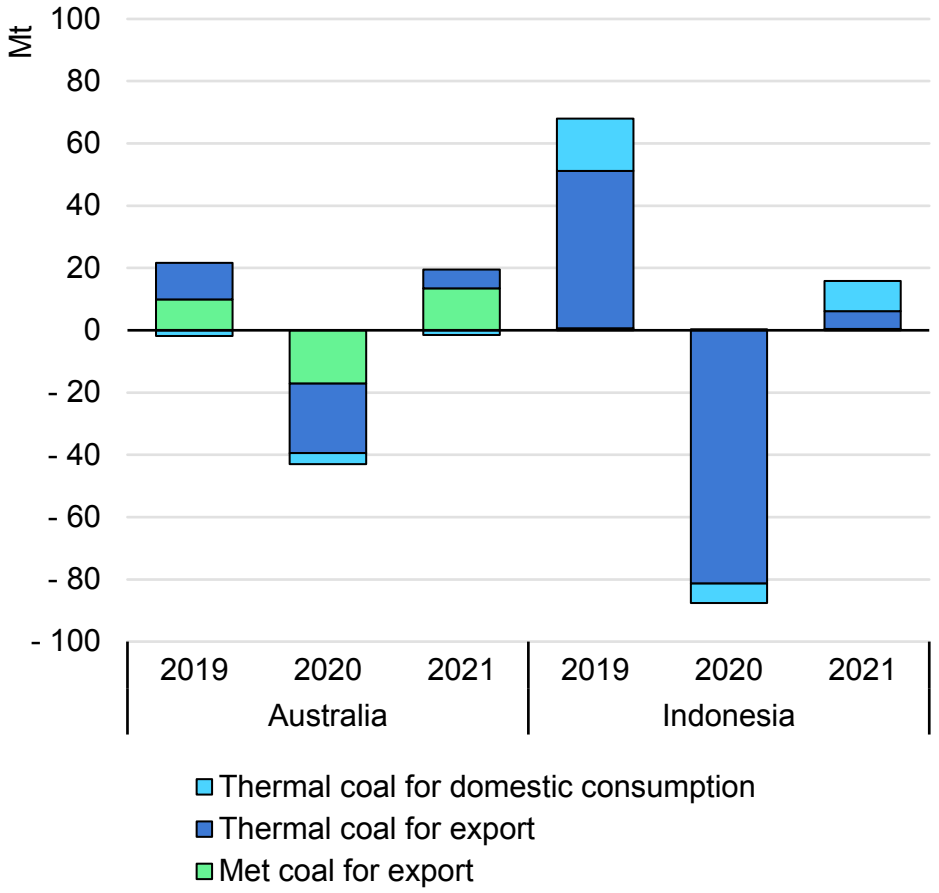
Coal production in Indonesia is estimated to decline by 14% to 529 Mt in 2020 as the Covid pandemic affects both domestic demand and exports. In the main import markets of Indonesia's lower calorific coal, import quotas in China and lower demand compounded by high stockpiles in India put pressure on producers. The Indonesian Coal Mining Association urged miners in July to reduce their output. As Indonesian coal export

prices declined drastically, many miners decided to cut production. This included major companies such as PT Adaro Energy, PT Bayan Resources, Indo Tambangraya Megah and PT Bukit Asam.

A law that relaxed environmental regulations was passed in June 2020. It eases restrictions on mining operations and allows automatic permit extensions up to 20 years. Proponents praise the positive effect on the coal mining industry through reduced uncertainty, while opponents are concerned about environmental damage and deforestation.

Coal production in Indonesia is estimated to reach 545 Mt in 2021, up 3% from the previous year reflecting increased domestic and export demand. In August 2020 Indonesia's energy and mineral resources ministry issued a target of 609 Mt of coal production for 2021, updated at a more realistic 550 Mt in December 2020.

Annual changes in coal production in Australia and Indonesia, 2019-2021



United States coal production slumps to volumes last seen in the 1960s

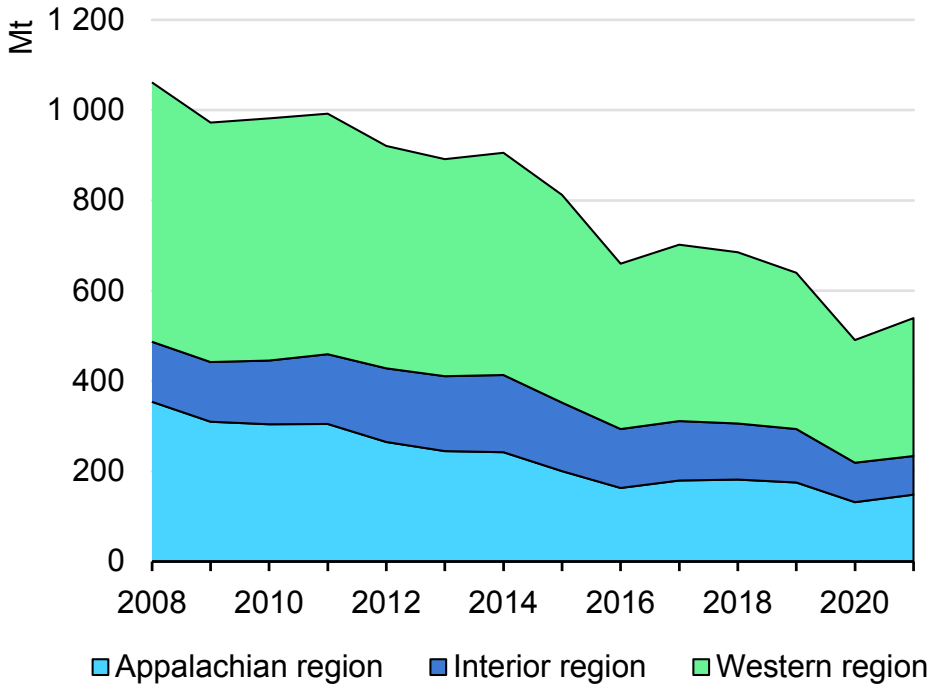
US coal production fell by 7% in 2019 to 640 Mt, the lowest level since the 110-day miner's strike in 1978. The decline in US coal production in 2019 continued a ten-year trend since the peak of production in 2008. Driven by the collapse in domestic coal use for power generation and lower demand in the leading export destination, Europe, coal production in the United States fell by around 40% between 2008 and 2019. As demand slumped, the number of US coal mines decreased by more than half between 2008 and 2019. This triggered bankruptcies of many coal mine operators throughout the 2010s.

In 2020 production is estimated to decline even more drastically, by one-quarter to 491 Mt. This level of production has not been seen since the 1960s. In addition to the challenging market conditions for coal in power generation vis-à-vis low natural gas prices and expansion of renewable generation assets, the decline in industrial activity and in particular, power demand, as a result of the Covid-19 pandemic, is also depressing coal production.

In 2021, production is expected to recover to 539 Mt, stimulated by a rebound in domestic demand.

Market forces that have burdened the US coal industry in recent years particularly affect thermal coal producers. Peabody Energy and Arch Resources (formerly Arch Coal), the two largest US producers, are trying to build a joint venture to manage thermal coal assets to face the collapse of US coal demand. Yet, metallurgical coal production, which not affected by the shale revolution is becoming more relevant for the US coal industry. For example, Arch Resources declared that it intends to focus on the production of met coal instead of thermal coal.

US coal production by region, 2008-2021



Sources: IEA estimates based on EIA (2020), Coal data.

Eurasia coal production slows in 2020

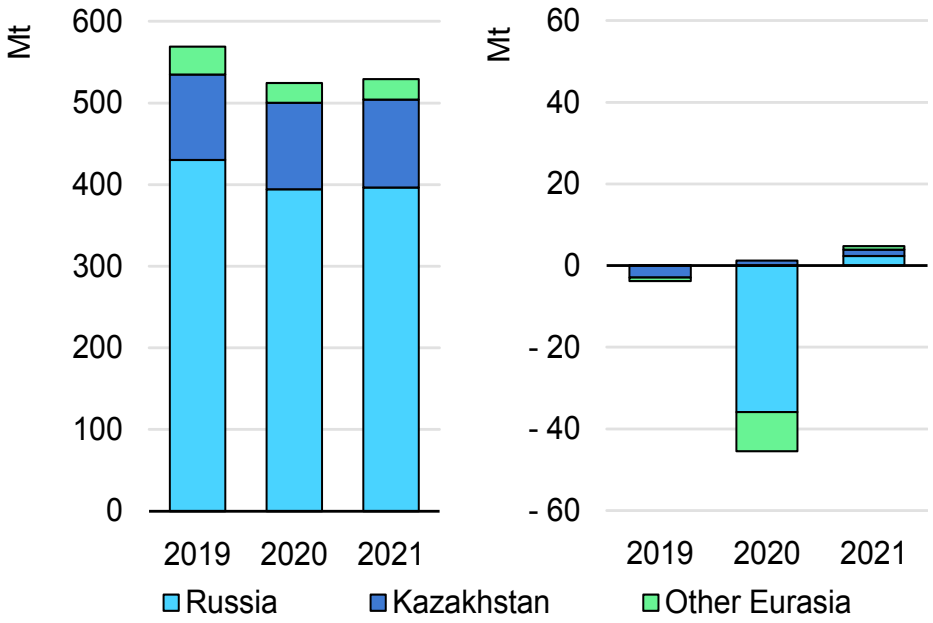
Coal production in the Eurasia region in 2019 was 569 Mt, less than a 1% decline from the previous year. The largest coal producer in the region was Russia, where production remained stable at 430 Mt. The second-largest producer in the region was Kazakhstan (105 Mt), followed by Ukraine (26 Mt).

In 2020, coal production in Russia is expected to decrease by about 8% due to reduced domestic demand, especially in power generation, and lower demand in the main thermal coal export markets, i.e. Europe and Korea. Conversely, production in Kazakhstan is expected to increase slightly in 2020, despite the Covid pandemic and economic slowdown.

In 2021, Russia's coal production is expected to remain close to 2020 levels. Production in Kazakhstan is expected to increase by 1.5%. Supply from the other coal producing countries in Eurasia is expected to remain stable.

Kazakhstan, which ranks eighth in worldwide coal reserves, aims to further develop its coal mining sector as it is one of the most important resource industries in the country. The Roadmap for the Development of the Coal Industry of Kazakhstan for 2019-2021 was established. High transportation costs, due to long distances between production sites and consumers as well as relatively low quality, render Kazakhstan's coal relatively expensive for consumers and reduce its competitiveness even in the Russian market. One of the priorities of the roadmap is to promote the production of processed products from coal to gain higher added value. Another focus is to expand exports, as its production volumes already satisfy domestic demand. In 2019 Kazakhstan exported 25 Mt of coal to Russia, Kyrgyzstan, Uzbekistan, Belarus and Ukraine.

Eurasian coal production and annual changes by country, 2019-2021



European Union coal production continues to wane

In 2019, coal production in the European Union decreased by 15% to 373 Mt from the previous year. This decline is mainly attributed to the decrease in production in Germany (-22%) and Poland (-8%).

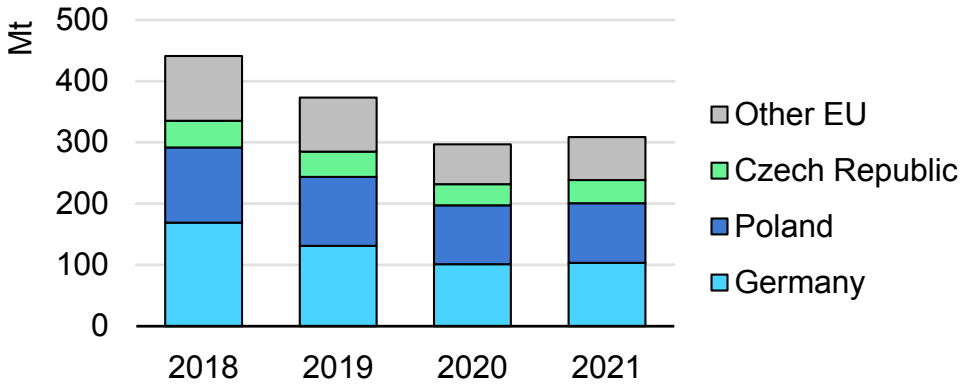
Developments in the European Union have been exacerbated in 2020 by the effects of the Covid-19 crisis. Estimates are that EU coal production will decline by 21%, driven by developments in Germany (-23%) and Poland (-14%). Even the economic recovery in 2021 is not expected to be able to reverse the trend. Only a minor increase of 4.0% is expected.

In Germany, the last hard coal mine, the Prosper Haniel in Bottrop, closed in December 2018. Hard coal production, has been in decline for decades. By contrast, in 2019, 131 Mt of lignite were produced, mostly for domestic electricity and heat generation. In January 2020, Germany's national government and the states reached an accord on to phase out lignite production by 2038. The quantities of lignite to be produced over the phase-out period will be shaped by the market environment for lignite-fired power generation. The Czech Republic is considering a similar plan.

In Poland, coal production in 2019 was comprised of lignite (50 Mt) for power generation, and thermal coal (50 Mt) for use in power generation, and the industrial and residential sectors, as well as coking coal (12 Mt). The decline in Poland's coal production in 2019 was driven by deteriorating market conditions for domestic coal and shrinking coal-fired power generation. The costs of domestic coal production have risen in recent years and are reflected in domestic coal prices. Imports of cheaper coals, especially from Russia, continue to put pressure on domestic production. With coal demand declining and stockpiles building in 2020 the Polish government halted coal imports by state-owned power producers. Yet a further decline in coal production is expected in 2020.

In September 2020 the Polish government and trade unions reached an agreement to halt operations of two thermal coal mines of state-owned Polska Grupa Gornicza (PGG) and to close all of PGG's coal mines by 2049. This marks the first coal phase-out plan declared in Poland. In case that this decision impacts on investment in mining, decline in coal production could accelerate.

Coal production in the European Union by country, 2018-2021



South Africa's coal production contracts amid sluggish domestic and overseas demand

South Africa accounts for more than 90% of coal production on the African continent. Its coal production in 2019 was robust, declining by less than 1% from the previous year. As in all major exporting countries, South African coal production was hit by the effects of the pandemic. Coal mines were excluded from lockdown measures as they are considered essential for power generation. Nevertheless production is expected to decline by around 7% in 2020, less than in Australia or Indonesia, as South African production is supported by relatively stable export volumes, despite the weakness of international markets. Lower production volumes are attributable to the decline in domestic demand, especially in power generation. Lower sales and prices have hit small and mid-size producers in particular, which are financially struggling. Big producers like Exxaro or Glencore could manage the downturn better. Coal production in South Africa is expected to recover only slightly by 1.5% in 2021.

Outside South Africa there are some developments in other African countries that, while small at global level, are relevant. In Zimbabwe, the Lubu project, which planned to start operations in 2020 to become the fourth coal producer in the country, delayed its schedule due to the Covid-19 crisis. This could increase Zimbabwe's coking coal production by 0.5 Mt, although it will probably be delayed beyond 2021. If the coal power projects announced go ahead, this will require over 20 Mtpa of coal supply only for these projects.

In Botswana, Minergy started operations in July 2019, to become the second operator in the country. Minergy has a production target of 1 Mtpa with output destined for domestic, South African and Namibian markets.

In Tanzania, if the Mbeya coal-fired power plant is built, the mine will produce 1 Mt in the 2025 planning horizon.

Coal production in Colombia declined in 2018 and further contracted by 2.6% to 82 Mt in 2019. Most of its production is thermal coal (94%). Almost all (87%) of Colombian coal production is exported. Changes in the seaborne thermal coal market underpin Colombia's reduced coal production in 2019.

Production in Colombia is expected to decrease dramatically in 2020, by over a quarter. Low prices, plummeting demand in the Atlantic Basin and interruptions due to measures to halt the spread of Covid-19 as well as industrial action in El Cerrejón, the country's largest coal mine, contribute to the decline. These labour and social crises have coincided with a progressive reduction in international demand for coal and a loss of markets for Colombia. Prodeco and CNR halted mining operations in 2020. Moreover, Prodeco applied for a four-year suspension, though mining authorities have not authorised the request to stop production. Since the decline in demand in key markets and the competitive situation is not expected to ease in 2021, a rebound in production is unlikely.

In Chile, coal production halted in 2019 after the supreme court banned the use of explosives at Mina Invierno, the only producer in the country.

Trade

International coal trade is hit by the pandemic and trade patterns continue to shift to Asia

Global coal trade reached its highest volume ever in 2019 at 1 445 Mt, a 0.8% increase from the previous year[3]. Trade accounted for 19% of global coal consumption in 2019. Trade in thermal coal (which includes lignite and some anthracite in this section) increased 1.1% while metallurgical (met) coal trade volumes were stable. Thermal coal accounted for 76% of global coal trade and met coal for the rest. The vast majority of coal traded in 2019, 92% (1 331 Mt), was seaborne trade.

Patterns of international (thermal) coal trade are shifting. Traditionally trade could be characterised by two geographic basins: the Pacific Basin, where Japan and Korea were the top importers; and the Atlantic Basin, where the European countries imported most of the traded coal. South Africa, and to a much lesser extent Russia, linked the two basins in coal trade. This no longer portrays international coal trade patterns, as the Atlantic market has separated from Asian market. For instance, in 2019, the volume of coal imports in India were almost double EU import quantities, a clear indicator of a shift to Asia and the waning of Europe in international coal markets.

Indonesia remained the world's largest exporter of coal (by weight) with total exports of 455 Mt in 2019. Australia ranked second, at 395 Mt, although it remains at the top of the league table ranked by energy and economic values. China was the largest importer of coal in 2019 at 308 Mt, followed by India at 249 Mt.

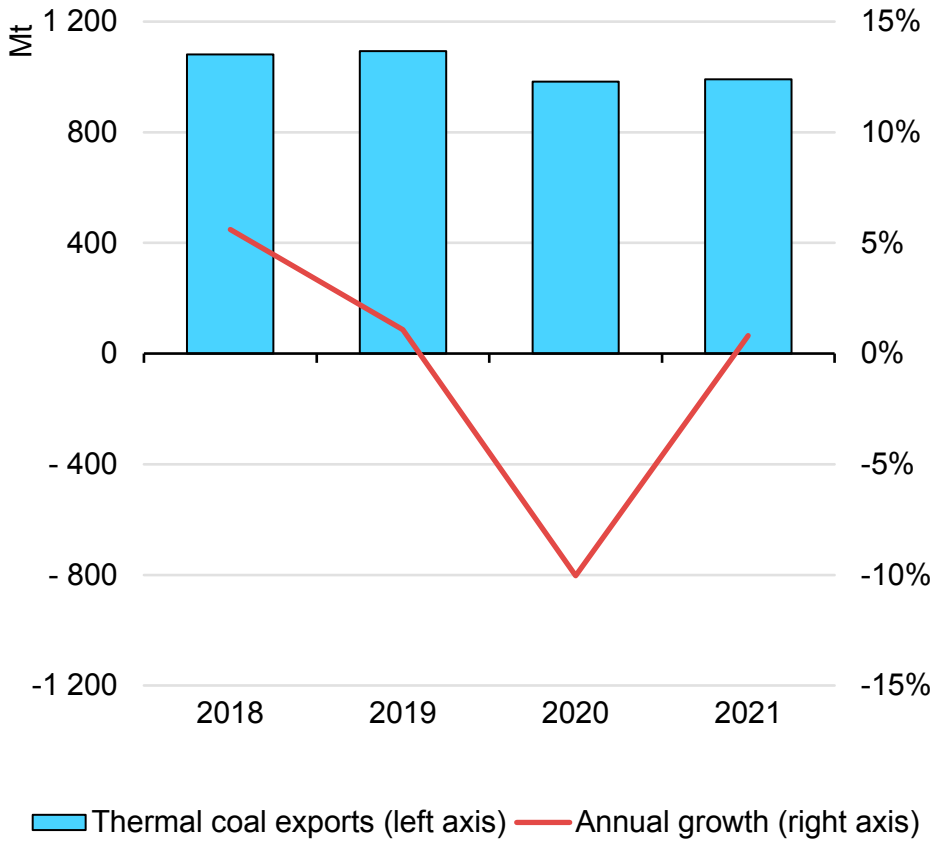
It is estimated that for 2020 trade volumes will recede around 10%, or around 150 Mt, the largest drop ever, most of which are seaborne coal trade. Trade volumes of thermal coal are expected to decline by 10% and those for met coal by 12%. The largest exporters bear the brunt of the largest absolute decline in exported volumes: Indonesian exports are expected to drop by 51 Mt (-11%) and those from Australia by 30 Mt (-8%). The biggest absolute decrease in imports is in India (-41 Mt). Among significant importers only Viet Nam (+18%, +8 Mt) and maybe Turkey will increase their coal imports.

In 2021, as coal demand recovers, traded volumes will rebound as well. Compared to 2020, exports are expected to increase by 31 Mt (2.4%) to 1 323 Mt in 2021, an increase in seaborne coal trade accounting for 26 Mt. This means that export volumes will remain well below the pre-Covid volumes. The recovery is supported by more imports in India (+12 Mt) and Southeast Asia (+10 Mt). It is expected that Australia and Indonesia in particular will benefit from this recovery in import demand. Australian coal exports are expected to increase by 20 Mt and Indonesian exports by 6 Mt.

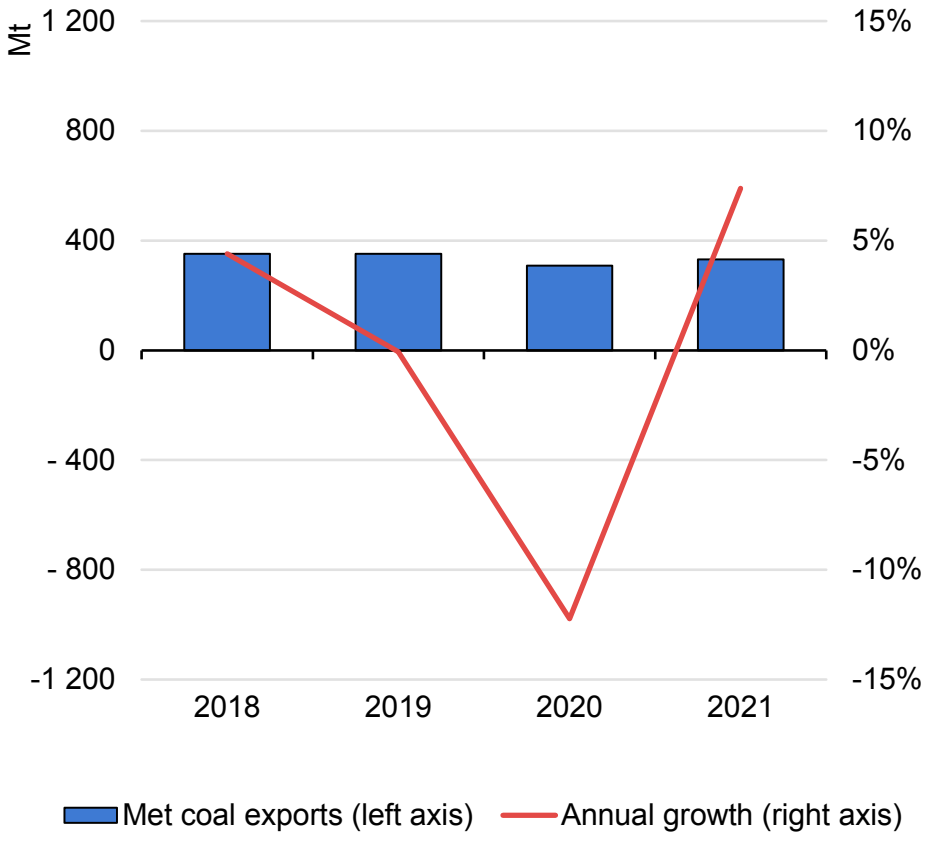
[3] The volumes of annual imports and exports are different, as some exports reported in December are reported as imports in January. Trade volumes in this section refer to exports.

Covid-19's strong impact on coal trade

Trade development for thermal coal, 2018-2021



Trade development for metallurgical coal, 2018-2021



Thermal coal

Thermal coal trade breaks the record in 2019...

In 2019, 1 093 Mt of thermal coal were traded internationally setting a new volume record. This was up 12 Mt from 2018 though is a much slower growth rate than the previous two years. Approximately 1 021 Mt (94%) of this trade was seaborne. Internationally traded thermal coal as a share of global consumption was stable at 17%.

The majority of seaborne thermal coal trade occurs in the Asia Pacific region, where both the largest importers and exporters are concentrated. Indonesia provided 41% of globally traded thermal coal in 2019, and has potential to increase its market share. Australia ranked second with 19%. Other important market participants include Russia (17%), South Africa (7%), Colombia (6%) and the United States (3.1%).

China was the largest importer of thermal coal in 2019 accounting for 21%, followed by India (17%) and Japan (13%). Southeast Asia and Europe each accounted for around 11% of thermal coal imports. Southeast Asia expanded imports by 19% in 2019, as demand from coal-fired electricity generation increased, especially in Viet Nam. Imports to India increased by 12%, despite a decline in overall coal demand. Imports in Japan were slightly lower (-1.6%), sustained by the slow restart of its nuclear power generation capacity. Coal imports to the European Union fell dramatically by 30 Mt (-21%).

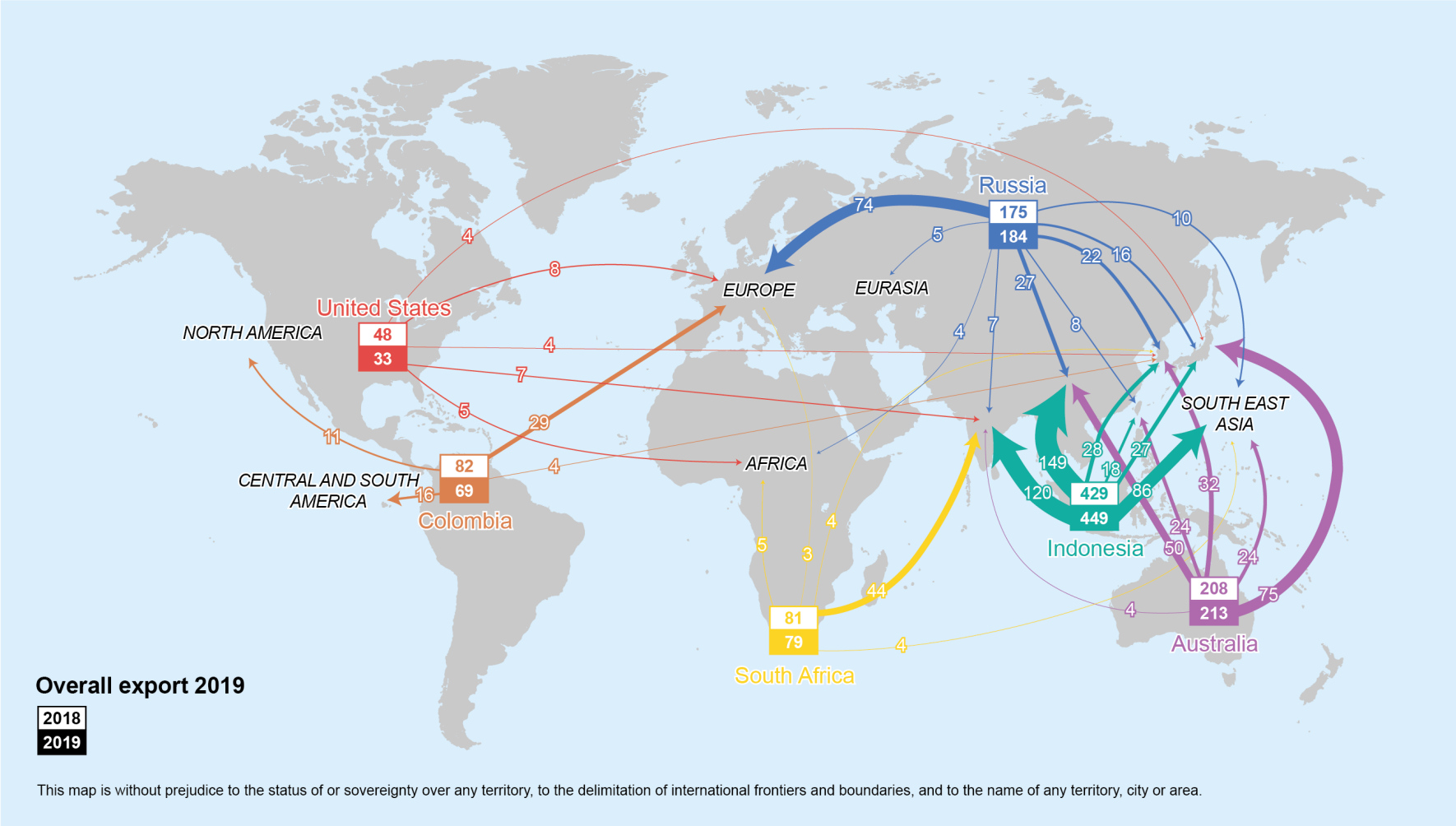
Indonesia, Australia and Russia significantly increased their coal exports in 2019. Indonesia and Russia continued to build on their export growth of the previous two years. Indonesia's coal exports increased by 20 Mt (+4.7%) as production capacity has significantly expanded. Russia increased exports by 9 Mt (+5.0%), though its exports to the European Union decreased by 3 Mt. However, measured against the slump in EU demand, Russia, as a low cost supplier, was able to increase its market share in Europe from around 53% to 65%. In addition, exports to China, India and Southeast Asia expanded. Australian exports increased by 5 Mt (+2.5%), being the main beneficiary of increased imports in Viet Nam. Coal exports through the port of Newcastle, in South Wales (the world's largest coal exporting port outside China) reached a record of 165 Mt in 2019, around 87% of which was thermal coal.

In relation to the drop in coal imports in the European Union in 2019, exports from Colombia declined by 12 Mt (-15%) and from the United States by 15 Mt (-31%). For the United States, coal exports to India and Korea also fell.

South African exports were relatively stable (-1.8%). As imports declined in Europe and other African countries, South African exports continued to shift to India, Pakistan and Southeast Asia.

… and remains concentrated in the Asia Pacific Basin

Main trade flows in the thermal coal market, 2019 (Mt)



Thermal coal trade was rattled by the pandemic

Thermal coal import volumes of 987 Mt estimated for 2020 will be about 9% (103 Mt) lower than the previous year. Forecast for 2021 anticipates a recovery of about 4 Mt.

It was expected that the implementation of the IMO-2020 to limit sulphur in shipping fuel in January 2020 would affect international trade[4]. What was not expected are the consequences of the Covid-19 crisis and how they impact international coal trade.

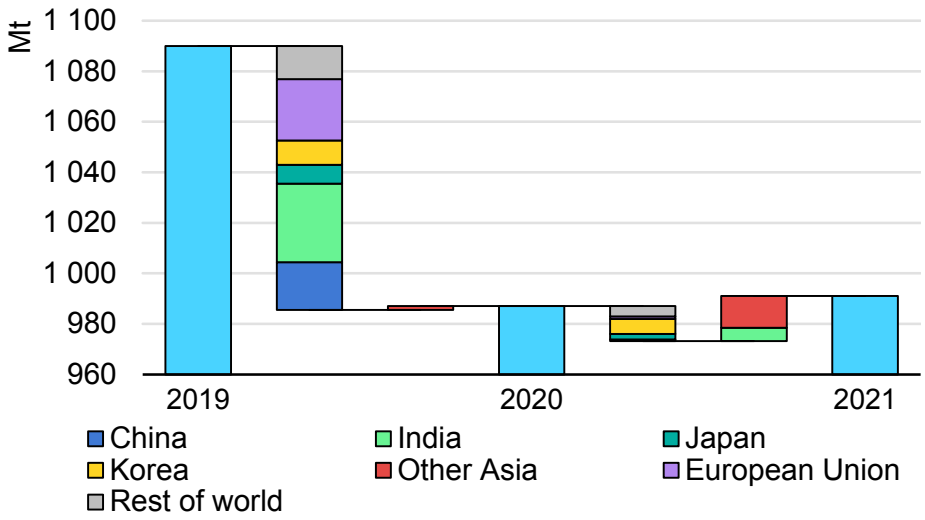
Imports of thermal coal to Japan, Korea and Chinese Taipei will decline in 2020. In each country, import volumes are driven primarily by demand for thermal coal to generate electricity. With lower electricity demand in 2020, Japan's thermal coal imports look to decline by 8 Mt, Korea's by 10 Mt and Chinese Taipei's by 6 Mt. Although a partial recovery in electricity demand is expected in 2021, the underlying decline in coal-fired power generation in favour of renewable generation persists and gas competition remains as a threat for coal. Japan's thermal coal imports in 2021 are expected to remain at 2020 levels while Korea's and Chinese Taipei's imports are expected to decrease further.

Imports of thermal coal to Viet Nam are expected to increase by 8 Mt (+21%) in 2020 to serve rising demand in the power sector as well as for industrial production. For 2021, a further increase of coal imports of 5 Mt (+11%) is expected as domestic production cannot satisfy increasing demand.

The European Union is playing a significant role in reshaping coal trade patterns. A strong decrease in imports by 24 Mt (-31%) is expected for 2020, a continuation of the trend from the previous year. Imports of thermal coal are expected to decrease in Germany (-7 Mt), Italy (-2 Mt) and Spain (-4 Mt). Since a recovery in coal demand in the European Union is not expected for 2021, import volumes are likely to be unchanged.

Turkey, where imports in 2020 might increase compared with 2019, consolidates its position as the largest thermal coal importer outside the Asia Pacific region, which it assumed after having surpassed Germany in 2018.

Changes in thermal coal imports, 2019-2021



[4] From 1 January 2020 the global upper limit of the sulphur content of ships' fuel oil was reduced to 0.50% (from 3.50%) by the International Maritime Organization (IMO). The reduced limit is mandatory for all ships operating outside certain designated Emission Control Areas, where the limit is already 0.10%.

Policies to protect domestic coal production rein in imports

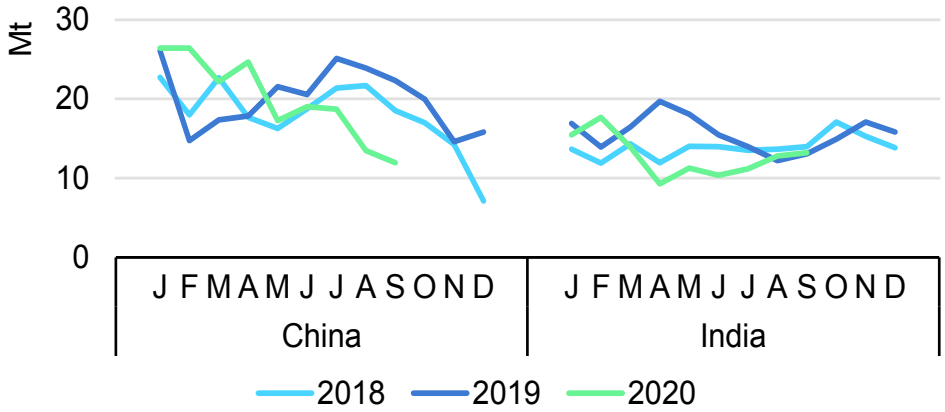
Annual coal import quotas have been enforced in recent years in China. Correspondingly, China's import volatility has jumped. In December 2019, for example, Chinese thermal imports were 1 Mt, plummeting from 14.6 Mt in November 2019 before jumping up again to 26.5 Mt in January 2020. Imports remained high in the first-quarter of 2020 as production in China was disrupted and global coal prices dropped. Towards the middle of 2020 the national government tightened import restrictions to shore up domestic coal producers. In addition, delays in the ports became frequent. As a result, a decrease in thermal coal imports of 19 Mt (-8%) in China is expected for the full year, although the fourth-quarter, and in particular December, is quite uncertain as the import quotas are not known. For 2021, it is expected that China's thermal coal imports will be similar to 2020 levels, as policies to curtail imports continue.

In response to the domestic decline in demand and rising stockpiles in 2020, India's state-owned coal producer, CIL, is pursuing the goal of replacing thermal coal imports with domestic production. The government mandated the company to replace at least 100 Mt of imports with domestically produced coal in fiscal year 2020-21. In September 2020, CIL announced the Special Spot e-Auction for importer substitution, which aims to replace 150 Mt of coal imports with domestic supply. The CIL sale efforts focus on Indian utilities as well as companies in the cement, sponge iron and fertiliser industries. Any company or trader that imported coal in the current or last two fiscal years is eligible to participate in the auctions.

As a result of the decline in demand and the efforts to replace imports, thermal coal imports to India are expected to decline by 31 Mt for 2020, the largest drop among thermal coal importers. In September 2020 the India's coal and trade ministers discussed the idea of setting up a coal import monitoring system. This step is in line with government policies to discourage coal imports as a way to support domestic coal sales and reduce the import bill.

India's thermal coal imports are expected to recover only by 5 Mt in 2021 owing to stockpiles built up in 2020, in combination with a potential increase in production and the continuation of policies to discourage imports.

Monthly thermal coal imports to China and India, 2018-2020



Source: IHS Markit (2020), Coal Price Data and Indexes.

Thermal coal exporters in 2020: A battle about location, quality and costs... and China

Driven by weaker demand and lower prices in 2020, thermal coal exports are expected to fall by 110 Mt (-10%). In 2021 a recovery in exports of 8 Mt is projected. The share of seaborne traded thermal coal remains constant at around 94%.

In absolute numbers, Indonesia is the hardest hit with exports of thermal coal in 2020 decreasing by around 51 Mt (-11%). Indonesian producers in particular are affected by shrinking import demand in Asia, since many mines are high cost producers of low quality coal. Furthermore the country is highly exposed to the Indian market, which is shrinking dramatically in 2020. In 2021 a recovery in exports of 6 Mt is estimated, but it depends on China and India, which accounted for 33% and 27% of Indonesian exports in 2019.

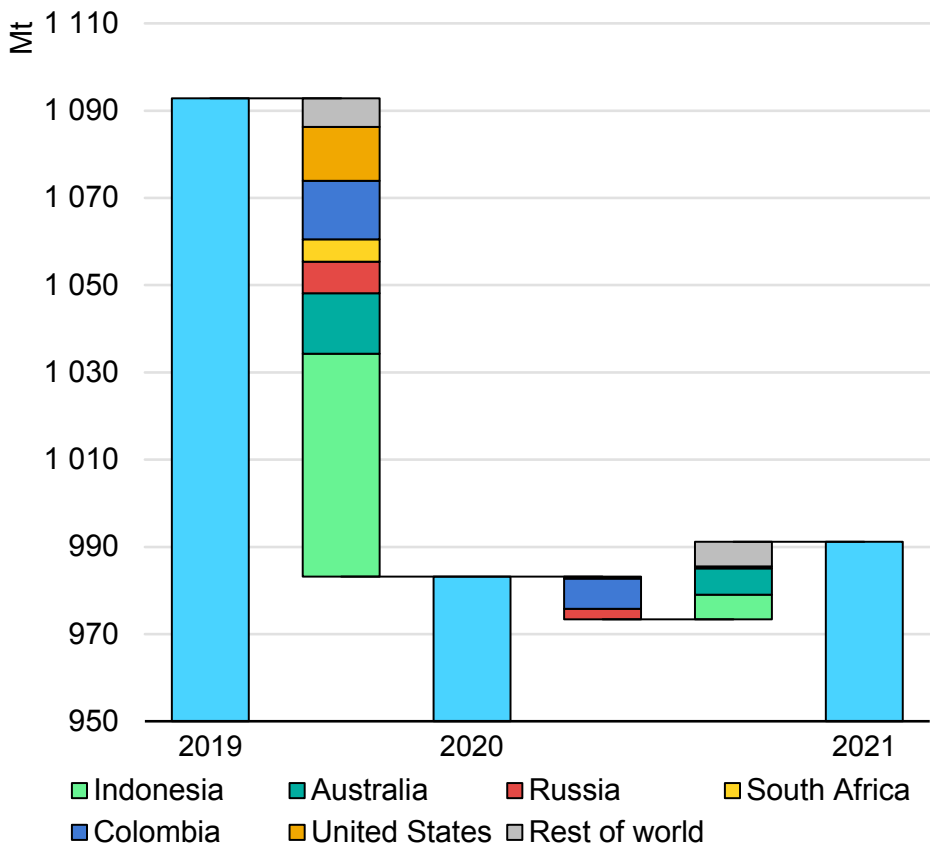
Australian exports of thermal coal are less affected by decreased import demand than Indonesia. Low coal prices in mid-2020 combined with recovering fuel prices and high labour costs mean that many thermal coal mines in Australia have been operating at a loss. High fixed costs of mine operation and take-or-pay contracts for the use of rail and port infrastructure cause most producers to continue operations, as long as the value of take-or-pay costs are higher than losses in production. In addition, term contracts, especially with Japanese utility buyers, support the production of Australian coal when spot prices go below contracted prices. Japan's fiscal year 2020-21 contract price for high calorific thermal coal settled at USD 68.75/t, significantly higher than mid-year spot prices. Australia was the only major exporting country to increase supply in the first-quarter 2020, driven by strong demand in China at that time. A decline of around 14 Mt (-7%) is expected for 2020 overall with a recovery of 6 Mt in 2021.

Even Russian exports of thermal coal – the growth story of recent years – are expected to fall by about 7 Mt (-3.9%) in 2020, as import demand shrinks in its most important export markets, Europe and Korea. The other two main exporters of thermal coal to Europe are also severely hit by the decline in demand. Exports of the relatively high cost producers of the United States are expected to decline by 12 Mt (-37%), while Colombia's exports are projected to decline by 13 Mt (-19%). Recovery of previous coal export volumes in 2021 is not expected for these three countries as demand in the Atlantic Basin will remain subdued and a shift of exports to the Asia Pacific region could prove difficult due to the relatively high costs of production and transport. However, if difficulties of Australian coal exports to gain access to Chinese markets persist, unusual coal flows could become the new normal in 2021.

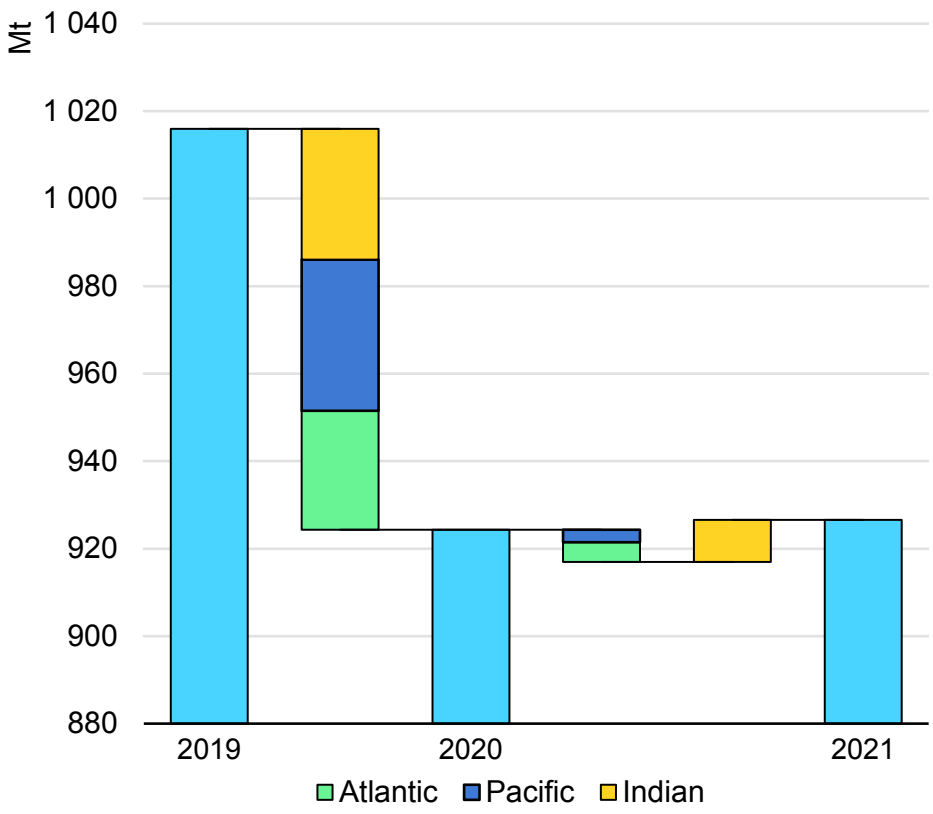
South Africa's exports are expected to decrease by 5 Mt in 2020. Its exports are generally competitive and well diversified. A combination of quality and price suits sponge iron producers in India, its largest market. In 2021 exports are expected to recover only slightly.

Will 2019 be the peak of thermal coal trade?

Changes in thermal coal exports, 2019-2021



Changes in seaborne thermal coal trade volumes by basin, 2019-2021



Note: Indian category includes India, Pakistan, Bangladesh and Sri Lanka.

Metallurgical coal

Metallurgical coal trade is more concentrated than thermal coal, with Australia leading exports

Although the metallurgical (met) coal market has only one-third the volume of the thermal coal market, international trade plays a more important role for met coal. In 2019, about 352 Mt or 32% of total met coal consumption was met by imports, of which 310 Mt (88%) was seaborne. The market for met coal is highly concentrated on the export side, with Australia (52% share in 2019, 59% if only seaborne is considered) as the dominant global supplier. Other countries with a significant market share include the United States (14%), Canada (10%), Russia (9%) and Mongolia (9%).

Asia Pacific countries accounted for 73% of all met coal imports in 2019, with China leading the way at 24%. China increased imports in comparison to 2018 by 11 Mt (+16%). Imports also increased to India (+2.4%) and Southeast Asia (+31%). China's import demand was fuelled by relatively low seaborne prices for met coal compared with Chinese domestic prices and increased steel output. Europe as a whole remained one of the largest importers because of its large iron and steel production capacities and shortage of domestic met coal supply, accounting for 18% of all imports. Yet, imports to Europe decreased by 3 Mt (-5%) in 2019, as reduced steel capacity cut demand.

A quarter of Australian met coal exports in 2019 were destined for India. Other major markets for Australian met coal include China with a share of 21% and Japan (17%). Australian exporters benefited from the increase in import demand in China, India and Southeast Asia in 2019. Australian exports increased by 3 Mt (+1.9%).

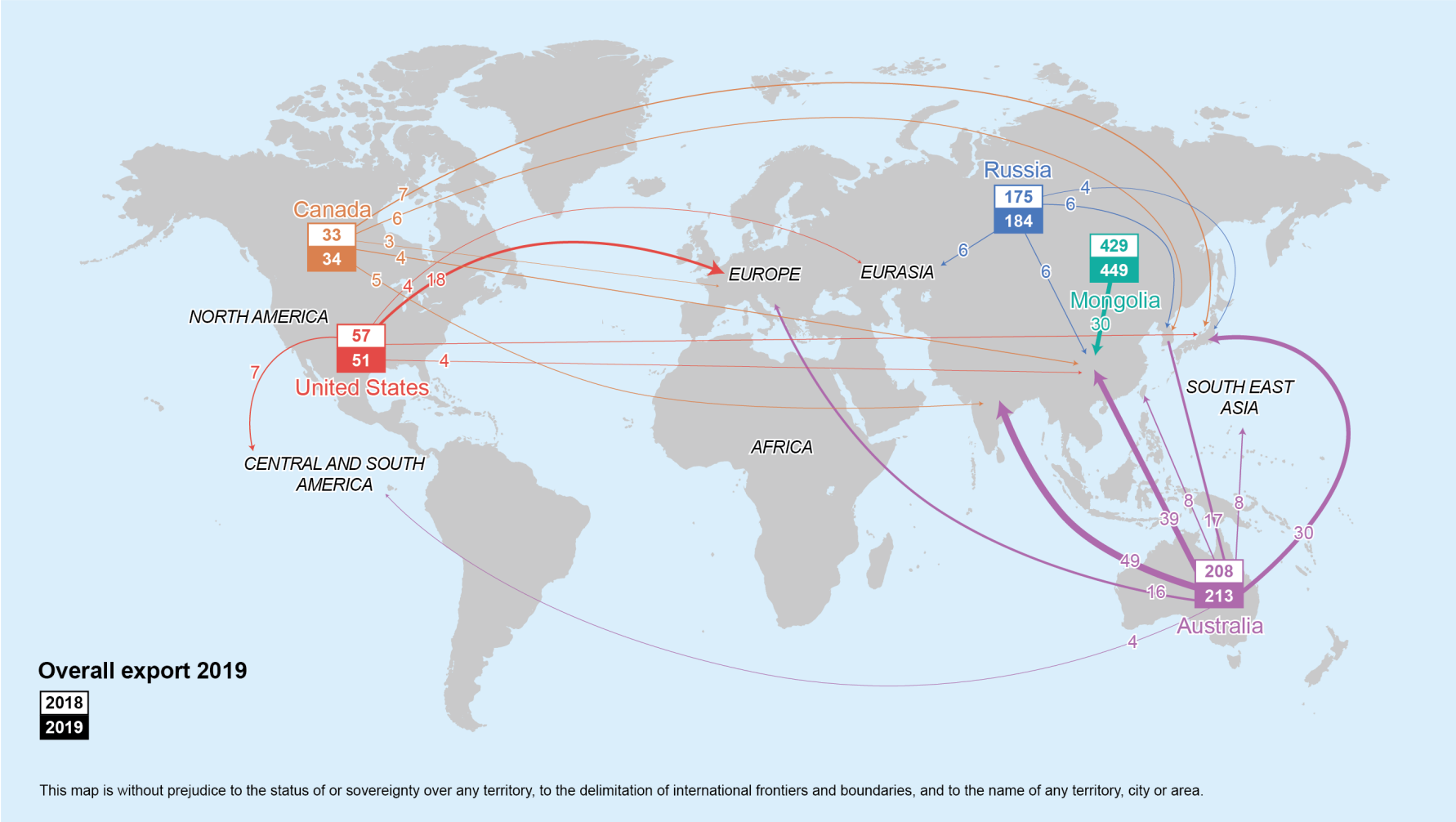
Mongolian coal producers are limited in their ability to export due to the country's geographical location. Coking coal exports are transported to China via truck. Mongolian exports are particularly price-sensitive, as transport costs are a major component in their profitability. In 2019, Mongolian exporters expanded exports by 3 Mt (+11%), driven by increased demand in China.

Met coal exports in 2019 from the United States declined by 6 Mt (-10%), below 2017 levels, as import demand from Europe and Brazil was weak. Demand from Brazil, the largest importer of US coking coal, declined in 2019 as three major blast furnaces were undergoing maintenance.

Even with weak demand, Russia increased exports to Europe by 2 Mt, at the expense of the United States and Canada. On the other hand, exports to Korea and to Ukraine were weak, leaving Russia with a decline in exports of 2 Mt (-4.5%) in 2019.

Australia dominates met coal trade

Main trade flows in the metallurgical coal market, 2019 (Mt)



Metallurgical coal trade was dented in 2020, but will rebound with economic recovery

Global met coal imports are expected to decline by 29 Mt (-8%) in 2020. In 2021 a recovery of import volumes by 19 Mt (+6%) is forecast.

In 2020, Covid-related lockdowns and struggling economies dented steel production in virtually every country other than China, with direct impact on met coal trade. In the first-half of 2020 an increase in met coal imports to China occurred. The outbreak of the Covid-19 virus in China in the first-quarter reduced domestic supplies, as the reopening of many domestic coal mines was delayed from the beginning of February until March. However, imports in China are expected to decline in the second-half of 2020 because import restrictions have been tightened and import quotas are taking effect. For 2020 as a whole, imports in China are expected to remain roughly at 2019 levels, a trend which will continue through 2021, subject to changes in import policy.

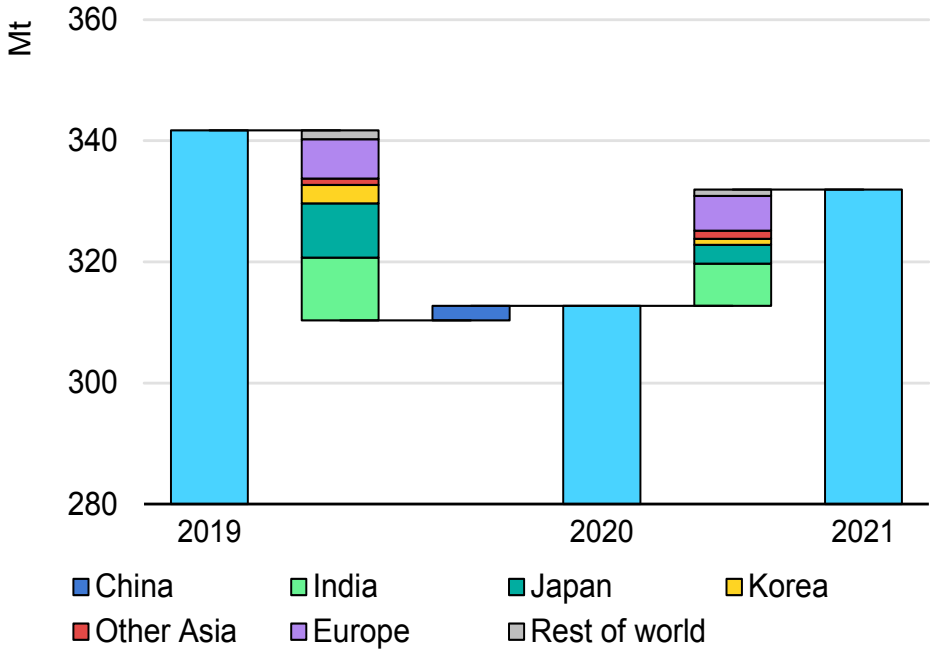
Pig iron and steel production in India were severely impacted by Covid-related shutdown measures. India's met coal imports are expected to decline by 10 Mt (-17%) in 2020, though met coal imports are projected to pick up by 7 Mt (+13 %) in 2021.

Similarly, in Japan and Korea steel production and thus the demand for met coal slumped sharply in 2020. It is estimated that Japan's met coal imports will fall by 9 Mt (-20%) in 2020. For Korea a decrease of 3 Mt (-8%) is estimated.

Recovery of the steel industry in Japan and Korea in 2021 is expected to be slow. Therefore, only a limited recovery in import volumes for met coal is expected: 3 Mt (+9%) in Japan and 1 Mt (+2.9%) in Korea.

Pig iron and steel production in Europe experienced a significant decline related to pandemic measures and subsequent economic turmoil. As a result, we estimate a decrease in met coal imports by 6 Mt (-11%) in 2020. For 2021 it is assumed that the industry will recover and met coal imports will increase by the same amount.

Changes in metallurgical coal imports, 2019-2021



Metallurgical coal exports hit by the pandemic, but Australia recovers in 2021

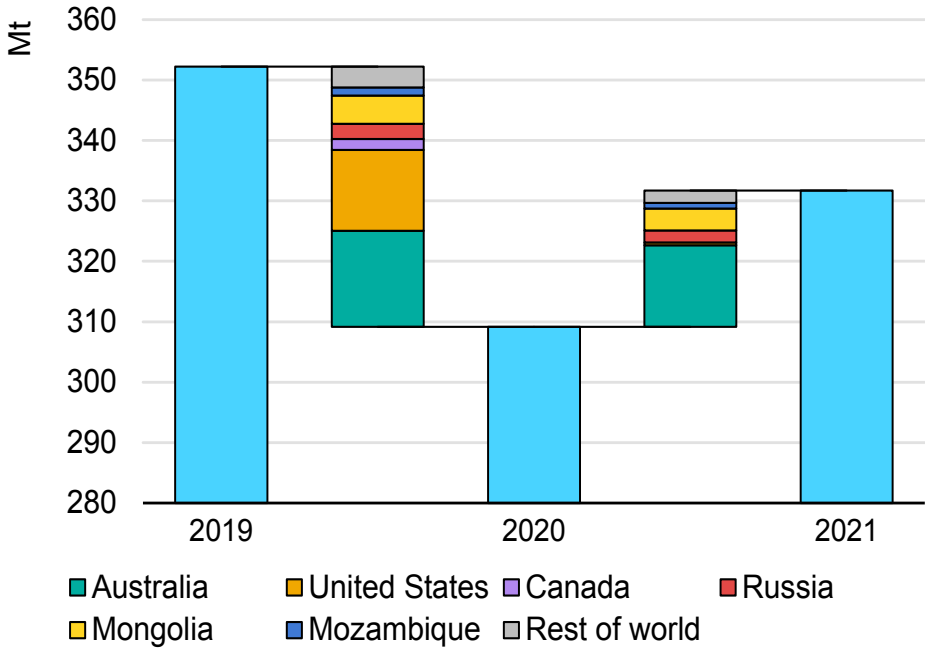
Met coal exports are estimated to fall by around 43 Mt (-12%) in 2020, mostly seaborne traded met coal (-39 Mt). The decline in exports is more severe than the decline in imports, because the delay in discharging coal ships in Chinese ports at the end of 2019 meant that exports from the previous year could not be booked as imports until 2020. In 2021 a recovery in exports by 23 Mt (+7%) is projected. The share of seaborne traded met coal remains at 88%.

In the first-half of 2020, Australia was the largest exporter of met coal to China, which increased over 65% from the previous year. This notable increase was driven by the rebound of the steel industry in China and the temporary closure of its border with Mongolia, which hindered exports of its met coal. This border closure was suspended in the second-half of the year, so Mongolia is ramping up exports at the expense of Australia. Furthermore, exports to other major markets for Australian coal, e.g. Japan and Korea, are declining in 2020, leaving Australia with a fall in exports of 16 Mt (-9%). Recovery in 2021 will depend on China accepting Australian coal and could be challenged if the La Niña event impacts Australia's coal supply chain.

The second-largest absolute decline in met coal exports, 13 Mt (-26%), in 2020 is expected for the United States due to lower demand in key US markets such as Brazil and Europe. Exports to India are also expected to decline sharply. As US coal mines are confronted with relatively high cost structures, no recovery of exports in 2021 is projected.

Met coal exports from Mongolia declined by 5 Mt (-16%) in 2020, mainly due to temporary border closures with China. However, exports were above 2018 levels. We expect a rebound of 4 Mt (+14%) in 2021, assuming exports to China are not disrupted. On 1 January 2021, Chinese tariffs for Mongolian coking coal will go down to 1.5% from the current 3% level. This can benefit Mongolian exports, but a bigger boost will be the start of the 30 Mtpa capacity railway from Tavan Tolgoi to the Chinese border, scheduled to be operational by the end of 2021.

Changes in metallurgical coal exports, 2019-2021



Prices and costs

Prices

Coal prices withstand despite Covid-19 and Chinese import quotas

Coal prices vary by region as well as by grade and quality. The price rebound starting in 2016 ended in 2018, moving in a downward trend in 2019. After stabilisation of prices in the beginning of 2020, Covid-related demand suppression pushed prices down. FOB prices for thermal coal with a calorific value (CV) of 6 000 kcal/kg which had hovered around USD 100/t in early 2019, had fallen to USD 65/t a year later and in late 2020 is trading closer to USD 50/t, a 50% decline, to rebound in November to same levels than one year ago. A similar trend applies to coking coal prices, which plummeted from USD 200/t to USD 100/t over the same period, but Chinese restrictions to Australian coal has prevented the latest uptick.

The price decline followed a period of high prices dating back to early 2016. In 2016 and 2017 prices increased due to supply-side restrictions in China as well as increasing demand. In the first eight months of 2019, thermal coal prices declined due to increased supply in the seaborne thermal coal market as producers reacted to higher prices in 2017-18. In addition, demand was dampened by weaker electricity demand and lower LNG prices. Import restrictions in China in the fourth-quarter 2019 added pressure to coal prices.

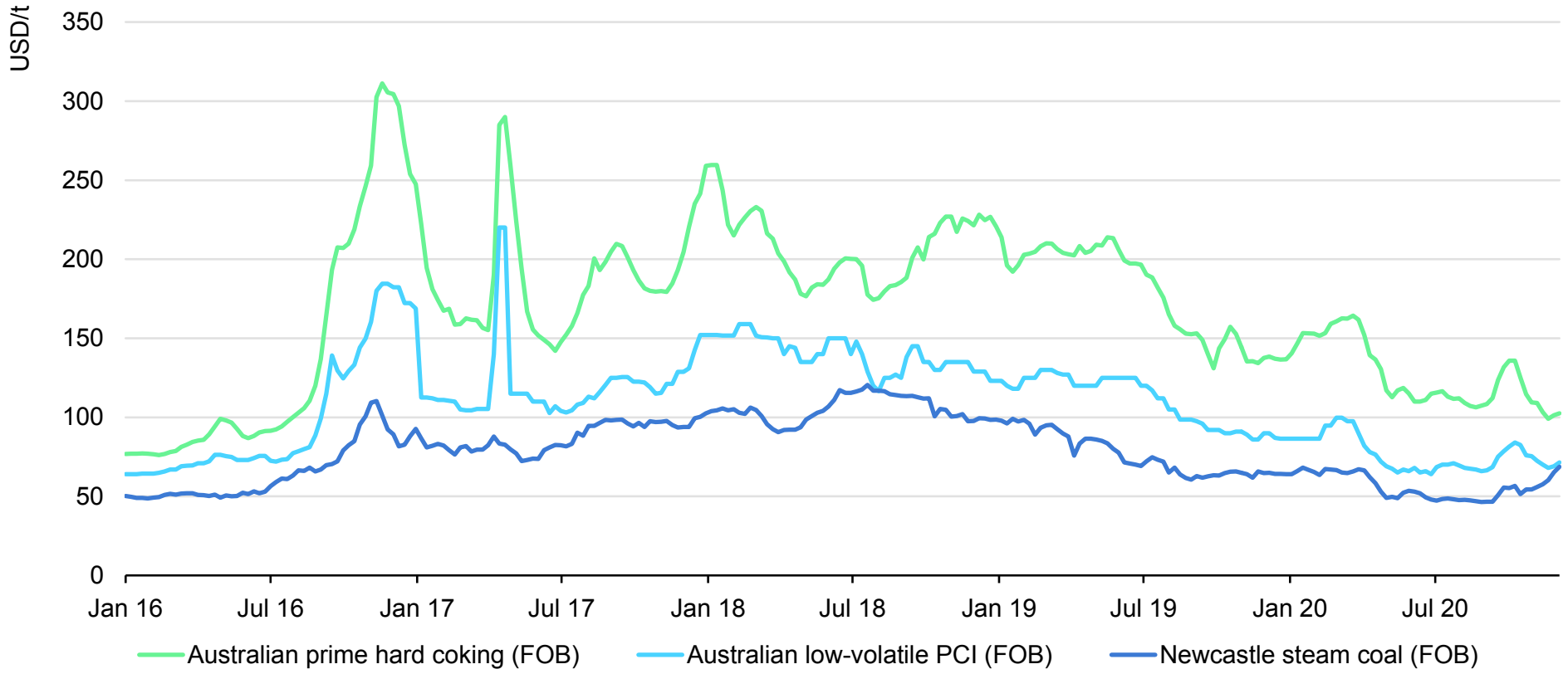
Spot prices for thermal coal were stable in the first-quarter 2020, despite a plunge in oil and gas prices. The lockdown in China led to a decline in electricity consumption and industrial output, but also to an increase in seaborne imports due to a reduction in domestic production as miners were unable to get to their workplaces and mines were closed as part of the containment measures. This shifted in April, as prices for thermal coal fell sharply reaching the levels of early 2016 as a result of the global decline in demand and the simultaneous recovery of coal production in China. Import quotas in China have also pushed international coal prices down by depressing demand. At the end of the third-quarter 2020, prices started to recover as demand beyond China picked up and the supply side adjustments had cut production.

Coking coal prices slipped in mid-2019 due to slowing global economic growth and weak steel production outside of China, notably in India.

Spot prices for coking coal rose in the first-quarter 2020. This was due to the reduction of coal production in China related to the pandemic and to Mongolia's decision to close its border with China which boosted China's import of seaborne traded coking coal. On the supply side, a roof collapse at the Moranbah North mine in Queensland and bad weather in Australia also supported higher spot prices. As global steel production collapsed outside China due to pandemic containment, the price of coking coal fell to around USD 110/t in April 2020. At the end of the third-quarter, coking coal prices saw an uptick as demand from steelmakers outside of China increased production. Forecasts of heavy rain in Queensland also supported higher prices, but the difficulties of Australian coal in Chinese customs have pushed prices down.

Coal prices withstand, but at lower level than in 2017-2018

Marker prices for different types of coal, 2016-2020



Note: FOB = free on board; PCI = pulverised coal injection.

Source: IHS Markit (2020), Coal Price Data and Indexes.

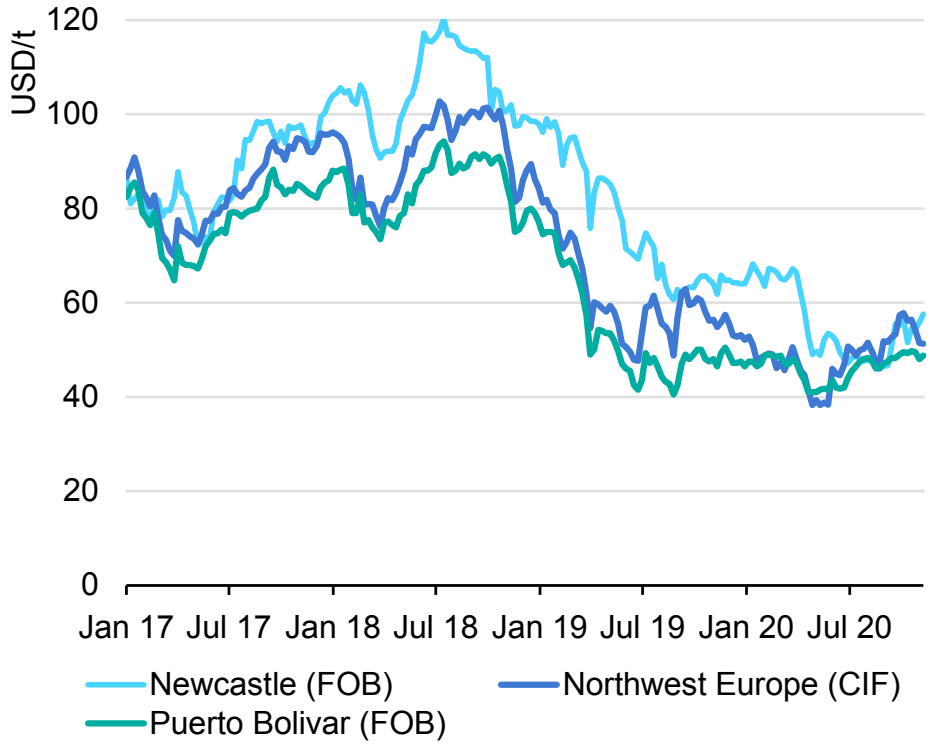
European thermal coal prices on their own path (up to a point)

The coal price spread between Europe and Asia has widened since 2018. While prices in the Asia Pacific region are supported by robust growth in demand, coal demand in Europe is waning. In 2019, CIF prices for thermal coal in Northwest Europe were consistently lower than FOB prices in Newcastle (New South Wales, Australia). Lower prices in Europe were driven by falling demand due to low natural gas prices and policies to reduce coal use in Europe. The correlation between both prices is getting weaker.

European coal imports in 2019 originated mainly from Russia and Colombia. Since exports to the Pacific Basin are more costly for Colombian producers and exports from Russia to the Asia Pacific region are constrained by transport infrastructure limitations, arbitrage opportunities arising from the price spread between the Atlantic Basin and the Pacific Basin cannot be fully exploited by producers. Therefore price spreads persisted. In order to compare European CIF and Asian FOB, it is important to remember that CIF includes freight and insurance.

A wide spread between prices in Europe and Asia was apparent at the start of 2020. As demand around the world plummeted so did prices in both regions. However, while prices in Asia remained on low levels in the middle of 2020, prices in the Atlantic Basin picked up in June as supply adjustments in Colombia and the United States were bigger than in Asia. In that moment, cheap freight rates enable exporters to exploit arbitrage opportunities between the markets, which supports price convergence.

Thermal coal (6 000 kcal/kg) price markers in Europe and Asia, 2017-2020



Notes: FOB = free on board; CIF = cost, insurance and freight.

Source: IHS Markit (2020), Coal Price Data and Indexes.

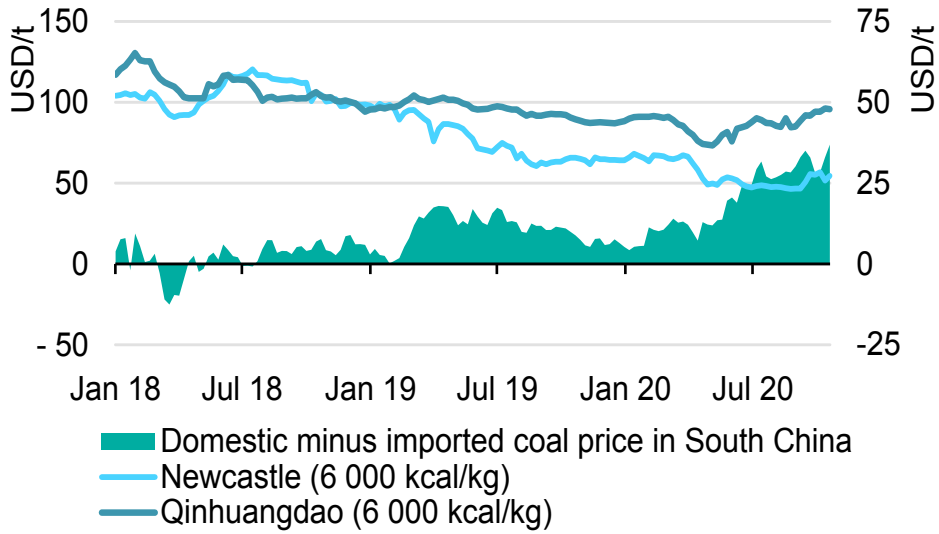
Tug-of-war between imports and price spreads in China

In 2019, prices for thermal coal in the Pacific Basin seaborne market were systematically lower than domestic prices in China. Thermal coal imports were on average 20% cheaper than domestic coal shipped from the northern ports.

Imports into China have been restricted by government policies for a few years. The most recent policy, according to market participants, is the establishment of import quotas. The exact terms of the policy or the volume amount of the quotas are not disclosed by official sources. Some ships, in particular those bringing coal from Australia, have experienced customs delays which increase costs and demurrage. This is part of China's policy to rein in imports in order to support its domestic coal industry. The government's target is to keep the domestic coal price in the range of RMB 500-570/t. The reference price for this determination is the Bohai-Rim Steam Coal Price Index (BSPI), a gauge of coal prices in northern China's major ports. The price level aims to ensure sufficient profitability for domestic coal producers and customers.

But by restricting imports, the spread between domestic and international prices has become wider in recent months. After the spread declined in first-quarter 2020, the spread continued to grow in the second-quarter, when restrictions were expanded. While the Australian price remained at a low level after declining in April, the domestic price recovery started in China. The economic recovery in China led to a reduction of stockpiles as power demand recovered but subsequently, due to tightened import restrictions, the reduced demand for foreign imported coal led to a decoupling between domestic and seaborne prices. The restrictions led to additional pressure on seaborne prices, as the continuing low demand outside China was accompanied by a further reduction in sales opportunities to China. The price spread indicates arbitrage opportunities for Chinese traders, which were not able to be exploited due to the import restrictions. This increases the pressure on policy makers in China, which have to balance the support of domestic production against the economic attractiveness of lower import prices.

Price arbitrage domestic versus imported coal in China, 2018-2020



Note: Price spread in South China includes taxes, freight costs and port charges for import cargos.
Source: IHS Markit (2020), Coal Price Data and Indexes; CRU (2020), Thermal Cost Model (database).

Increasing segmentation by coal quality in Asia

Thermal coal, traded in the Pacific Basin, can be categorised by its calorific value (CV). Although there is a potential for substitution between the various qualities of coal, the differences represent separate market segments.

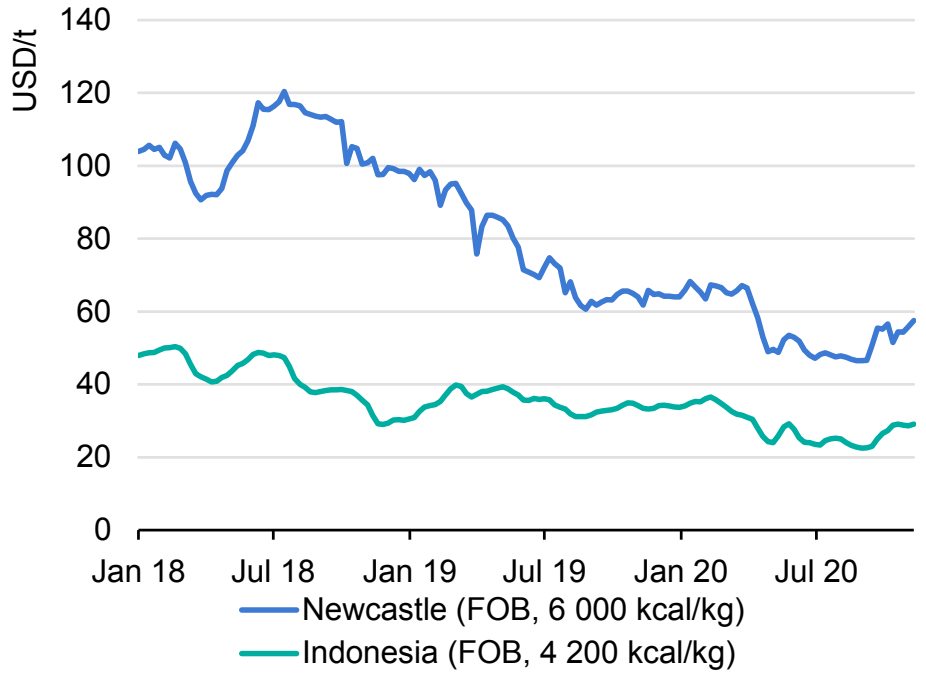
In 2019, thermal coal with high CV (> 5 700 kcal/kg) accounted for around 43% of thermal coal exports to countries in the Asia Pacific region. About 85% of thermal coal exported from Australia is high CV and it is the main exporter of high CV thermal coal to countries in the Asia Pacific region, with Japan, Korea and Chinese Taipei as the main importers.

Thermal coal with low CV (< 4 500 kcal/kg) accounted for about 20% of coal exported to countries in the Asia Pacific region in 2019. Around 95% of worldwide exports of thermal coal with low CV originate from Indonesia. While 37% of coal exported from Indonesia has low CV, only 8% has high CV. The biggest importers for Indonesian coal are China and India.

Low CV coal is cheaper per tonne because of its lower energy content. In addition, low CV coal generally has higher logistics costs owing to higher ash and moisture content and lower efficiencies at final use. Therefore low CV thermal coal is traded at a discount per unit of energy than higher quality coal. Spot FOB prices for low calorific coal in the Pacific Basin in 2019 were on average about 52% lower than prices for high calorific coal.

Blending can offer opportunities to some coal. For example, low sulphur and low ash sub-bituminous Indonesian coal is a good match for high sulphur and high ash Chinese bituminous coal. The prices for low calorific coal from Indonesia are also less volatile than prices for high calorific thermal coal.

Thermal coal FOB price markers for different qualities of coal, 2018-2020

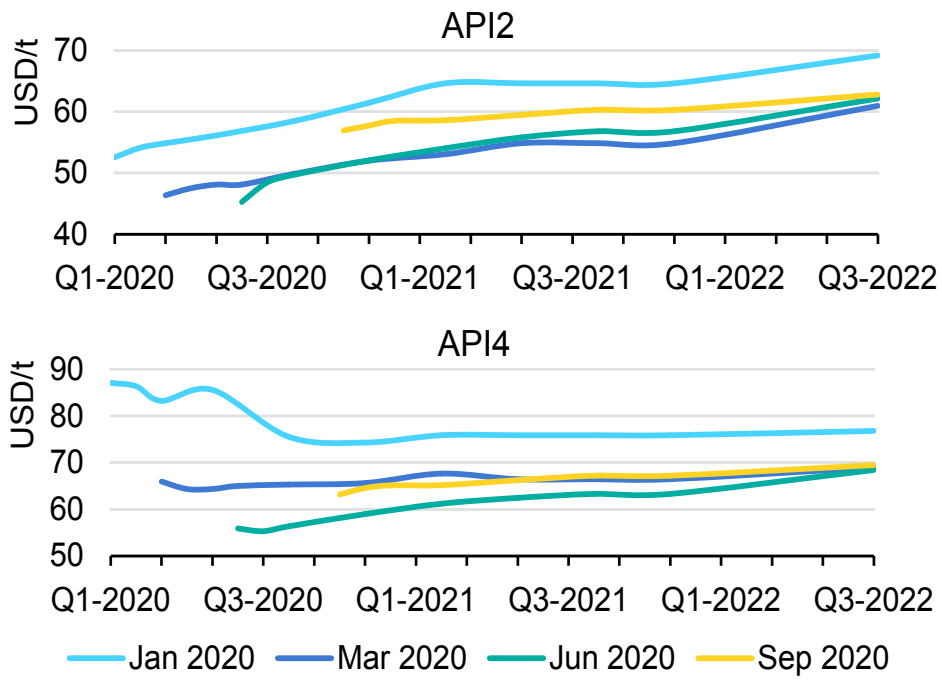


Source: IHS Markit (2020), Coal Price Data and Indexes.

Forward price curves show mostly a soft contango

The Argus/McCloskey's Coal Price Index[5] (API) API2, which is CIF prices in Europe, showed a contango (when spot prices are below forward prices) for the last year, but consistently USD 60 by the third-quarter of 2022. API4, which is FOB prices at Richards Bay, South Africa, started 2020 in backwardation (opposite to contango), as a result of a price rally in the final-quarter 2019, due to the demand pushed by sponge iron buyers in India in conjunction with the South African utility Eskom, which was buying spot as the coal shortage threatened electricity supply. This was considered temporary and revealed by the January 2020 forward curve. Otherwise, forward curves show a very flat profile, in a very soft contango moving with the spot prices throughout 2020. The Covid-related decline in thermal imports in 2020 will be over 100 Mt (taking into account the decline and the expected growth never materialised) and which looked to be too much for the supply side to absorb. Especially, as import restrictions in China did not allow utilities and traders to take full advantage of the low prices. Production cuts have been the norm among producers during 2020, and the players assumed that the supply demand balance would be restored over 2021, although the market has been quicker than expected. Therefore, the view that FOB USD 70-80/t is the price channel for standard 6 000 kcal/kg is predominant. The disconnection between European and Asian markets is proven as API2 (which is a CIF price) is well below API4, which is a FOB price, in any period considered. The higher contango existing in gas futures (at both the HH and TTF gas hubs) anticipates a slightly better competitiveness of coal versus gas.

Forward curves of API2 and API4, 2020



Source: IHS Markit (2020), Coal Price Data and Indexes.

[5] Index prices for international physical and derivative coal markets.

Coal supply costs

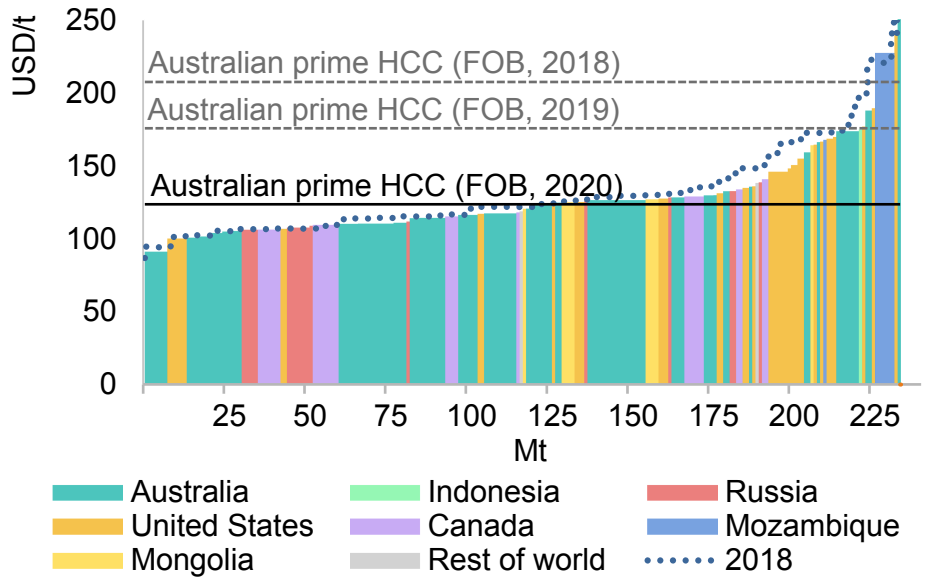
Coal supply costs decreased in 2019, but prices declined more and profitability deteriorated

Coal supply costs for coking coal as well as for the various qualities of thermal coal decreased in 2019 compared with 2018. The average FOB price for Australian prime coking coal in 2019 was about USD 176/t, a y-o-y drop of roughly 15%. In comparison, supply costs for coking coal decreased only slightly, indicating that the profitability of met coal production decreased.

The supply cost curve for both high and low calorific thermal coal decreased from 2018 to 2019. Average supply costs decreased in all countries, particularly in Colombia and Indonesia, driven by falling fuel prices. Total seaborne thermal coal supply increased by around 30 Mt in 2019; Indonesia in particular increased its output. In 2019 the average FOB price for Australian thermal coal with a CV of 6 000 kcal/kg was about USD 76/t, a decrease of roughly 28% from 2018, indicating a decrease in thermal coal production profitability for high CV coal. Producers of low calorific thermal coal also faced falling prices in 2019. Our analyses indicate that producers that were barely profitable in 2018 were struggling in 2019.

Further declines characterise 2020 and the drop in coal prices put producers under additional pressure. Mining costs, e.g. for diesel fuel, also fell at the beginning of the year, though fuel prices rebounded in mid-2020. Mining saw increased cost for safety measures and social distancing measures related to the pandemic, while coal prices remained low. These factors, among others, mean that a large share of the world's coal mines were not able to operate profitably in 2020, with better economics for coking than for thermal coal.

Indicative hard coking coal FOB supply curve 2019 and average FOB marker prices

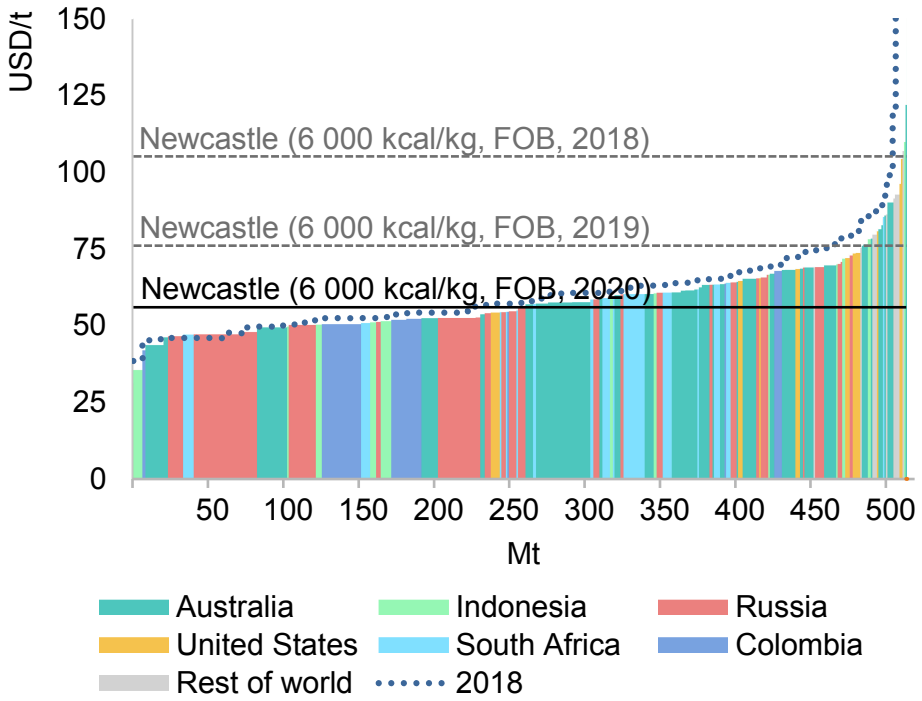


Note: The cost curves account for variable production costs, overburden removal, royalties, inland transportation and port usage fees. The annual average FOB marker price is based on the monthly average index from Australian prime hard coking coal (HCC). The 2020 price is based on the monthly average January-October.

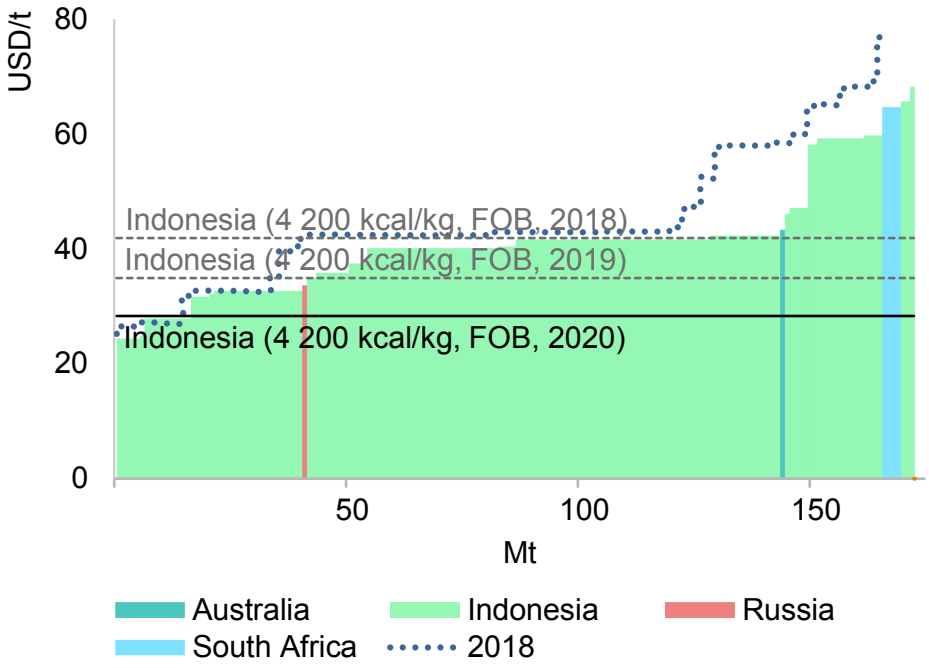
Sources: Adapted from CRU (2020), Thermal Cost Model (database); IHS Markit (2020), Coal Price Data and Indexes.

Many thermal coal mines were not able to turn a profit in 2020

Indicative high calorific (> 5 700 kcal/kg) thermal coal FOB supply curve 2019 and average FOB marker prices



Indicative low calorific (< 4 500 kcal/kg) thermal coal FOB supply curve 2019 and average FOB marker prices



Note: The cost curves account for variable production costs, overburden removal, royalties, inland transportation and port usage fees. The cost curve is not adjusted for different qualities of coal. The transportation costs given are to the closest port, so the FOB costs of Russian producers in Asia are somewhat higher than the figure shows. The annual average FOB marker price is based on the monthly average index from Newcastle/Indonesian steam coal. The 2020 prices are based on the monthly average January-October.

Source: Adapted from CRU (2020), Thermal Cost Model (database); IHS Markit (2020), Coal Price Data and Indexes.

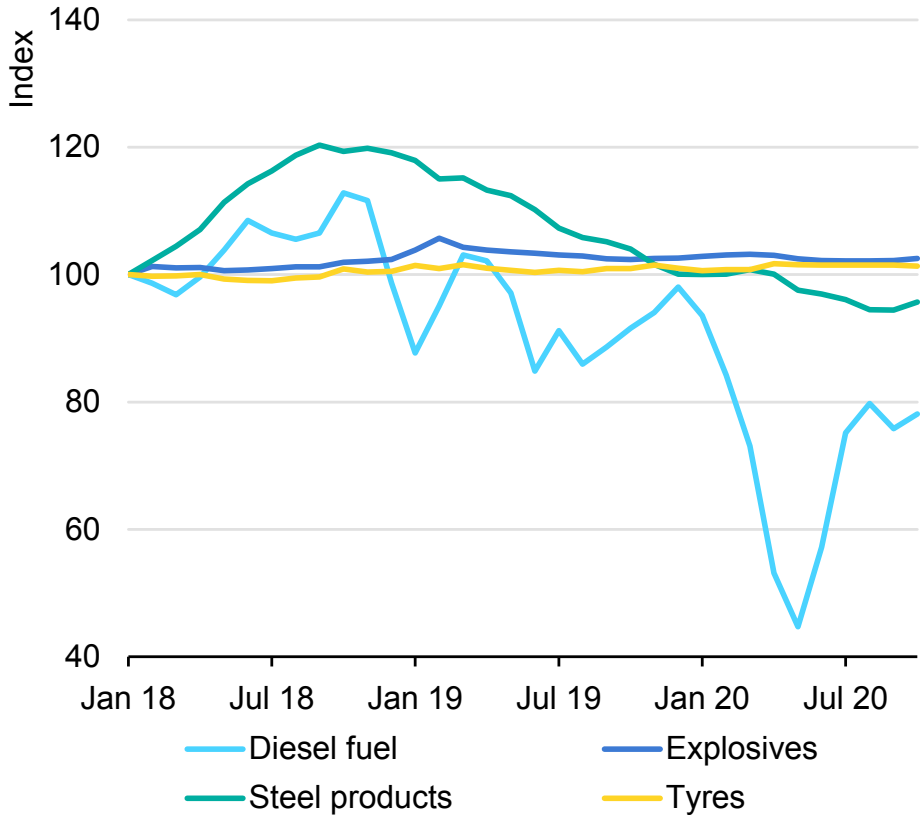
Prices for steel and diesel used in coal mining declined in 2020

The cost structure of coal mining is determined mostly by operating expenses such as mining cash costs (e.g. labour, fuel, taxes and royalties) and transportation expenditures (e.g. inland transportation, port fees and seaborne freight rates). The proportions of these costs depend on the mining method, i.e. surface or underground mining, and can vary significantly depending on the producer, country and specific mine location.

Input factors such as fuel, explosives, tyres and steel products are internationally traded and prices follow global trends. Prices for tyres and explosives have remained stable over recent years. Prices for steel products rose from 2016 until the middle of 2018. Since then, steel product prices have weakened against a backdrop of trade friction, uncertain outlook for demand growth and persistence of excess production capacity. On average, diesel fuel prices were 10% lower in 2019 than the previous year.

Oil prices dropped sharply in the first-quarter 2020 and were reflected in diesel prices, which in June fell to the lowest level since 2003. As global oil prices increased, nearly doubling from June to July, so too, did fuel costs for coal producers.

Nominal prices of selected commodities and input factors used in coal mining, 2018-2020



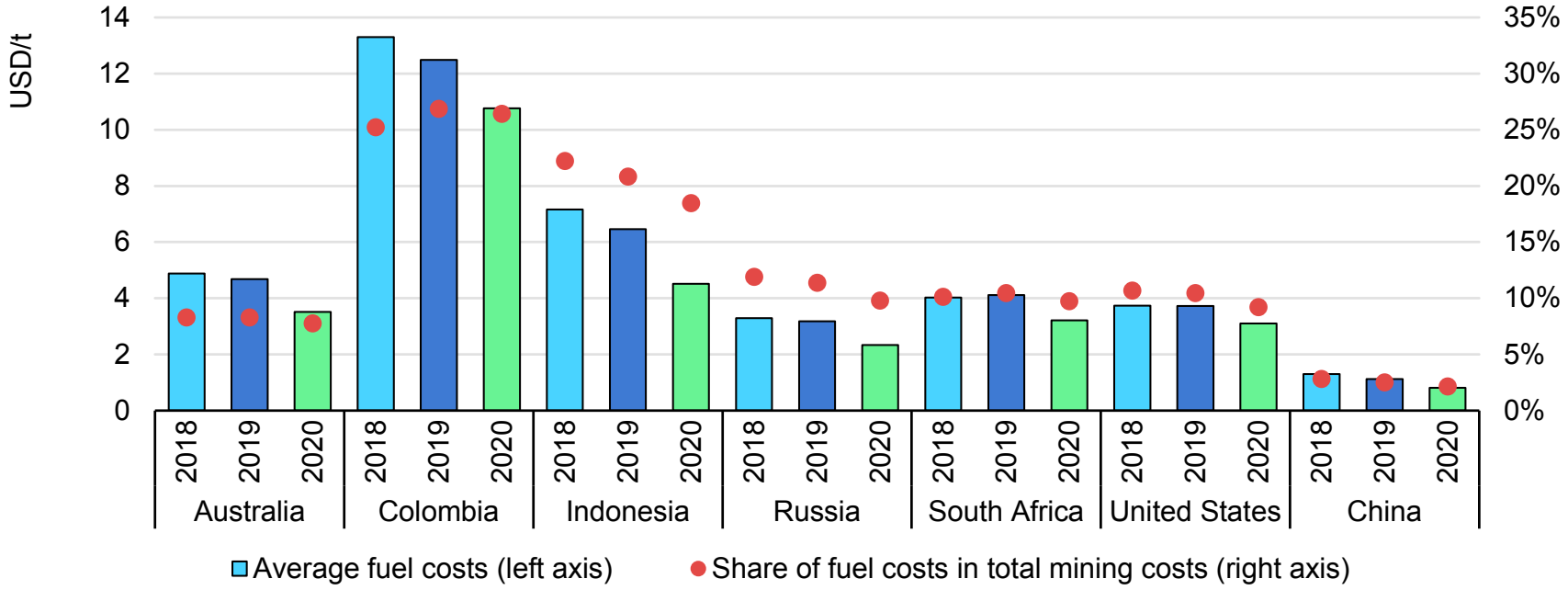
Source: US Bureau of Labour Statistics (2020), Producer Price Indexes.

Major drop in average fuel costs in 2020

Decreasing diesel prices cut coal mining operating costs, especially for operators of opencast mines that rely on diesel trucks and other equipment. Low fuel costs particularly benefit countries with mainly opencast mines such as in Indonesia.

Average fuel costs declined in 2019 due to lower diesel prices. In 2020 these effects where strengthened due to the pandemic and the consequent sharp drop in diesel prices, resulting in further declines in average fuel costs. In most countries lower average fuel costs translate to a lower proportion in total mining supply costs.

Average fuel costs and share in total coal mining costs in selected countries, 2018-2020

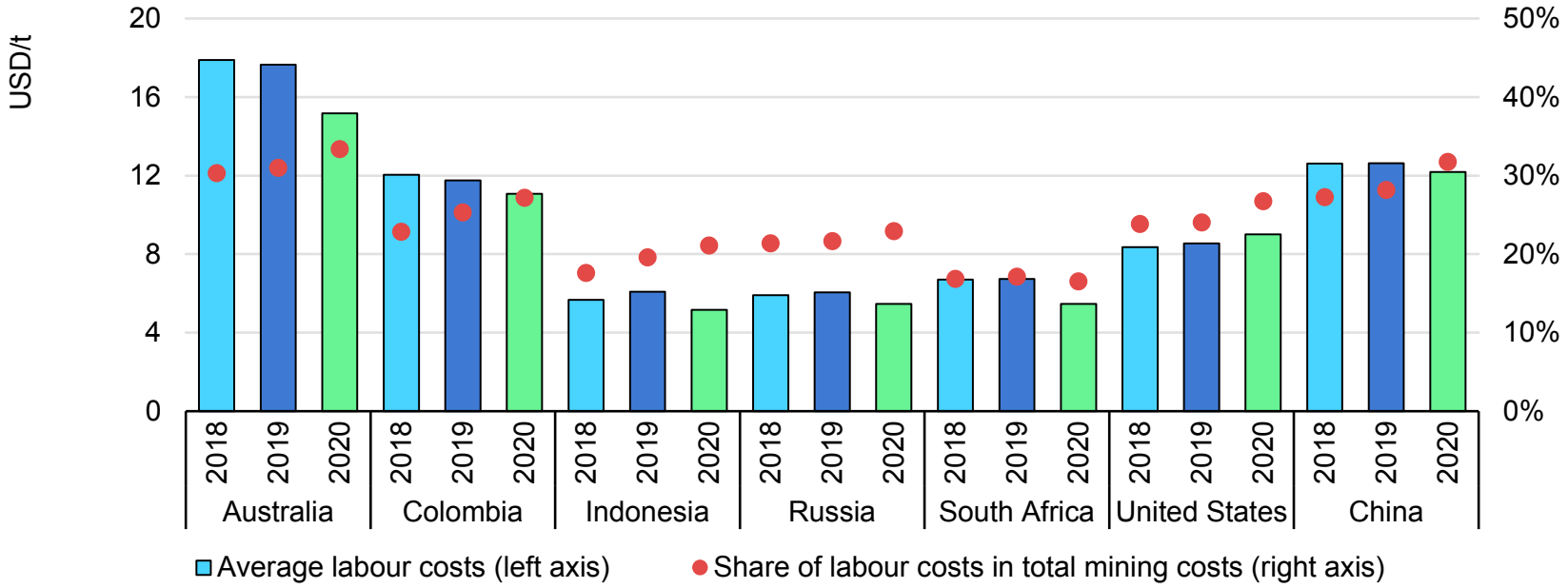


Source: Adapted from CRU (2020), Thermal Cost Model (database).

Average labour costs in mining are impacted by economic slowdown and currency depreciation in 2020

The development of labour costs differs among coal exporting countries (China is included because the domestic coastal coal trade of more than 700Mt is comparable with global trade). For most, labour costs were relatively stable from 2018 to 2019. Average labour costs in 2020 declined in most countries, though not in the United States, driven by currency depreciation against the US dollar. The share of labour costs in total mining costs therefore increased in 2019 as well as in 2020 because this relative development is also driven by cost declines for other inputs, e.g. fuel.

Average labour costs and share in total coal mining costs in selected countries, 2018-2020



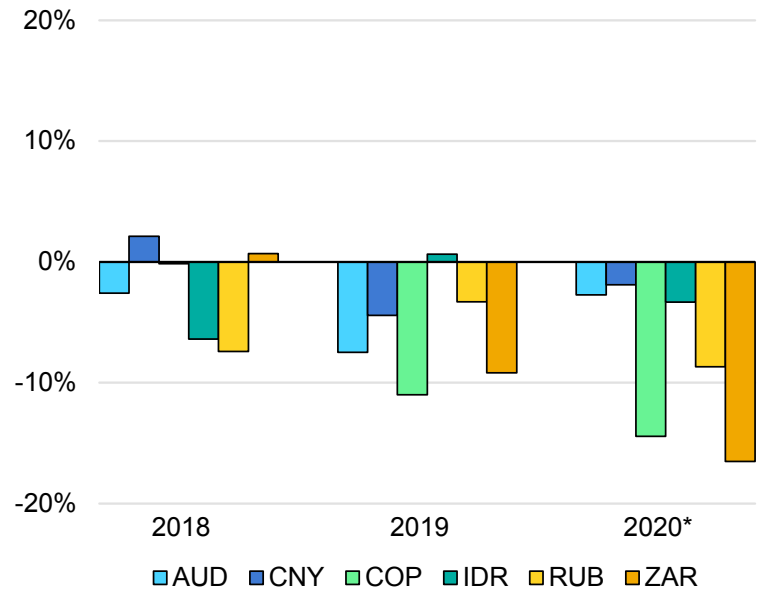
Source: Adapted from CRU (2020), Thermal Cost Model (database).

A strong US dollar increases the competitiveness of other exporters

Currency exchange rates can have significant effects on a coal exporter's competitiveness. While revenue streams from coal are largely in US dollars (USD), operating costs such as labour, railway tariffs, port charges and royalties are settled in local currencies. Therefore a depreciation in local currencies implies a reduction in operating costs for the producer, increasing its competitiveness. Currency exchange rates also influence importer's purchase power and the relative competitiveness of imported coal against substitutes such as domestic lignite or natural gas.

In 2018, and especially in 2019, most currencies of coal exporting countries depreciated against the US dollar as it was supported by relatively strong growth in the United States against the backdrop of weakened global growth and trade frictions. In 2020, driven by the worldwide economic crisis related to the Covid-19 pandemic, currencies of the major coal exporting countries depreciated against the USD. In particular, the emerging markets of South Africa and Colombia have been heavily affected. In the case of Colombia, this is due in particular to its dependence on the price of oil. It is obvious that Indonesia and Australia have not improved competitiveness as much as the other majors, especially Australia, as the Australian dollar has gained some ground versus the US dollar since March 2020.

Year-on-year development of selected currencies against the US dollar, 2018-2020



* 2020 represents average exchange rates to September 2020 for all currencies except the AUD which is to October 2020.

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

Source: OECD (2020), Monthly Monetary and Financial Statistics (MEI): Exchange rates (USD monthly averages).

Freight rates fluctuated with pandemic pressures

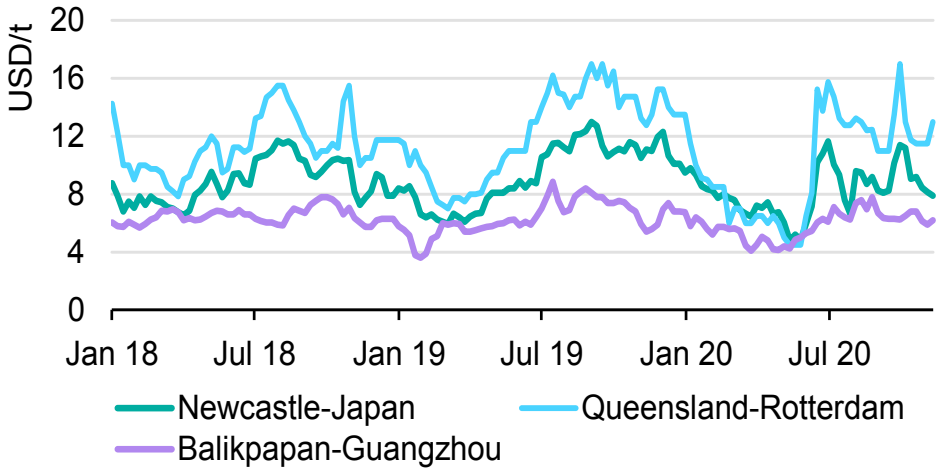
More than 90% of coal trade is seaborne. Plus seaborne coal trade is around one-quarter of total seaborne dry bulk trade by mass, ahead of grain (9%) and slightly behind iron ore (28%). Dry bulk vessels are categorised according to their deadweight tonnage (dwt), which is a measure of how much weight a ship can carry, (and includes fuel, fresh water, ballast and other provisions for the ship). There are four main vessel types: Handysize; Handymax/Supramax; Panamax; and Capesize. The most commonly used vessels are the Panamax (60 000 - 80 000 dwt) and Capesize (over 80 000 dwt).

Costs of dry bulk shipping are determined largely by fuel prices. Final freight rates are further determined by supply and demand. For instance, at the beginning of 2019, low iron ore imports to China combined with moderate coal imports put pressure on freight rates. Freight rates recovered in the second- and third-quarters of 2019. This was due to a combination of surging iron ore exports from Brazil and a reduction in available vessels related to ships being retrofitted with scrubbers to comply with the IMO-2020 regulation to curb sulphur levels in ship fuels that came into force 1 January 2020. In fourth-quarter 2019, freight rates came under pressure due to a decline in demand as well as a surplus of ships.

In the wake of the collapse in demand for coal and iron ore triggered by the Covid-19 pandemic, freight rates plummeted in the first-quarter 2020. In particular this affects the freight rates on the Queensland-Rotterdam and Newcastle-Japan routes operated mainly by Capesize vessels. Freight rates from Indonesia to China, where mainly Panamax vessels are used, were less impacted by the pandemic. This is partly due to the fact that grain transport, which is also mainly carried out by Panamax vessels, was less affected than the transport of iron ore.

The rebound of the steel industry in China led to a sharp recovery in freight rates by mid-2020. Freight rates spiked again in early October, as China's booming demand for iron ore was met by surging Brazilian exports.

Freight rates on selected routes, 2018-2020



Source: IHS Markit (2020), Coal Price Data and Indexes.

Coal mining projects

Australia, Russia and South Africa are the focus of investment in export-oriented coal mining

Investments in export-oriented coal mining projects are under consideration in a number of countries. They are at various stages in the development process and here are classified as "more-advanced" and "less-advanced" [6].

More-advanced projects under development represent about 93 Mtpa of coal mining capacity, of which about 69% are for metallurgical (met) coal though it is less than 20% of coal demand and around one-third of international trade. Most of the more-advanced projects are in Australia (41%), Russia (22%) or South Africa (19%). Most of the projects in Australia and Russia are for met coal, while most in South Africa are for thermal coal.

The pipeline of more-advanced projects is sufficient to sustain the trend of expanding production capacity seen in recent years. However, disruptions due to the Covid-19 pandemic could have a dampening effect on the implementation of specific projects.

Less-advanced projects under development represent about 819 Mtpa of coal mining capacity, of which about 66% is planned in Australia. This partially reflects that Australia is more transparent than other countries with respect to proposed coal developments, as well as that both its resource base and the legal and regulatory framework are favourable to attract investors and project development companies.

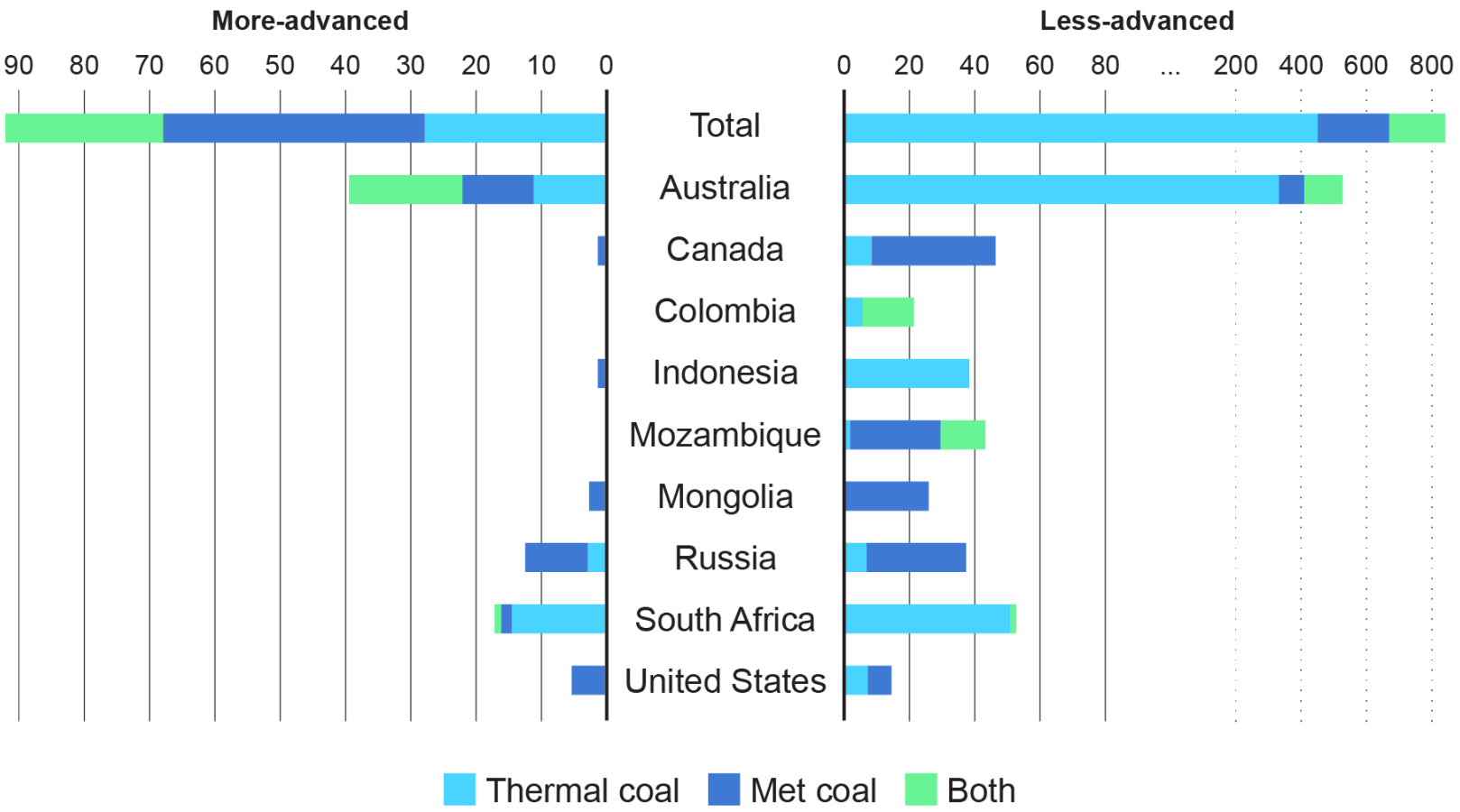
In Annex 2, a non-exhaustive list of coal mining projects in the major exporting countries is attached.

Investments in coal-related infrastructure are commonly linked to coal mining developments. For instance, as Russia proceeds to increase coal production and exports, investments are being made in the related transport infrastructure such as the Elegest-Kyzyl-Kuragino railway line, one of the largest infrastructure projects in modern Russian history. In Australia, the most significant expansion is led by Bravus Mining and Resources (former Adani Mining), an Indian company, and investment plans include a 189 km railway line to connect their Carmichael mine with the existing rail network. In South Africa, Transnet, the rail operator, is well underway to develop rail infrastructure to connect Limpopo and Richards Bay. Feasibility studies to extend this rail line to the Mmamabula Coalfield in Botswana are in progress.

[6] In this classification, at a minimum more-advanced projects have been approved and obtained a final investment decision, or are under construction. Less-advanced projects are at a feasibility or environmental assessment stage, or they are awaiting approval.

More-advanced coal mining projects are in Australia, Russia and South Africa

Capacity of hard coal export mining projects by country and coal grade (Mtpa)



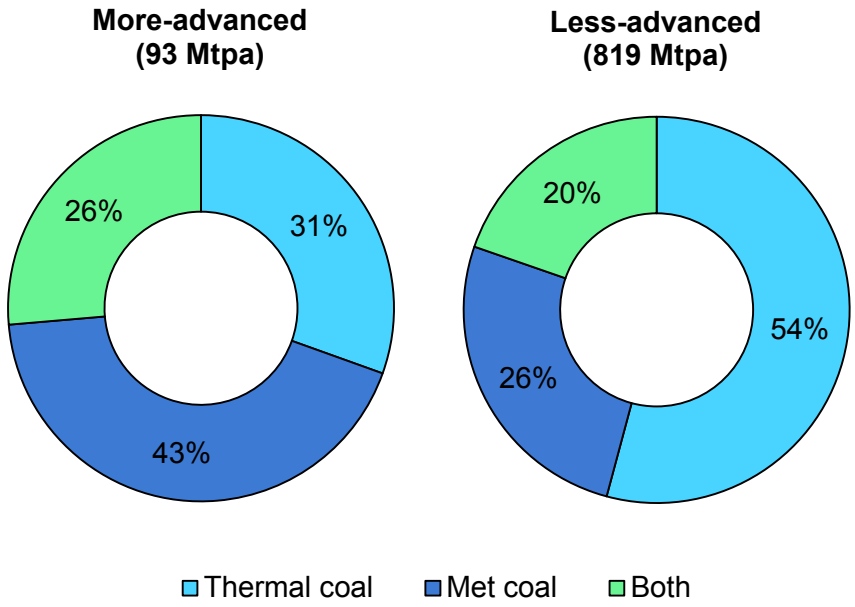
Investment in metallurgical coal appears to prosper, though it has a smaller market share

More-advanced coal mining projects focus mainly on coking coal and include 40 Mtpa capacity of met coal and cumulative capacity of 24 Mtpa to produce both met and thermal coal. Even though thermal coal has triple the market size of met coal, met coal projects appear to be favourable to investors. By contrast, thermal coal projects account for 54% of the less-advanced projects.

The stronger investor interest in met coal projects can be attributed to the risk and uncertainties linked to thermal coal projects posed by climate change policies and public opposition. Coal-fired generation has readily available substitutes that have become more economical in recent years and are climate-friendly such as wind and solar PV for power generation. By contrast, substitution of steel production from iron ore at scale without coal is not expected in the near term. This is illustrated in the European Union, which despite its policies to eliminate thermal coal from the energy mix, has included coking coal in its list of critical raw materials. This is also reflected in the behaviour of some companies, like BHP's decision to focus on higher quality coking coal and to sell its 80% stake in Australia's BHP Mitsui Coal joint venture that mines thermal coal. Anglo American has also announced intentions to reduce its exposure to thermal coal, while maintaining coking coal production.

An important caveat to analyse the data above comes from the different visibility of the different exporting countries. Whereas in Australia, where most of met coal projects are located, the list is exhaustive, in other countries projects are more difficult to track.

Coal grades in hard coal export mining projects



Australia leads in expanding export-oriented coal mining capacity

Several mining projects in Australia recently announced the start of operations. Mach Energy's Mount Pleasant thermal coal project in New South Wales reached production in late December 2018 just over two years after construction commenced, with the target to reach 10.5 Mtpa of run-of-mine coal. In Queensland, the Bluff PCI coal mine (target of 12 Mtpa) shipped first coal in July 2019. The project is owned by Wealth Mining, a subsidiary of China Kingho Energy Group. Also in Queensland, QCoal's Byerwen Coal Project commenced shipments of met coal in 2019. The opencast mine could reach a production rate of 10 Mtpa met coal in 2021 after significant site expansion.

A third of the world's more-advanced coal mining projects are located in Australia, mostly in Queensland, with total capacity of 38 Mtpa. Capacity of 27 Mtpa may begin operation by 2021.

Construction of phase 1 (10 Mtpa) of Bravus's Carmichael thermal coal mine (former Adani Mining) started in June 2019, with first coal to be shipped in 2021. Work on the 189 km rail project to transport coal from the Carmichael mine to the Port of Abbot Point commenced in July 2020. The narrow gauge rail line with a transport capacity of 40 Mtpa will connect the mine to the existing Goonyella rail system. In 2020 Adani launched its own rail business to transport coal to Abbot Point, as rail operators capable of hauling coal from Carmichael mine came under pressure from activists and shareholders. The step increases the upfront capital costs of the project, while Adani avoids being locked into take-or-pay contracts with rail operators.

In September 2020, Pembroke was granted mining leases for the Olive Downs coking coal project, allowing project construction to start. First coal from the AUD 1 billion opencast mine is expected in 2022. The first stage has an expected production rate of 4.5 Mtpa of met coal. Subsequent expansion could increase production to 15 Mtpa. The construction of an 18 km rail spur, connecting the mine to the Norwich Park Branch Railway, is also planned for 2021.

In April 2020, Sojitz Coal Mining and Futura Resources signed an agreement to start production at Futura's new Wilton coal mine in Queensland. When in full operation the mine together with the adjacent Fairhill mine will have an annual output of around 3 Mtpa of met coal.

Yancoal Australia got approval for their Cameby Downs coal mine expansion in May 2019. The approval allows for an increase in production from 2.8 Mtpa to 3.5 Mtpa of thermal coal as well as for an increase in the lifetime of the mine.

Anglo-American approved the Aquila project in July 2019. The AUD 400 million met coal project extends the life of the Capcoal project by six years to 2028. Anglo-American claims that the Aquila project will be one of the most advanced underground mines in the world. Production is scheduled to start in 2022.

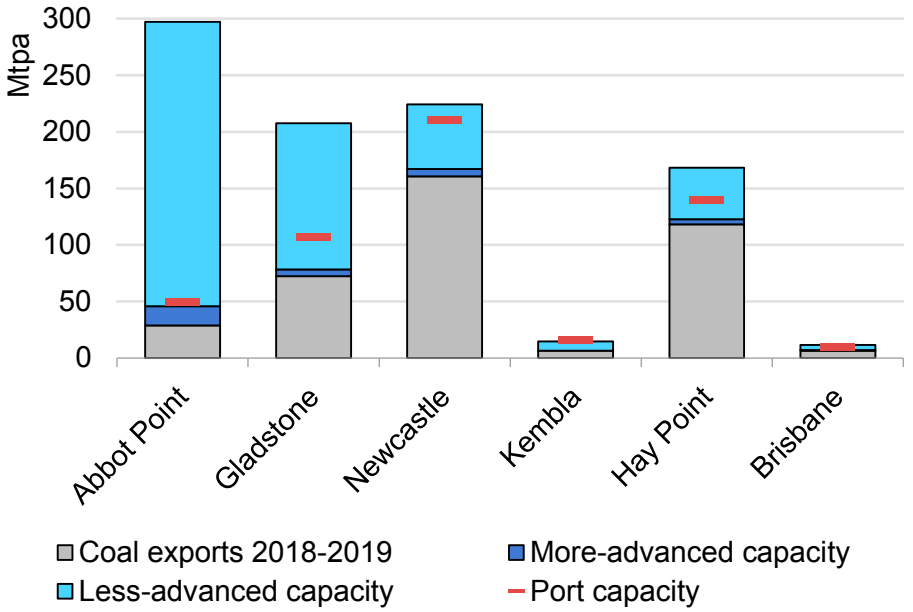
Another project well under way is the expansion of Coronado's Curragh mine. Production is scheduled to increase by 2 Mtpa by 2023. In the course of the expansion, Coronado also intends to increase the capacity and efficiency of the affiliated coal handling and preparation plant.

In July 2020 the New South Wales Mineral Council published a report on 32 mining projects and their economic impact in the region. Coal mining projects account for 21 of those projects with a projected total

investment volume of over AUD 6 billion. The report attributes the realisation of these projects as an important contribution in the post-Covid economic recovery. Of these coal mining projects, the United-Wambo project by Glencore and Peabody is the only one categorised as more-advanced. The 6.5 Mtpa expansion of the thermal and met coal mine with an investment of around AUD 207 million is currently under construction.

As production capacity in Queensland continues to expand, the question of further expansion of the export infrastructure arises. As the majority of development projects are located in Central Queensland the ports on the east coast, i.e. Abbot Point, Gladstone and Hay Point, could become a bottleneck, in particular, if further development of the Galilee Basin occurs, which is far from certain.

Australian coal exports, capacity of coal export mining projects and annual export capacity by port



Notes: Gladstone includes RG Tanna Coal Terminal and Wiggins Island Coal Export Terminal. Hay Point includes Dalrymple Bay Coal Terminal and Hay Point Services Coal Terminal.

Major investment projects in South Africa are in progress

Two new coal mines sold their first coal in 2019 overcoming financial and permit challenges. One was the Exxaro Resources' Belfast coal mine in Mpumalaga which sold first coal in May 2019. It is a ZAR 3.30 billion project, with an output estimated at 2.7 Mtpa, that includes an opencast mine, handling and preparation plant, and supporting infrastructure and services. The second, also located in Mpumalaga, the Impumelelo underground mine, officially opened in April 2019. With an estimated output of 8.5 Mtpa, Impumelelo was built to replace Sasol Mining's Brandspruit mine.

South Africa has the third-highest estimated production capacity (16.9 Mtpa) in the more-advanced project category and most are greenfield projects. Mines that have the potential to start operations in 2021 represent about 11.4 Mtpa.

Construction work on Resource Generation's Boikarabelo project – the largest coal mining project in South Africa – started in April 2013. Completion was scheduled for September 2018, but financial issues have delayed it at least to 2021 with an expected first phase production of 6 Mtpa. A doubling of production levels is foreseen in the long-run, though financial issues are expected to be a challenge.

Transnet's rail project to connect Limpopo and Mpumalaga could benefit the Boikarabelo project. Transnet plans to increase rail capacity connecting the Waterberg mine in Limpopo to Richards Bay. The first stage of the project was scheduled to increase rail capacity on the line between Lephalale and Ermelo from 3.6 Mtpa to 9.5 Mtpa, with a second phase scheduled to be increased to 13.8 Mtpa. However, it is not clear if and when Boikarabelo will go ahead.

In addition to Exxaro's Grootegeluk and the Boikarabelo projects, coal producers in Botswana hope to export coal via the rail line. Feasibility studies on the connection of the rail line to the Mmamabula Coalfield in Botswana are in progress, lifting the outlook for Botswana's coal mining sector. Construction could start in 2021 or 2022.

Construction for Phase 1 of MC Mining's Makhado hard coking and thermal coal project in the Soutpansberg coalfield in the Limpopo province could start in 2021. MC Mining concluded a coal purchase agreement for 0.4 Mtpa of hard coking coal with Huadong Coal Trading Centre, a Chinese state-owned enterprise, in 2018. MC Mining also concluded an offtake agreement for at least 0.35 Mtpa with steelmaker ArcelorMittal South Africa in July 2019.

Russia aims to expand domestic coal production and exports

Russia aims to expand domestic coal production to 448-530 Mtpa by 2024 and 485-668 Mtpa by 2035, while doubling coal exports during this period. These objectives were adopted in June 2020 as part of Russia's Energy Strategy to 2035. At least 20.3 Mtpa of capacity expansions are categorised as more-advanced. Most of these projects are expected to produce coking coal.

This focus on exports requires expanded rail and coal export terminal facilities. A number of investments in both railway and port infrastructure have been announced in recent years.

A particularly ambitious project is the construction of a rail connection between Tuva, a Siberian Republic bordering Mongolia, and the rail network of the rest of the country. The connection would allow for the development of the coal deposits of the Ulug-Khemsky Basin located in the Tuva Republic. First trains on the 410 km Elegest-Kyzyl-Kuragino railway line are planned for 2023. Cargo transport capacity of 14 Mtpa is planned for the first phase, which could be expanded to 27 Mtpa. Costs for the rail development are estimated to be about RU 126 billion.

Several port expansion projects were completed in 2019. The new Taman port shipped first coal, becoming one of the largest thermal coal export hubs in the Black Sea. The port has a capacity of 20 Mtpa and can handle Capesize vessels. Exports from Taman port are mainly destined for Turkey. A third export line at Russia's largest coal terminal at Vostochny port in the Far East region was opened in September 2019, which doubles the terminal's loading capacity to 50-55 Mtpa.

The transport capacities of several other ports are planned to be expanded in the coming years. At Port Dickson in the Krasnoyarsk Territory the construction of a coal terminal for shipping coal from the field near the Lemberova River is planned as well as a terminal for shipping coal from the Syradasaisk coal field. SUEK, Russia's largest coal miner, is expanding the port of Vanino in Russia's Far East region, increasing capacity by 80% to 40 Mtpa. Tigers Realm Coal aims to expand its Beringovsky Port, located northeast of the Amaam North coal deposit and their Amaam North Project F mine.

The Lavna coal terminal project in Kola Bay, near Murmansk, has been delayed. The viability of the project is uncertain, particularly given the weakness of the European coal import market.

Tavan Tolgoi is key for expansion in Mongolia

Mongolia aims to expand its coal export capacity by around 27 Mtpa. The plans are for met coal only and mostly at Tavan Tolgoi, the world's largest untapped coking coal deposits, with estimated reserves of 7.4 billion tonnes.

Authorities in Mongolia approved plans in 2018 to sell up to 30% of the state-owned Tavan Tolgoi mine in a proposed initial public offering, which aimed to raise USD 1 billion. Plans for the IPO were shelved in April 2020 as the Covid pandemic disrupted global financial markets. The IPO launch would have been the third attempt to raise money to develop the mine. Therefore, if and when it may be developed is uncertain.

The Tavan Tolgoi mine location is in proximity to the border with China. So development of the mine would crucially require expansion of railway capacity to reach Chinese markets. To this end, Mongolia is taking steps to complete a rail line from the Tavan Tolgoi mine to the border town of Zuunbayarn by the end of 2021. The 415 km rail link is intended to carry up to 30 Mtpa of coal from Tavan Tolgoi to China. Construction began in May 2019 and the first 50 km was completed in August 2020. In China, the rail link will connect to the Ganquan railway to deliver coal to Chinese ports via Shenhua rail lines. Over the long term, developing the mine and the transport infrastructure could increase competition for Australia's dominance in China's import coking coal market.

Russia's 410 km Elegest-Kyzyl-Kuragino railway that is being developed has the potential to be extended to the border with Mongolia. This could open access for Mongolian coal to Asia Pacific markets.

Mongolia is co-operating with Russia to build a 10 Mtpa coal terminal at Zarubina in Primorsky Krai, Posyet Bay. The greenfield project is a joint venture between FESCO Transportation Group, Russia's largest intermodal transport operator, and Erdenes Tavan Tolgoi (Mongolia's coking coal mining company). The main aim of the development is to handle transport flows of Mongolian coal to countries in the Asia Pacific region. The port is planned to begin operations in 2023.

Coking coal is the investment focus in the United States, Canada and Europe

United States

All of the current projects classified as more-advanced are for metallurgical coal and represent 5.6 Mtpa of new capacity.

Arch Resources announced in 2019 that it will spend USD 220 million, mostly with its own funding, on its new Leer South coking coal mine. The mine, which will produce an estimated 3 Mtpa of coking coal, will be similar to Arch Coal's existing Leer longwall mine. Production is set to start in 2021.

Canada

Current development projects in Canada mostly focus on the production of coking coal. The only one classified as more-advanced is the Crown Mountain project in British Columbia. Owned by Jameson Resources, first coal at the 1.7 Mtpa coking coal mine is expected in 2023.

In June 2020, the Province of Alberta loosened restrictions on opencast coal mining to boost its economy which was hit hard by the Covid-19 pandemic and the associated decline in oil prices. The approach could stimulate activity to develop, such as Riverdale Resources' Grassy Mountain project.

Europe

In line with the consideration of coking coal as a critical raw material by the European Union, some small coking coal mining projects are under development, although under challenging conditions.

In the United Kingdom, most coal mines closed in recent years. But there are plans for some new mines, particularly to produce met coal for the steel industry, as well as for export. The Woodhouse Colliery project would be the first new deep coal mine project in the United Kingdom for 30 years. Developers aim for the 3.1 Mtpa coking coal mine to produce first coal in 2022. Other less-advanced projects include: Bank Mining's Highthorn surface mine (3 Mtpa); New Age Exploration's Lochinvar project (1.4 Mtpa); and West Cumbrian Mining's coking coal project in Cumbria (2.1 Mtpa).

Poland

The Polish state-run coal mining company, Jastrzębska Spółka Węglowa, started operations at Bzie-Debina 1-Zachód in September 2019 – Poland's first new coal mine in 25 years. Production at the coking coal mine is scheduled to start in 2022. Prairie Mining Limited proposes to develop additionally the Jan Karski coking coal mine with an estimated capacity of 6.3 Mtpa.

Whereas projects move ahead in Indonesia, it is not the case in Colombia and Mozambique

Colombia

Reduced demand in the Atlantic Basin coal market suppresses plans to expand mining capacity in Colombia. The few proposals are categorised as less-advanced. Of the projects discussed by the companies, Drummond, El Cerrejón and Prodeco, the most likely to expand production would be Drummond. The less-advanced Cerrejón P40 expansion project seems to have been shelved.

Indonesia

Thermal coal is the focus of proposed coal mining projects in Indonesia, most of which are categorised as less-advanced. Lack of transparency in most Indonesian projects makes comparison with other countries difficult.

The only more-advanced coal project in Indonesia is Cokal's Bumi Barito Mineral project. Cokal announced tenders in February 2020 for project development. In November 2020 Cokal contracted PT Harmoni Panca Utama to provide mining services at the 2 Mtpa coking coal and PCI project.

Mozambique

All coal mine development projects in Mozambique are categorised as less-advanced.

Significant projects include the expansion of the Benga Mine in several stages to 15 Mtpa and the adjacent Zambeze Mine with a target production capacity of 12 Mtpa. Both projects are owned by the Indian consortium ICVL, which bought the mine projects from Rio Tinto in 2014.

Annexes

Tables

Coal demand (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**5 650**	**5 720**	**5 597**	**5 718**	**-2.1%**	**2.2%**
China	3 793	3 834	3 814	3 875	-0.5%	1.6%
India	997	979	911	946	-6.9%	3.8%
Japan	183	184	170	171	-7.3%	0.5%
Southeast Asia	292	332	335	357	0.8%	6.6%
North America	**670**	**583**	**478**	**526**	**-17.9%**	**10.0%**
United States	619	532	438	487	-17.7%	11.1%
Central and South America	**52**	**53**	**46**	**45**	**-13.0%**	**-1.7%**
Europe	**799**	**693**	**588**	**602**	**-15.1%**	**2.3%**
European Union	595	484	386	400	-20.2%	3.5%
Middle East	**13**	**13**	**11**	**10**	**-18.1%**	**-12.8%**
Eurasia	**372**	**368**	**340**	**345**	**-7.7%**	**1.5%**
Russia	230	230	214	217	-6.6%	1.3%
Africa	**210**	**197**	**183**	**187**	**-7.3%**	**2.3%**
World	**7 766**	**7 627**	**7 243**	**7 432**	**-5.0%**	**2.6%**

Notes: Mt = million tonnes. Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite demand (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**4 819**	**4 853**	**4 743**	**4 839**	**-2.3%**	**2.0%**
China	3 135	3 143	3 107	3 161	-1.1%	1.8%
India	930	913	859	882	-5.9%	2.6%
Japan	137	138	133	131	-3.2%	-1.6%
Southeast Asia	281	318	322	343	1.2%	6.5%
North America	**644**	**558**	**457**	**503**	**-18.1%**	**10.2%**
United States	601	515	424	471	-17.7%	11.3%
Central and South America	**36**	**38**	**33**	**31**	**-13.8%**	**-5.8%**
Europe	**721**	**621**	**525**	**532**	**-15.6%**	**1.4%**
European Union	529	425	336	344	-21.0%	2.5%
Middle East	**9**	**9**	**7**	**6**	**-23.5%**	**-21.2%**
Eurasia	**284**	**273**	**254**	**254**	**-7.0%**	**0.0%**
Russia	161	156	147	146	-5.8%	-0.4%
Africa	**205**	**193**	**179**	**183**	**-7.2%**	**2.2%**
World	**6 720**	**6 547**	**6 198**	**6 348**	**-5.3%**	**2.4%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Metallurgical coal demand (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**831**	**866**	**855**	**879**	**-1.3%**	**2.9%**
China	657	691	708	714	2.4%	0.8%
India	67	66	52	64	-20.2%	22.7%
Japan	46	46	37	40	-19.6%	8.1%
Southeast Asia	11	14	13	15	-6.4%	9.4%
North America	**26**	**25**	**21**	**23**	**-15.0%**	**7.1%**
United States	18	17	14	15	-15.8%	6.6%
Central and South America	**16**	**15**	**13**	**14**	**-11.1%**	**8.6%**
Europe	**77**	**71**	**63**	**70**	**-11.4%**	**10.1%**
European Union	66	59	51	56	-14.2%	9.8%
Middle East	**4**	**4**	**4**	**4**	**-5.2%**	**3.4%**
Eurasia	**88**	**95**	**86**	**91**	**-9.5%**	**5.9%**
Russia	69	74	68	71	-8.5%	5.0%
Africa	**5**	**4**	**4**	**4**	**-12.3%**	**8.6%**
World	**1 047**	**1 080**	**1 045**	**1 084**	**-3.2%**	**3.7%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Coal production (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**5 538**	**5 779**	**5 592**	**5 662**	**-3.2%**	**1.2%**
China	3 549	3 693	3 690	3 685	-0.1%	-0.1%
India	790	783	743	771	-5.1%	3.7%
Australia	489	505	459	476	-9.1%	3.7%
Indonesia	548	616	529	545	-14.2%	3.0%
North America	**759**	**709**	**556**	**604**	**-21.6%**	**8.5%**
United States	686	640	491	539	-23.3%	9.9%
Central and South America	**92**	**90**	**65**	**62**	**-28.2%**	**-3.4%**
Europe	**594**	**535**	**450**	**461**	**-15.9%**	**2.5%**
European Union	441	373	297	308	-20.5%	4.0%
Middle East	**2**	**2**	**2**	**2**	**-7.5%**	**6.6%**
Eurasia	**573**	**569**	**525**	**529**	**-7.8%**	**0.9%**
Russia	430	430	394	397	-8.3%	0.6%
Africa	**276**	**268**	**248**	**254**	**-7.5%**	**2.2%**
World	**7 833**	**7 953**	**7 438**	**7 575**	**-6.5%**	**1.8%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite production (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**4 731**	**4 937**	**4 780**	**4 826**	**-3.2%**	**0.9%**
China	2 961	3 081	3 086	3 074	0.1%	-0.4%
India	782	777	737	765	-5.1%	3.7%
Australia	311	318	290	293	-8.9%	1.0%
Indonesia	543	610	523	538	-14.4%	3.0%
North America	**648**	**604**	**469**	**514**	**-22.4%**	**9.7%**
United States	612	572	439	487	-23.2%	10.8%
Central and South America	**86**	**85**	**61**	**57**	**-28.7%**	**-5.8%**
Europe	**578**	**520**	**439**	**449**	**-15.7%**	**2.4%**
European Union	425	359	286	297	-20.4%	3.9%
Middle East	**0**	**0**	**0**	**0**	**-31.3%**	**40.0%**
Eurasia	**463**	**451**	**419**	**418**	**-7.1%**	**-0.4%**
Russia	330	322	297	294	-8.0%	-1.0%
Africa	**265**	**260**	**241**	**245**	**-7.1%**	**1.8%**
World	**6 771**	**6 857**	**6 409**	**6 509**	**-6.5%**	**1.6%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Metallurgical coal production (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**808**	**843**	**812**	**836**	**-3.6%**	**3.0%**
China	588	612	605	611	-1.1%	1.0%
India	8	6	6	6	-5.0%	4.0%
Australia	178	187	170	183	-9.4%	8.1%
Indonesia	5	6	6	7	6.3%	7.0%
North America	**111**	**106**	**88**	**90**	**-17.0%**	**2.1%**
United States	74	68	51	53	-24.2%	2.7%
Central and South America	**6**	**5**	**4**	**5**	**-20.4%**	**32.9%**
Europe	**16**	**15**	**12**	**12**	**-22.2%**	**6.2%**
European Union	16	14	11	12	-23.3%	6.4%
Middle East	**1**	**2**	**1**	**2**	**-5.0%**	**4.0%**
Eurasia	**109**	**118**	**105**	**112**	**-10.3%**	**6.1%**
Russia	100	108	98	103	-9.3%	5.5%
Africa	**11**	**9**	**7**	**8**	**-19.3%**	**18.7%**
World	**1 062**	**1 096**	**1 029**	**1 066**	**-6.1%**	**3.5%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Coal imports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Europe	209	175	144	149	-17.7%	3.2%
Japan	189	186	170	171	-8.9%	0.6%
Korea	136	130	118	113	-9.7%	-4.2%
Chinese Taipei	67	67	60	60	-10.5%	-1.5%
China	292	308	292	291	-5.3%	-0.3%
India	227	249	208	220	-16.6%	5.9%
Southeast Asia	115	139	146	156	5.0%	7.1%
Rest of world	169	176	163	164	-7.8%	1.0%
World	**1 404**	**1 432**	**1 300**	**1 323**	**-9.2%**	**1.8%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite imports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Europe	145	115	90	89	-21.4%	-1.3%
Japan	142	140	133	131	-5.4%	-1.6%
Korea	99	93	84	78	-10.2%	-7.0%
Chinese Taipei	58	59	53	51	-10.0%	-3.0%
China	222	227	208	207	-8.3%	-0.3%
India	167	188	157	162	-16.6%	3.4%
Southeast Asia	105	124	131	141	5.5%	7.4%
Rest of world	135	143	131	131	-8.5%	0.4%
World	**1 073**	**1 090**	**987**	**991**	**-9.4%**	**0.4%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Metallurgical coal imports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Europe	64	60	54	60	-10.7%	10.6%
Japan	47	46	37	40	-19.6%	8.5%
Korea	36	37	34	35	-8.2%	2.9%
China	70	81	84	84	3.0%	0.0%
India	60	62	51	58	-16.8%	13.5%
Rest of world	54	56	53	56	-4.6%	4.6%
World	**331**	**342**	**313**	**332**	**-8.5%**	**6.1%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Coal exports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Australia	387	395	366	385	-7.5%	5.3%
Canada	34	36	36	35	-1.8%	-2.4%
Colombia	84	72	58	52	-19.5%	-10.2%
Indonesia	434	455	404	410	-11.2%	1.5%
Russia	210	217	207	207	-4.5%	-0.2%
South Africa	82	81	75	76	-6.6%	0.8%
United States	105	84	59	59	-30.5%	0.0%
Rest of world	99	105	88	100	-16.0%	13.3%
World	**1 434**	**1 445**	**1 292**	**1 323**	**-10.6%**	**2.4%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite exports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Australia	208	213	199	205	-6.5%	.0%
Colombia	82	69	56	49	-19.3%	-12.4%
Indonesia	429	449	398	404	-11.4%	1.4%
Russia	175	184	177	175	-3.9%	-1.4%
South Africa	81	79	74	75	-6.4%	0.6%
United States	48	33	21	21	-37.0%	-2.1%
Rest of world	59	64	58	63	-10.2%	9.8%
World	**1 081**	**1 093**	**983**	**991**	**-10.0%**	**0.8%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Metallurgical coal exports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Australia	179	182	167	180	-8.7%	8.1%
Canada	33	34	33	33	-5.3%	1.0%
Mongolia	27	30	26	29	-15.6%	14.3%
Mozambique	7	5	4	4	-27.4%	25.5%
Russia	35	33	30	32	-7.6%	6.5%
United States	57	51	38	38	-26.2%	1.2%
Rest of world	15	17	13	15	-20.8%	15.5%
World	**352**	**352**	**309**	**332**	**-12.2%**	**7.4%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Coal demand (Mtce), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**4 083**	**4 171**	**4 087**	**4 176**	**-2.0%**	**2.2%**
China	2 844	2 889	2 877	2 922	-0.4%	1.6%
India	575	575	533	556	-7.3%	4.4%
Japan	162	163	150	152	-7.7%	0.7%
Southeast Asia	215	250	253	270	0.9%	6.7%
North America	**496**	**436**	**357**	**394**	**-18.0%**	**10.1%**
United States	459	399	329	365	-17.7%	11.1%
Central and South America	**45**	**46**	**40**	**40**	**-12.6%**	**-0.8%**
Europe	**392**	**334**	**286**	**294**	**-14.6%**	**2.9%**
European Union	302	246	200	207	-19.0%	3.5%
Middle East	**12**	**12**	**10**	**9**	**-17.6%**	**-12.0%**
Eurasia	**273**	**271**	**249**	**254**	**-8.2%**	**2.0%**
Russia	173	173	161	164	-6.9%	1.9%
Africa	**161**	**151**	**140**	**143**	**-7.3%**	**2.4%**
World	**5 462**	**5 421**	**5 168**	**5 308**	**-4.7%**	**2.7%**

Notes: Mtce = million tonnes of coal equivalent. Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite demand (Mtce), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**3 346**	**3 401**	**3 327**	**3 394**	**-2.2%**	**2.0%**
China	2 265	2 279	2 252	2 292	-1.2%	1.8%
India	519	519	488	502	-5.9%	2.7%
Japan	117	119	115	113	-3.2%	-1.6%
Southeast Asia	205	237	240	256	1.4%	6.6%
North America	**468**	**409**	**335**	**369**	**-18.2%**	**10.3%**
United States	440	380	313	348	-17.8%	11.3%
Central and South America	**29**	**30**	**26**	**25**	**-13.3%**	**-5.7%**
Europe	**316**	**264**	**223**	**225**	**-15.5%**	**0.8%**
European Union	238	188	149	151	-20.5%	1.3%
Middle East	**8**	**8**	**6**	**5**	**-23.4%**	**-21.0%**
Eurasia	**188**	**179**	**165**	**165**	**-7.5%**	**0.0%**
Russia	107	101	95	95	-5.8%	-0.2%
Africa	**157**	**146**	**136**	**139**	**-7.1%**	**2.2%**
World	**4 511**	**4 437**	**4 219**	**4 322**	**-4.9%**	**2.5%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Metallurgical coal demand (Mtce), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**737**	**771**	**760**	**782**	**-1.5%**	**2.9%**
China	579	610	624	630	2.3%	0.9%
India	56	55	44	54	-20.2%	22.8%
Japan	44	44	36	39	-19.6%	8.2%
Southeast Asia	11	14	13	14	-6.4%	9.5%
North America	**27**	**27**	**23**	**24**	**-15.1%**	**7.1%**
United States	19	19	16	17	-15.8%	6.7%
Central and South America	**17**	**15**	**14**	**15**	**-11.0%**	**8.6%**
Europe	**76**	**71**	**63**	**69**	**-11.4%**	**10.1%**
European Union	65	59	50	55	-14.2%	9.9%
Middle East	**4**	**4**	**4**	**4**	**-5.2%**	**3.4%**
Eurasia	**85**	**92**	**84**	**89**	**-9.5%**	**6.0%**
Russia	66	72	66	69	-8.5%	5.1%
Africa	**5**	**4**	**4**	**4**	**-12.4%**	**8.8%**
World	**951**	**984**	**949**	**986**	**-3.5%**	**3.9%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Coal production (Mtce), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**4 015**	**4 190**	**4 050**	**4 102**	**-3.3%**	**1.3%**
China	2 657	2 753	2 750	2 747	-0.1%	-0.1%
India	416	410	389	404	-5.1%	3.8%
Australia	414	430	390	406	-9.3%	4.3%
Indonesia	411	460	395	407	-14.1%	3.0%
North America	**581**	**545**	**426**	**462**	**-21.7%**	**8.4%**
United States	527	492	376	413	-23.5%	9.7%
Central and South America	**83**	**81**	**58**	**56**	**-28.1%**	**-3.6%**
Europe	**212**	**189**	**158**	**162**	**-16.6%**	**2.7%**
European Union	168	144	115	119	-19.9%	3.6%
Middle East	**2**	**2**	**2**	**2**	**-7.3%**	**6.3%**
Eurasia	**444**	**440**	**406**	**411**	**-7.6%**	**1.2%**
Russia	348	347	321	324	-7.6%	0.9%
Africa	**225**	**217**	**201**	**206**	**-7.6%**	**2.4%**
World	**5 562**	**5 663**	**5 301**	**5 400**	**-6.4%**	**1.9%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite production (Mtce), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**3 288**	**3 432**	**3 321**	**3 350**	**-3.2%**	**0.9%**
China	2 140	2 217	2 220	2 212	0.1%	-0.4%
India	410	406	385	400	-5.1%	3.8%
Australia	241	248	225	229	-9.2%	1.5%
Indonesia	406	454	389	401	-14.4%	3.0%
North America	**477**	**446**	**345**	**379**	**-22.6%**	**9.9%**
United States	455	426	327	362	-23.4%	10.8%
Central and South America	**78**	**76**	**54**	**51**	**-28.6%**	**-6.1%**
Europe	**196**	**174**	**146**	**150**	**-16.1%**	**2.4%**
European Union	152	130	105	108	-19.5%	3.3%
Middle East	**0**	**0**	**0**	**0**	**-31.3%**	**40.0%**
Eurasia	**338**	**327**	**305**	**304**	**-6.6%**	**-0.5%**
Russia	252	244	227	225	-6.8%	-1.0%
Africa	**214**	**209**	**194**	**197**	**-7.1%**	**1.8%**
World	**4 591**	**4 664**	**4 366**	**4 431**	**-6.4%**	**1.5%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Metallurgical coal production (Mtce), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Asia Pacific	**728**	**758**	**729**	**752**	**-3.8%**	**3.1%**
China	517	536	530	535	-1.1%	1.0%
India	6	4	4	4	-5.0%	3.9%
Australia	173	182	165	178	-9.4%	8.1%
Indonesia	5	6	6	6	6.3%	7.0%
North America	**104**	**98**	**81**	**83**	**-17.7%**	**2.2%**
United States	72	66	50	51	-24.4%	2.7%
Central and South America	**5**	**5**	**4**	**5**	**-20.4%**	**32.9%**
Europe	**16**	**15**	**12**	**12**	**-22.3%**	**6.2%**
European Union	16	14	11	12	-23.4%	6.3%
Middle East	**1**	**1**	**1**	**1**	**-5.0%**	**3.9%**
Eurasia	**105**	**113**	**101**	**107**	**-10.6%**	**6.2%**
Russia	97	103	93	99	-9.6%	5.6%
Africa	**11**	**9**	**7**	**8**	**-19.3%**	**18.4%**
World	**971**	**999**	**935**	**969**	**-6.4%**	**3.6%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Seaborne coal imports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Europe	183	144	120	124	-16.6%	2.9%
Japan	189	186	170	171	-8.9%	0.6%
Korea	136	130	118	113	-9.7%	-4.2%
Chinese Taipei	67	67	60	60	-10.5%	-1.5%
China	260	273	261	257	-4.3%	-1.8%
India	227	249	208	220	-16.6%	5.9%
Southeast Asia	115	139	146	156	5.0%	7.1%
Rest of world	110	126	117	118	-7.3%	0.8%
World	**1 286**	**1 316**	**1 200**	**1 218**	**-8.8%**	**1.5%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Seaborne thermal coal and lignite imports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Europe	120	85	67	65	-20.8%	-3.3%
Japan	142	140	133	131	-5.4%	-1.6%
Korea	99	93	84	78	-10.2%	-7.0%
Chinese Taipei	58	59	53	51	-10.0%	-3.0%
China	217	222	203	202	-8.5%	-0.4%
India	167	188	157	162	-16.6%	3.4%
Southeast Asia	105	124	131	141	5.5%	7.4%
Rest of world	93	104	96	96	-7.6%	0.0%
World	**1 001**	**1 016**	**924**	**927**	**-9.0%**	**0.2%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Seaborne metallurgical coal imports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Europe	63	60	53	59	-10.7%	10.6%
Japan	47	46	37	40	-19.6%	8.5%
Korea	36	37	34	35	-8.2%	2.9%
China	43	51	58	54	13.9%	-6.4%
India	60	62	51	58	-16.8%	13.5%
Rest of world	36	45	42	45	-5.2%	5.3%
World	**285**	**300**	**276**	**291**	**-8.0%**	**5.5%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Seaborne coal exports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Australia	387	395	366	385	-7.5%	5.3%
Canada	33	36	35	34	-1.8%	-2.4%
Colombia	84	72	58	52	-19.5%	-10.2%
Indonesia	434	455	404	410	-11.2%	1.5%
Russia	163	171	172	170	0.3%	-0.9%
South Africa	82	81	75	76	-6.6%	0.8%
United States	95	77	53	53	-31.1%	-0.2%
Rest of world	40	45	29	37	-35.3%	26.9%
World	**1 317**	**1 331**	**1 191**	**1 217**	**-10.5%**	**2.1%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Seaborne thermal coal and lignite exports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Australia	208	213	199	205	-6.5%	3.0%
Colombia	82	69	56	49	-19.3%	-12.4%
Indonesia	429	449	398	404	-11.4%	1.4%
Russia	141	145	148	144	2.1%	-2.4%
South Africa	81	79	74	75	-6.4%	0.6%
United States	43	31	20	19	-35.7%	-1.7%
Rest of world	28	35	26	30	-27.0%	18.2%
World	**1 011**	**1 021**	**920**	**927**	**-9.9%**	**0.7%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Seaborne metallurgical coal exports (Mt), 2018-2021

Region/country	2018	2019	2020	2021	2019-2020	2020-2021
Australia	179	182	167	180	-8.7%	8.1%
Canada	32	34	32	32	-5.4%	1.0%
Mozambique	7	5	4	4	-27.4%	25.5%
Russia	22	27	24	26	-9.1%	7.9%
United States	52	47	34	34	-28.1%	0.6%
Rest of world	14	15	11	14	-27.0%	23.8%
World	**307**	**310**	**271**	**290**	**-12.5%**	**7.2%**

Notes: Data for 2018 and 2019 are from IEA statistics; 2019 are preliminary; 2020 are estimated; 2021 are forecasts. Differences in totals are due to rounding.

Coal demand (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Asia Pacific	**5 650**	**5 718**	**5 896**	**0.4%**	**0.8%**
China	3 793	3 875	3 880	0.7%	0.0%
India	997	946	1 068	-1.7%	3.1%
Japan	183	171	166	-2.2%	-0.7%
Southeast Asia	292	357	415	7.0%	3.8%
North America	**670**	**526**	**394**	**-7.8%**	**-7.0%**
United States	619	487	368	-7.7%	-6.8%
Central and South America	**52**	**45**	**41**	**-4.8%**	**-2.4%**
Europe	**799**	**602**	**519**	**-9.0%**	**-3.6%**
European Union	595	400	302	-12.4%	-6.8%
Middle East	**13**	**10**	**18**	**-10.2%**	**17.9%**
Eurasia	**372**	**345**	**345**	**-2.5%**	**0.0%**
Russia	230	217	210	-1.9%	-0.8%
Africa	**210**	**187**	**195**	**-3.7%**	**1.1%**
World	**7 766**	**7 432**	**7 409**	**-1.5%**	**-0.1%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. CAAGR = compound average annual growth rate. Differences in totals are due to rounding.

Thermal coal and lignite demand (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Asia Pacific	**4 819**	**4 839**	**5 074**	**0.1%**	**1.2%**
China	3 135	3 161	3 231	0.3%	0.5%
India	930	882	995	-1.8%	3.1%
Japan	137	131	128	-1.4%	-0.6%
Southeast Asia	281	343	396	6.9%	3.7%
North America	**644**	**503**	**372**	**-7.9%**	**-7.3%**
United States	601	471	353	-7.8%	-7.0%
Central and South America	**36**	**31**	**27**	**-5.0%**	**-3.4%**
Europe	**721**	**532**	**463**	**-9.7%**	**-3.4%**
European Union	529	344	259	-13.4%	-6.8%
Middle East	**9**	**6**	**13**	**-15.5%**	**24.1%**
Eurasia	**284**	**254**	**256**	**-3.6%**	**0.2%**
Russia	161	146	141	-3.2%	-0.9%
Africa	**205**	**183**	**190**	**-3.7%**	**1.0%**
World	**6 720**	**6 348**	**6 396**	**-1.9%**	**0.2%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Metallurgical coal demand (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Asia Pacific	**831**	**879**	**823**	**1.9%**	**-1.6%**
China	657	714	649	2.8%	-2.4%
India	67	64	73	-1.2%	3.3%
Japan	46	40	38	-4.7%	-1.3%
Southeast Asia	11	15	18	10.4%	5.3%
North America	**26**	**23**	**22**	**-4.3%**	**-0.8%**
United States	18	15	14	-4.5%	-1.7%
Central and South America	**16**	**14**	**14**	**-4.2%**	**-0.3%**
Europe	**77**	**70**	**56**	**-3.4%**	**-5.3%**
European Union	66	56	43	-5.2%	-6.5%
Middle East	**4**	**4**	**5**	**0.7%**	**6.6%**
Eurasia	**88**	**91**	**89**	**1.0%**	**-0.5%**
Russia	69	71	69	1.1%	-0.7%
Africa	**5**	**4**	**5**	**-5.9%**	**3.4%**
World	**1 047**	**1 084**	**1 013**	**1.2%**	**-1.7%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Coal production (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Asia Pacific	**5 538**	**5 662**	**5 671**	**0.7%**	**0.0%**
China	3 549	3 685	3 633	1.3%	-0.4%
India	790	771	850	-0.8%	2.5%
Australia	489	476	457	-0.9%	-1.0%
Indonesia	548	545	542	-0.2%	-0.1%
North America	**759**	**604**	**467**	**-7.3%**	**-6.2%**
United States	686	539	416	-7.7%	-6.3%
Central and South America	**92**	**62**	**65**	**-12.1%**	**0.8%**
Europe	**594**	**461**	**410**	**-8.1%**	**-2.9%**
European Union	441	308	243	-11.2%	-5.7%
Middle East	**2**	**2**	**2**	**0.8%**	**0.0%**
Eurasia	**573**	**529**	**530**	**-2.6%**	**0.0%**
Russia	430	397	392	-2.7%	-0.3%
Africa	**276**	**254**	**264**	**-2.7%**	**1.0%**
World	**7 833**	**7 575**	**7 409**	**-1.1%**	**-0.6%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite production (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Asia Pacific	**4 731**	**4 826**	**4 876**	**0.7%**	**0.3%**
China	2 961	3 074	3 046	1.3%	-0.2%
India	782	765	844	-0.7%	2.5%
Australia	311	293	291	-2.0%	-0.2%
Indonesia	543	538	535	-0.3%	-0.1%
North America	**648**	**514**	**384**	**-7.4%**	**-7.0%**
United States	612	487	367	-7.4%	-6.8%
Central and South America	**86**	**57**	**60**	**-12.9%**	**1.2%**
Europe	**578**	**449**	**399**	**-8.1%**	**-2.9%**
European Union	425	297	233	-11.3%	-5.9%
Middle East	**0**	**0**	**0**	**-1.3%**	**0.0%**
Eurasia	**463**	**418**	**420**	**-3.4%**	**0.2%**
Russia	330	294	292	-3.8%	-0.1%
Africa	**265**	**245**	**255**	**-2.5%**	**1.0%**
World	**6 771**	**6 509**	**6 395**	**-1.3%**	**-0.4%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Metallurgical coal production (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Asia Pacific	**808**	**836**	**794**	**1.2%**	**-1.3%**
China	588	611	587	1.3%	-1.0%
India	8	6	6	-7.5%	0.0%
Australia	178	183	166	1.0%	-2.4%
Indonesia	5	7	7	8.5%	0.4%
North America	**111**	**90**	**84**	**-6.8%**	**-1.7%**
United States	74	53	49	-10.6%	-1.6%
Central and South America	**6**	**5**	**5**	**-1.0%**	**-3.2%**
Europe	**16**	**12**	**11**	**-8.9%**	**-2.7%**
European Union	16	12	10	-9.9%	-2.9%
Middle East	**1**	**2**	**2**	**1.0%**	**0.0%**
Eurasia	**109**	**112**	**110**	**0.8%**	**-0.5%**
Russia	100	103	100	0.9%	-0.6%
Africa	**11**	**8**	**8**	**-9.2%**	**-0.2%**
World	**1 062**	**1 066**	**1 014**	**0.1%**	**-1.2%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Coal imports (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Europe	209	149	116	-10.7%	-6.1%
Japan	189	171	166	-3.4%	-0.7%
Korea	136	113	106	-6.0%	-1.6%
Chinese Taipei	67	60	59	-3.6%	-0.1%
China	292	291	251	-0.1%	-3.6%
India	227	220	218	-1.1%	-0.2%
Southeast Asia	115	156	177	10.6%	3.2%
Rest of world	169	164	178	-1.0%	2.0%
World	**1 404**	**1 323**	**1 271**	**-2.0%**	**-1.0%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite imports (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Europe	145	89	68	-14.9%	-6.7%
Japan	142	131	128	-2.9%	-0.6%
Korea	99	78	74	-7.8%	-1.3%
Chinese Taipei	58	51	49	-3.7%	-1.0%
China	222	207	190	-2.2%	-2.2%
India	167	162	151	-1.1%	-1.7%
Southeast Asia	105	141	160	10.5%	3.2%
Rest of world	135	131	143	-0.9%	2.2%
World	**1 073**	**991**	**962**	**-2.6%**	**-0.7%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Metallurgical coal imports (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Europe	64	60	48	-2.2%	-5.1%
Japan	47	40	38	-4.9%	-1.3%
Korea	36	35	32	-1.4%	-2.2%
China	70	84	62	6.1%	-7.4%
India	60	58	67	-1.1%	3.7%
Rest of world	54	56	62	1.0%	2.5%
World	**331**	**332**	**308**	**0.1%**	**-1.8%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Coal exports (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Australia	387	385	371	-0.1%	-0.9%
Canada	34	35	33	0.9%	-1.2%
Colombia	84	52	54	-14.8%	1.1%
Indonesia	434	410	375	-1.9%	-2.2%
Russia	210	207	212	-0.5%	0.6%
South Africa	82	76	77	-2.4%	0.3%
United States	105	59	55	-17.7%	-1.7%
Rest of world	99	100	94	0.4%	-1.5%
World	**1 434**	**1 323**	**1 271**	**-2.6%**	**-1.0%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Thermal coal and lignite exports (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Australia	208	205	208	-0.4%	0.4%
Colombia	82	49	52	-15.6%	1.5%
Indonesia	429	404	370	-2.0%	-2.2%
Russia	175	175	180	-0.2%	0.8%
South Africa	81	75	76	-2.6%	0.3%
United States	48	21	19	-24.7%	-2.0%
Rest of world	59	63	58	2.7%	-2.2%
World	**1 081**	**991**	**963**	**-2.9%**	**-0.7%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Met coal exports (Mt), 2018-2025

Region/country	2018	2021	2025	CAAGR 2018-2021	CAAGR 2021-2025
Australia	179	180	163	0.2%	-2.5%
Canada	33	33	31	0.1%	-1.6%
Mongolia	27	29	28	2.4%	-0.9%
Mozambique	7	4	4	-13.6%	0.0%
Russia	35	32	32	-2.0%	-0.4%
United States	57	38	36	-12.5%	-1.5%
Rest of world	15	15	14	-0.6%	-2.1%
World	**352**	**332**	**308**	**-2.0%**	**-1.9%**

Notes: Data for 2018 from IEA statistics; 2021 and 2025 are forecasts. Differences in totals are due to rounding.

Definitions

Coal: Coal is a solid, combustible fossil sedimentary rock. Coal comes from buried vegetation transformed by the action of high pressure and 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 as 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)**:** 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 previous to 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 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. Power shovels, conveyor belts and trucks may be used to remove the coal as well as some extremely large machinery, such as draglines or bucket wheels. Opencast mining is usually less labour-

intensive than underground mining, but has higher consumable costs, e.g. 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 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.

Regional groupings

Africa – Algeria, Angola, Benin, Botswana, Cameroon, Congo, Democratic Republic of the Congo, Côte d'Ivoire, Egypt, Eritrea, Ethiopia, Gabon, Ghana, Kenya, Libya, Morocco, Mozambique, Namibia, Nigeria, Senegal, South Africa, Sudan, United Republic of Tanzania, Togo, Tunisia, Zambia, Zimbabwe and other African countries and territories.[1]

Asia Pacific – Australia, Bangladesh, Brunei Darussalam, Cambodia, Chinese Taipei, India, Indonesia, Japan, Korea, Democratic People's Republic of Korea, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, People's Republic of China,[2] Philippines, Singapore, Sri Lanka, Thailand, Viet Nam and other Asian countries, territories and economies.[3]

Central and South America – Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela and other Latin American countries and territories.[4]

Eurasia – Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

Europe – Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus,[5,6] Czech Republic, Denmark, Estonia, Finland, North Macedonia, France, Germany, Gibraltar, Greece, Hungary, Iceland, Ireland, Italy, Kosovo,[7] Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

European Union – Austria, Belgium, Bulgaria, Croatia, Cyprus,[5,6] 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, Iraq, Israel,[8] Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen.

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[1] Individual data are not available and are estimated in aggregate for: Burkina Faso, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Djibouti, Gambia, Equatorial Guinea, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Niger, Reunion, Rwanda, Sao Tome and Principe, Seychelles, Sierra Leone, Somalia, Eswatini and Uganda.

[2] Including Hong Kong.

[3] Individual data are not available and are estimated in aggregate for: Afghanistan, Bhutan, Cook Islands, Fiji, French Polynesia, Kiribati, Macau (China), Maldives, New Caledonia, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga and Vanuatu.

[4] Individual data are not available and are estimated in aggregate for: Includes Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Falkland Islands (Malvinas), Grenada, Guyana, Montserrat, Saba, Saint Eustatius, Saint Kitts and Nevis, Saint Lucia, Saint Pierre and Miquelon, Saint Vincent and the Grenadines, Sint Maarten and the Turks and Caicos Islands.

[5] Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

[6] Note by all the European Union member states of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

[7] The designation is without prejudice to positions on status, and is in line with the United Nations Security Council Resolution 1244/99 and the Advisory Opinion of the International Court of Justice on Kosovo's declaration of Independence.

[8] The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD and/or the IEA is without prejudice to the status of the Golan Heights

North Africa – Algeria, Egypt, Libya, Morocco and Tunisia.

North America – Canada, Mexico and the United States.

Southeast Asia – Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. These countries are all members of the Association of Southeast Asian Nations (ASEAN).

Advanced economies – OECD member nations, plus Bulgaria, Croatia, Cyprus, Malta and Romania.

Emerging markets and developing economies – All other countries not included in the advanced economies regional grouping.

Abbreviations and acronyms

API	Argus/McCloskey's Coal Price Index
ARA	Amsterdam-Rotterdam-Antwerp (price index)
ASEAN	Association of Southeast Asian Nations
BGR	Federal Institute for Geosciences and Natural Resources (Germany)
BSPI	Bohai-Rim Steam Coal Price Index (China)
CCGT	combined-cycle gas turbine
CCL	Central Coalfields (India)
CFR	cost and freight
CHP	combined heat and power
CIF	cost, insurance and freight
CIL	Coal India Limited
CNR	Colombian Natural Resources
CO_2	carbon dioxide
CV	calorific value
DMO	domestic market obligation
dwt	deadweight tonnage
EIA	Energy Information Administration (United States)
EU	European Union
EUA	European Union Allowance
EU ETS	European Union Emissions Trading System
FESCO	FESCO Transportation Group (Russia)
FID	final investment decision
FOB	free on board
FY	fiscal year
FYP	Five-Year Plan (China)
GDP	gross domestic product
HCC	hard coking coal
HH	Henry Hub
ICVL	International Coal Ventures Private Limited
IEA	International Energy Agency
IMF	International Monetary Fund
IMO	International Maritime Organisation
IPO	initial public offering
JCC	Japanese Crude Cocktail
KETS	Korea Emissions Trading Scheme
LHV	lower heating value
LNG	liquefied natural gas
MDO	mine developer operator
met	metallurgical
METI	Ministry of Economy, Trade and Industry (Japan)
MSTC	MSTC Limited (India)
NEA	National Energy Administration (China)
NCI	National Coal Index (India)
NLC	NLC India Limited
NSW	New South Wales
NTPC	NTPC Limited (India)
OECD	Organisation for Economic Co-operation and Development
PCI	pulverised coal injection
PGG	Polska Grupa Górnicza S.A.

POSOCO	Power System Operation Corporation Limited (India)
PV	photovoltaics
SCCL	Singareni Collieries Company Limited (India)
SUEK	Siberian Coal Energy Company
TTF	Title Transfer Facility (Netherlands)
UHV	ultra-high voltage
US	United States
USC	ultra-supercritical
y-o-y	year-on-year

Currency codes

AUD	Australian dollar
CNY	Chinese yuan renminbi
COP	Colombian peso
IDR	Indonesian rupiah
RUB	Russian ruble
USD	United States dollar
ZAR	South African rand

Units of measure

Bt	billion tonnes
dwt	deadweight tonnage
GW	gigawatt
kcal	kilocalorie
kg	kilogramme
km	kilometre
kt	kilotonnes
Mt	million tonnes
Mtpa	million tonnes per annum
MW	megawatt
t	tonne
TWh	terawatt hours

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