



## Global Coal Markets at a Climax

### An Era of Coal Decline is Finally about to Begin

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#### ► Key Takeaways

- Global coal demand hit an all-time high in 2022, driven by China and India mainly. With lower prices, 2023 could see another record use.
  - Yet this is not a lasting coal comeback. Already in 2023, European coal demand is collapsing. US coal demand is continuing its structural decline. Even in China, where coal power plant permitting is experiencing a new boom, coal demand may decline as soon as 2024. Indian demand is likely to continue growing over the decade though.
  - The global energy crisis has not derailed the move away from coal especially as clean investment is rising everywhere.
- The gap between the growth of clean electricity generation and the growth in electricity demand has been narrowing in recent years, suggesting that a structural decline in global coal generation is soon to begin, notably as natural gas prices ease.
  - Global trade is experiencing a shift towards the Pacific basin. In 2022, the balance of the international market was ensured by increased Indonesian exports, reduced Chinese imports and the redirection of Russian coal to China, India and Turkey, mainly. China now accounts for almost 30% of world trade and has considerable power on the international market.

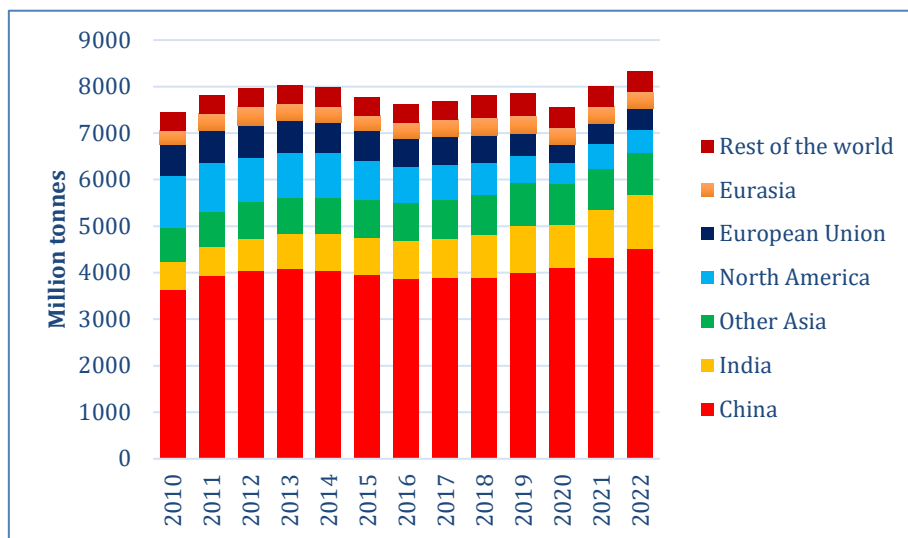
## Introduction

In a previous note published in 2018,<sup>1</sup> we noted that global coal demand had flattened. Several governments had announced coal phase-out plans, global coal power investment had contracted, and investment in greenfield coal mines was also at a standstill. The freezing of financial resources for coal projects might have indicated the beginning of a structural decline in coal demand and supply. However, global coal demand again reached an all-time high in 2022, and 2023 may set a new record as coal prices have fallen from their highs of 2022, making coal more competitive in Asia. The key question is therefore when a structural decline in coal demand will begin, and how steep the decline will then be. This briefing note looks at coal demand in four major markets, China, India, the United States (US), and the European union (EU), which together account for 80% of global coal demand, and also analyzes recent trends in international trade and prices.

## Global demand reaches a new high driven by China and India

Coal markets have encountered three years of turbulence. In 2020, coal demand dropped significantly due to the impact of the pandemic on global economic activity. After its strong recovery in 2021 (+6.1%), global coal demand (in tonnage) reached new highs in 2022, up 3.9% to 8.3 gigatonnes (Gt). Driven by rising demand in China and India, it has exceeded its previous record of 8 Gt registered in 2013 (Graph 1).

**Graph 1: Global coal demand and the rising role of China and India, 2010-2022**



Source: International Energy Agency (IEA), BP, National Bureau of Statistics of China.

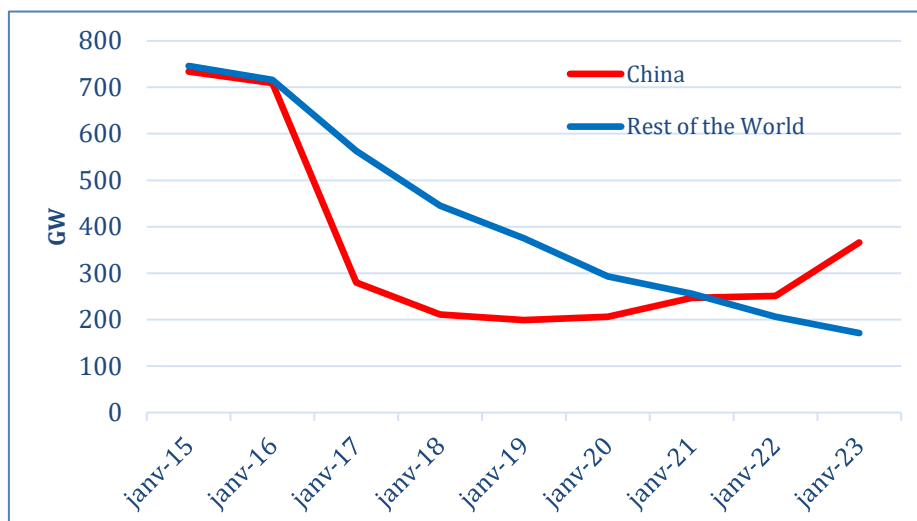
1. S. Cornot-Gandolphe, "Coal Exit or Coal Expansion. A review of coal market trends and policies in 2017", *Étude de l'Ifri*, Ifri, May 2018.

The global gas crisis triggered by the invasion of Ukraine and renewed concerns about energy security, combined with exceptional weather events (droughts reducing hydroelectricity production and heat waves increasing electricity demand), have driven an increased reliance on coal for electricity generation.<sup>2</sup> Coal has been seen by many governments as the only short-term option for securing electricity supply in the face of soaring gas prices. As a result, global coal-fired power generation increased by 1.1% in 2022, accounting for 36% of the global electricity mix, up one percentage point compared to 2021.<sup>3</sup> However, the energy crisis did not lead to a major increase in coal burn as many feared.

The global coal fleet grew by 8 GW (net) in 2022 and now approaches 2,100 GW, of which more than half is in China. 2022 saw the lowest number of coal plant closures in seven years, as countries looked to maintain back-up capacity. Above all, new coal capacity under development (including announced, pre-permit, permitted, and construction stages) increased by 12% in 2022 to 537 GW, a reversal of previous trends.<sup>4</sup> This is due to a spree of new coal power plant permitting in China. Hence, China's coal capacity under development climbed by 46% in 2022. Outside China, the global coal fleet continued to shrink (Graph 2).

The global coal fleet grew by 8 GW (net) in 2022

**Graph 2: Coal capacity under development, 2015-2023**



Source: Centre for Research on Energy and Clean Air (CREA) and Global Energy Monitor (GEM).

2. Power generation remains the biggest driver of coal demand and accounts for two-thirds of total global coal demand.

3. "Coal Market Update", International Energy Agency, July 2023, 3, available at: [www.iea.org](http://www.iea.org).

4. "CREA/GEM, Boom and Bust Coal 2023: Tracking the Global Coal Plant Pipeline", Global Energy Monitor, April 2023, available at: [www.globalenergymonitor.org](http://www.globalenergymonitor.org).

In the first half of 2023, global coal demand again rose 1.5%. Reduced demand in the EU and the US was not sufficient to offset growing demand in China and India. The shift of coal demand to Asia continues. Whereas in 2000, half of demand was still concentrated in North America, Europe, Japan, South Korea, and Taiwan, in 2022, Asia accounted for 80% of global demand: 54% in China and 13% in India.

These consumption levels fall far short from a 1.5 °C trajectory. CO<sub>2</sub> emissions from coal grew by 1.6% in 2022 and reached a new all-time high of almost 15.5 Gt.<sup>5</sup> The Intergovernmental Panel on Climate Change (IPCC) and the IEA are clear that ending the construction of unabated coal power and phasing-out coal power are critical to achieve the goals of the Paris Agreement. As per the IEA Net Zero Emissions scenario, unabated coal plants need to be phased out by 2030 in advanced economies and by 2040 in developing ones.<sup>6</sup>

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## China and India account for two thirds of global coal demand

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As China and India account for two thirds of global coal demand and about 80% of all planned coal power capacity in the world, the decline in global coal demand is linked with energy policies in China and India and development in their power sector mainly.

### ***China: low-quality coal as the main tool to secure energy supply***

In the face of a twin energy crisis—the global energy crisis and domestic power shortages—, coal has once again become the major component of China's energy security policy. Coal was reiterated as a critical commodity during China's National Congress in 2022. Again, the National Congress in 2023 emphasized the role of coal for energy security, coal being considered as the mainstay of the country's energy system. While the share of coal in China's energy consumption had been falling for the past 10 years, in 2022 it increased to 56.2%, compared with 55.9% in 2021, and coal made up 61% of electricity generation in 2022.

Since 2021, China has experienced repeated extreme droughts in its southwestern regions that have limited the contribution of hydroelectricity. In addition, repeated intense heat waves have increased summer peak electricity demand for cooling. In 2021, these droughts led to a severe power crisis and to power rationing nationwide, as coal supply was unable to offset the deficit in hydro generation. Since then, expanding coal mining and increasing coal production has been a key energy policy priority to meet electricity demand. In 2022, the government decided to increase coal production capacity by over 300 million tonnes (Mt) per year. Domestic coal production thus reached an all-time high in 2022, increasing by 10.5% to 4.56 Gt (Graph 3). Faced with soaring imported coal prices, the

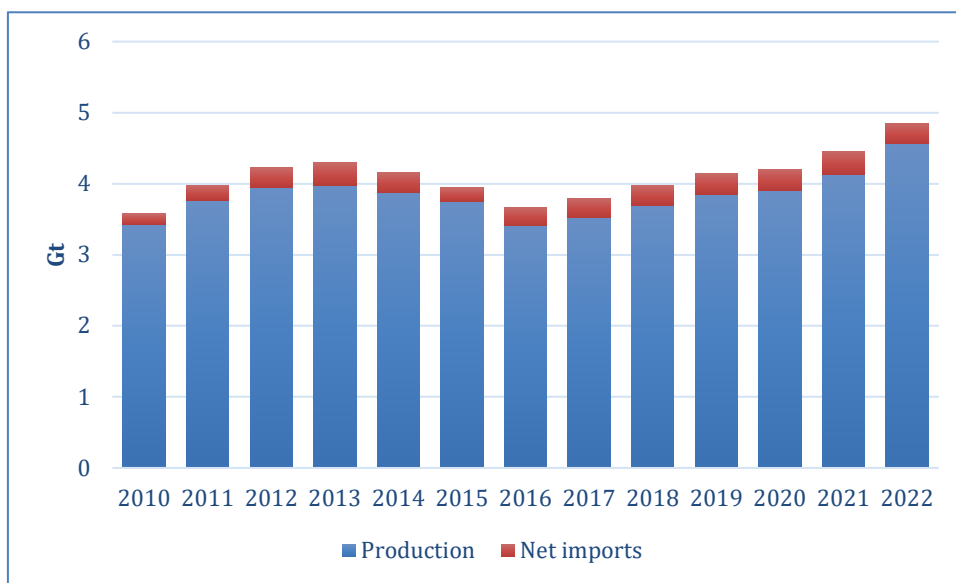
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5. "CO<sub>2</sub> emissions in 2022", International Energy Agency, available at: [www.iea.org](http://www.iea.org).

6. "World Energy Outlook 2022", International Energy Agency, October 2022, available at: [www.iea.org](http://www.iea.org).

government limited the use of imports in order to reduce the cost of coal supply. China's total imports fell by 9% in 2022, to 293 Mt. Weak economic growth and the impact of the zero-Covid policy limited the increase in coal demand. Coal-fired power generation grew slightly, by 1.4% in 2022, and output in the other major coal-using sectors, steel and cement, contracted. However, Chinese coal demand in tonnage increased by 4.3% to 4.5 Gt. This strong growth is due to a fall in the quality of domestic coal. To fulfill the government output targets, miners have prioritized quantity over quality, resorting to exploiting lower-quality coal reserves. Hence, the growth in coal demand in energy equivalence is much lower (1% according to the Statistical Review of World Energy 2023).

**Graph 3: China's coal supply, 2010-2022**



Source: National Bureau of Statistics of China.

Concerns about power shortages have pushed the Chinese government to rely more on coal to keep grids stable. New coal capacity under development accelerated dramatically, with new permits reaching the highest level since 2015, even as clean energy made new records. A total of 106 GW of new coal power projects were permitted (and 52 GW in the first half of 2023), from 23 GW in 2021. Some 50 GW of coal power capacity started construction in China in 2022, a more than 50% increase from 2021. This is a reversal from previous policies which vowed to strictly control coal power capacity over the 2021-2025 period in order to bring CO<sub>2</sub> emissions to a peak by 2030. Altogether, as of beginning of 2023, according to CREA and GEM, China is building or planning to build some 366 GW of new coal capacity, accounting for some 68% of global planned new coal capacity. If all are built, China's coal power capacity may reach close to 1,500 GW by 2025.

**China's coal power capacity may reach close to 1,500 GW by 2025.**

In the first half of 2023, China again experienced lower-than-normal rainfalls. It again increased its coal consumption by some 5% year-on-year (y-o-y), driven by higher use in the

power sector as hydroelectric generation has fallen. Despite an increase of 4.4% of domestic production, and contrary to 2022, China massively increased its coal imports, which almost doubled in the first half of 2023 (see below).

China is committed to peaking CO<sub>2</sub> emissions by 2030 and reaching carbon neutrality by 2060. According to the current Five-Year Plan for energy (2021-25), coal consumption will start falling in the 2026-2030 period. The coal permitting revival has not hindered an acceleration of clean power investment at a staggering growth rate. China is getting close to the point where the growth in clean power is sufficient to cover the growth in power demand. Hence, coal demand is expected to start declining. This may occur as soon as 2024, depending on hydro production, gas prices and economic growth. As more coal capacity continues to be added, this implies that the utilization rate of China's coal power fleet could decrease sharply, making the energy transition more complicated and costly, or that aging plants could be phased out in an accelerated manner.<sup>7</sup> It already declined to 52.4% in 2022.<sup>8</sup> The government is working on capacity payment mechanisms that compensate coal power plants for the decline in earnings as they adjust to their new role as backup suppliers.

### ***India: coal-based power generation as the backbone of the power sector***

To support its economic and population growth and to secure its energy supply, India also relies on coal. The country's demand for coal is rising sharply. In 2022, it is estimated at 1.15 Gt, i.e. 12% more than in 2021, when it had already risen by 14%. Coal provides almost half of India's energy needs. The rapid growth in economic activity and an unusually early and strong heat wave experienced in April and May 2022 led to a sharp increase in electricity demand (+8%) and in the output of coal-fired power plants, which also had to compensate for the drop in gas-fired power generation. Coal accounted for 72.5% of total electricity generation. Contrary to China, the utilization rate of coal power plants increased to 64% in 2022 from 59% in 2021 and approached 70% in the first half of 2023. Coal demand again rose by 6% in the first half of 2023, driven by stronger power demand.

Faced with this strong demand, India is increasing its domestic production to ensure the security and stability of its electricity supply. In 2022, the country produced 910 Mt, up 12%. Yet India encountered supply and logistical constraints during the particularly hot season, which led to a sharp increase in steam coal imports (+18% to 157 Mt), and this, despite high coal prices on the international market. However, the government is pursuing its policy of reducing steam coal imports and intends to increase domestic production to 1 Gt in 2023 and to 1.5 Gt in 2030.

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7. "CREA/GEM, Boom and Bust Coal 2023: Tracking the Global Coal Plant Pipeline", *op.cit.*

8. "中电联发布2023年度全国电力供需形势分析预测报告", ChinaPower, January 21, 2023, available at: <http://mm.chinapower.com.cn> (in Chinese).



India has committed to achieve net zero emissions by 2070. The government is determined to eventually phase down coal, however it has not set a formal timeline. India has one of the world's most ambitious renewable energy targets (500 GW of capacity by 2030). After China, but very far behind, India has the most operating (211 GW as of March 2022, excluding captive power plants) and proposed coal plant capacity in the world. According to CREA and GME, at the end of 2022, the country had some 60 GW of coal capacity under development, of which 32 GW were under construction. India's recent National Electricity Plan (NEP),<sup>9</sup> with projections for the years 2027 and 2032, reiterates the importance of coal-based power generation as the backbone of the Indian power sector. It also emphasizes the need to operate coal-based plants in a more flexible mode, in the wake of huge intermittency and variability of renewable-based generation. The NEP estimates that a coal power capacity of 235 GW in 2027 and 260 GW in 2032 is required to meet peak demand and energy requirements. Hence, India envisages to stop building new coal-fired power plants, apart from the roughly 30 GW already in the pipeline.<sup>10</sup> The NEP also proposes delaying the retirement of old coal-fired plants until energy storage for renewable power becomes financially viable. The share of coal power capacity will shrink to 29% of total capacity by 2032, down from about half now, while renewables are to increase their share to 66%. India's renewables targets, while ambitious, will still not be enough to meet rising power demand, and coal will still generate 50% of India's electricity in 2032, down from 73% in 2023, while renewables, led by solar, will account for 44%, up from 12% now. Coal requirements by the power sector may thus exceed 1 Gt in 2032, from 0.8 Gt in 2022.

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### ***United States: King Coal is in bad shape***

Apart from 2021, when coal demand recovered from the pandemic and increased by 14%, US coal demand has been on a structural decline since the end of the 2000s, when it peaked at over 1 Gt. In 2022, US coal demand, dominated by the power sector, declined by 6% to 465 Mt. Despite higher gas prices, coal-fired power generation declined sharply (-8%) and accounted for only 20% of total electricity generation, a three-point decline in one year. Various factors such as an aging coal fleet, environmental regulations, and competition from other sources have contributed to the declining economics of coal-fired capacity. The decline in 2022 is unprecedented in a context of rising gas prices and demonstrates the impact of the numerous closures of coal-fired power capacity over the past decade. Between 2012 and 2021,

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9. "National Electricity Plan, Volume 1, Generation", Central Electricity Authority, May 2023, available at: [www.cea.nic.in](http://www.cea.nic.in).

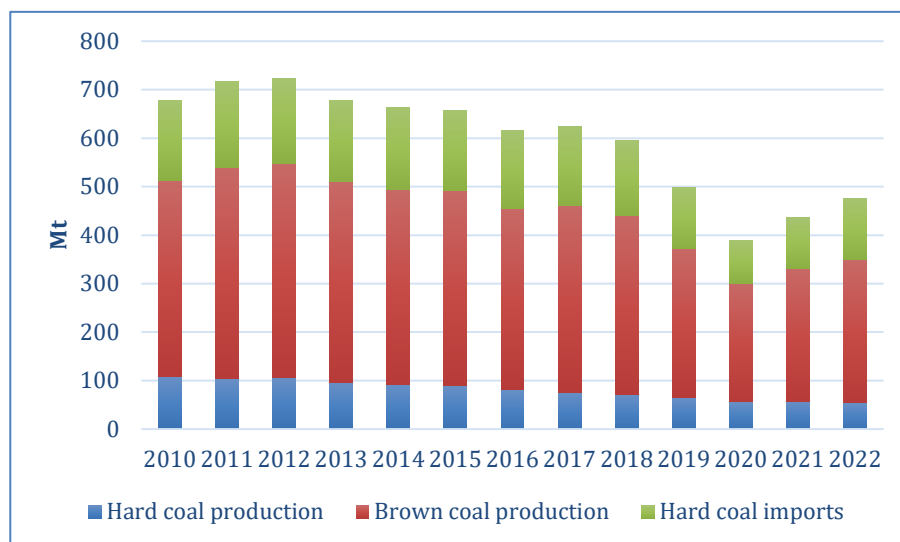
10. "Exclusive: India Amends Power Policy Draft to Halt New Coal-Fired Capacity", Reuters, May 5, 2023, available at: [www.reuters.com](http://www.reuters.com).

an average of 9.5 GW of coal-fired capacity was retired each year, and 11.5 GW in 2022. Coal's share in the electricity mix will drop further to 16% in 2023 and 15% in 2024, with growing power generation from natural gas and renewable energy.<sup>11</sup> The Inflation Reduction Act will facilitate the transformation towards “a carbon-free power sector” by 2035, hence the US Energy Information Administration forecasts a collapse in coal demand to 200 Mt in 2030 or 8% of electricity generation.<sup>12</sup> Coal-fired capacity (200 GW in 2022) will be reduced by half by 2030.

### ***Europe: coal has made a short-lived comeback***

After its strong post-Covid recovery in 2021 (+13%), EU coal demand again increased in 2022 (+4%), driven by demand from the power sector.<sup>13</sup> EU coal generation rose by 7% in 2022 compared to 2021.<sup>14</sup> Coal provided 16% of electricity generation in 2022 (14.5% in 2021). The EU had to turn to coal to secure its electricity supply as the region not only had to face reduced Russian gas pipeline deliveries but also a severe drought, which led to the lowest level of hydro generation since at least 2000, and widespread unexpected French nuclear outages. In addition, in 2021 and in most of 2022, higher gas prices made coal more competitive than gas for power generation despite rising steam coal prices.

**Graph 4: EU coal supply, 2010-2022.**



Source: Eurostat.

Several countries have introduced temporary measures to secure electricity supply by extending the lifespan of coal-fired power plants, allowing the restart of closed plants, and

11. “Short Term Energy Outlook (STEO)”, Energy Information Administration, August 8, 2023, available at: [www.eia.gov](http://www.eia.gov).

12. “Annual Energy Outlook (AEO)”, Energy Information Administration, March 16, 2023, available at: [www.eia.gov](http://www.eia.gov).

13. “Supply, Transformation and Consumption of Solid Fossil Fuels”, Eurostat, July 5, 2023, available at: <https://data.europa.eu>.

14. “European Electricity Review 2023”, Ember, January 31, 2023, available at: [www.ember-climate.org](http://www.ember-climate.org).



increasing existing production quotas. In most cases, the capacity involved is small, except in Germany, which has created a “gas replacement reserve” of 10 GW based on coal and lignite plants. Altogether, at EU level, there were 26 old coal units brought back on emergency standby during winter 2022/2023. However, the average utilization of these units during the winter was just 18%, and they added only 1% point to the EU’s total 2022 coal generation.<sup>15</sup>

EU coal supply increased by 9% in 2022 (Graph 4). Despite the implementation of the embargo on Russian coal, the EU increased its steam coal imports by almost 35% in 2022, thanks to diversification of supply from non-Russian suppliers (see below). However, a large share of the increased supplies was stored at ports and thermal power plants in case there was an emergency in the gas system during winter.

The recovery of coal has been short-lived. Already coal generation decreased in the last months of 2022. In the first half of 2023, EU coal demand collapsed by 16% driven by a 23% decline in coal generation. Plans to phase out coal by 2030 are still on track. In 2021 and 2022, six European countries announced their exit from coal, bringing the number of European countries that have announced their exit from coal to 23. Germany remains firmly committed to its coal exit plan by 2030 and aims to increase the share of renewables in gross electricity consumption to 80% by then. One uncertainty, however, concerns Poland, where the energy crisis has delayed plans to close existing coal mines. Poland uses coal to generate 70% of its electricity, by far the highest percentage in the EU.

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## International trade: a significant reshuffling of international flows

International trade is estimated at 1,352 Mt in 2022, including 1,045 Mt of steam coal and 307 Mt of coking coal (used in the steel industry).<sup>16</sup> Over the past two decades, the center of gravity of international trade has shifted from the Atlantic Basin, dominated by European imports, to the Pacific Basin, which now accounts for almost 80% of total steam coal imports. But since 2021, trade flows have undergone major upheavals.

A first redistribution of international flows took place in 2021, in response to the informal ban on Australian coal imports decided by the Chinese government at the end of October 2020. It benefited all alternative exporters to Australia, but mainly Indonesia and Russia, which accounted for 60% and 18% of Chinese coal imports in 2021. Australia succeeded in replacing lost Chinese tonnages and maintaining its production and exports at 2020 levels by increasing its exports to India, Japan and Korea.

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16. “Short Term Energy Outlook (STEO)”, *op. cit.*

The reshuffling of international flows accelerated in 2022 due to the embargo on Russian coal imposed by the EU and the UK, following the invasion of Ukraine. In addition, Japan, South Korea and Taiwan have announced a gradual phase-out of their Russian coal imports but have not indicated when exports will cease. Russia is the third largest coal exporter in the world (214 Mt exported in 2021), and so far has kept its rank. In total, about 70-80 Mt/year of steam coal must be replaced by countries that have banned Russian coal. In 2022, EU imports from Russia halved, while Japan's imports were down 41%. Despite the embargo on Russian coal, European steam coal imports surged by 35%. European buyers turned to their traditional suppliers (USA, Colombia, South Africa), but also diversified their supply by buying steam coal from Australia, Indonesia, Mozambique, Kazakhstan and even Tanzania and Botswana. Japan turned mainly to Australia and Indonesia. Russian exports (all coals) fell by 7% in 2022, and steam coal by 11%. Russia discounted its coal prices by up to 50-70% of international benchmark prices to find alternative outlets. China played a moderating role in the international market by reducing its steam coal imports. Steam coal imports from Southeast Asia also declined due to high international prices.

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## China played a moderating role in the international market

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In the face of the increased demand for non-Russian coal, supply on the international market was very tight, constrained by bad weather, notably in Australia, lack of investment in mines and coal logistics for several years (US, Colombia, South Africa), and labor shortages. Only Indonesia, the world's largest exporter of steam coal, was able to increase its production and exports significantly. Thus, the balance of the international market was ensured by increased Indonesian exports, reduced Chinese imports and the redirection of Russian coal to China, India and Turkey, mainly. Global steam coal supply chains are now longer and less efficient than they were in 2019. High-quality steam coal (6,000 kcal/kg, mainly exported from Australia) has been particularly affected, and the price premium for high-quality coal has increased significantly (see below).

In the first half of 2023, global seaborne coal trade increased by +12% y-o-y to 637 Mt, based on vessel tracking data from Refinitiv. Despite no investment in new steam coal mines in major exporting countries, all coal exporters have been able to ramp up exports, thanks to the end of La Niña and investments to sustain existing mines. Indonesia again experienced the largest growth. Japan and South Korea imports dropped, while EU imports fell sharply (- 14.5% y-o-y) due to reduced coal generation and ample stocks built in 2022. Moreover, a new reshuffling of trade flows is occurring as the Chinese government lifted its unofficial ban on Australian coal in January 2023. China sharply increased its imports in the first half of 2023, almost doubling them y-o-y (to 222 Mt). Shipments from Indonesia accounted for nearly half of the increase in Chinese seaborne imports, while Russia and Australia together contributed the other half. Overland imports from Mongolia also surged. Chinese purchases were driven by the prospect of a hotter-

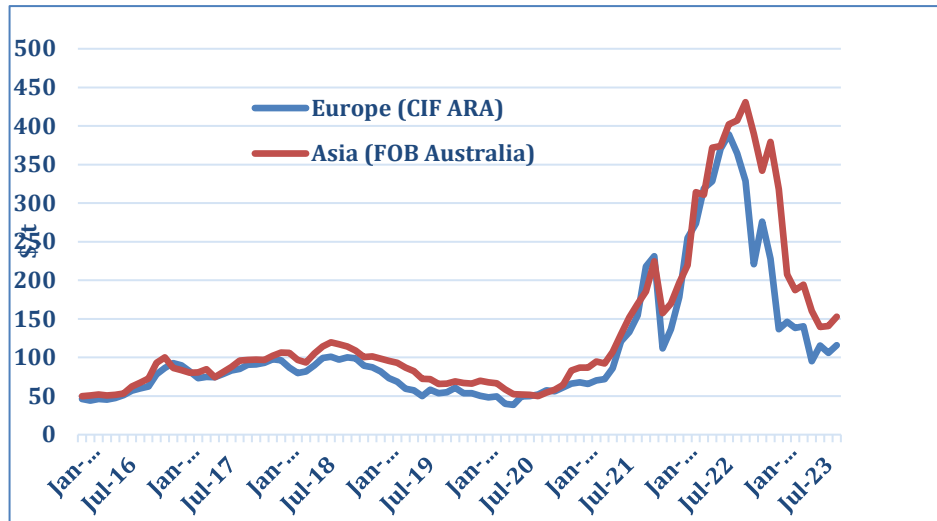
than-usual summer, Beijing's determination to minimize blackouts and, above all, a drop in seaborne coal prices, which makes coal imports more competitive than domestic coal. The import uptrend is unlikely to continue as Chinese economy is slowing. However, Chinese imports are driven by price arbitrage between domestic coal and international prices, and imported coal remains cheaper than domestic coal burdened by high transport costs, particularly in the country's southeastern provinces. On the narrow international steam coal market, China now accounts for almost 30% of world trade and has considerable power on the international market.

## Highly volatile prices

International steam coal prices had already surged in 2021, reaching all-time highs in October at over \$250/t. This surge reflected the global supply-demand imbalance following the post-Covid economic recovery, coal shortages in China and India and rising gas prices, driving gas-to-coal switching. On average over 2021, the price of Australian steam coal (FOB Newcastle, 6,000 kcal/kg) was \$138/t, up 127% on 2020; steam coal delivered in Europe (CIF price, ARA zone) was \$122/t, up 137% on 2020. In 2022, prices exploded in the face of tight supply following the embargo on Russian coal and constraints on international supply, particularly in Australia. On annual averages, the European price has more than doubled to \$294/t, with peaks of \$400 during the summer of 2022; the Australian price was up 150% to \$345/t. Australian steam coal prices even exceeded coking coal prices, a first for coal markets.

Prices in the two markets have diverged since September 2022 (Graph 5). In Europe, prices started declining in September 2022. Thus, like gas, the price of European steam coal fell and ended the year below \$190, with the mild winter reinforcing the price decline. In contrast, the Australian price continued to rise in winter 2022/2023 as supply remained tight in the Pacific Basin. The Australian price ended the year at \$400, thus commanding a premium of more than \$200/t over the European benchmark. Since February 2023, with the end of La Niña and weaker demand in Japan and Korea, the Australian coal benchmark has started to decline. The European benchmark settled at \$105-115 in summer 2023, while the Australian benchmark was around \$140-150. Despite the substantial drop, coal prices remain elevated compared with their historical levels (\$70/t for the European benchmark over the period 2016-2020, and \$80 for the Australian benchmark). Several factors, such as growing capital and operating costs, constrained supply due to government policies, sanctions, lack of mine approvals, and reserve depletion, mean that a return to historical levels is unlikely.

**Graph 5: Evolution of international steam coal monthly prices, 2016-July 2023**



Source: Data from the World Bank and investing.com.

## Perspectives: an era of coal decline is about to begin

In contrast to past investment cycles, major coal exporters are not responding to the price hike. They are no longer investing in new steam coal mines, although they are still investing in coking coal mines. Project financing and insurance conditions are becoming increasingly difficult, leading to higher costs and uncertainties.

The structural decline of coal power was acknowledged at COP26, although no date for coal's exit was set, with governments committing only to “[accelerate] efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies”. In October 2021, the G20 countries pledged to stop subsidizing overseas coal-fired power plants by the end of 2021, and China, Japan and South Korea pledged to end overseas financing of unabated coal-fired power plants. A growing number of countries – 75 as of July 2022 – have specific plans to phase out unabated coal or not develop new plants, and 16 more countries have made net zero emissions pledges, combined they cover nearly 100% of current global coal-fired generation.<sup>17</sup> Multilateral “just transition” financing schemes have been set up to facilitate the early closure of coal-fired power plants, notably in South Africa, Senegal, Indonesia and Vietnam.

The global energy crisis has not derailed the move away from coal. However, the main uncertainty lies in the speed of this decline in emerging Asian economies, led by China, and how some coal emissions could be effectively abated by Carbon Capture, Utilization and Storage (CCUS) or ammonia co-firing.

17. “Coal in Net Zero Transitions, WEO Special Report”, Energy Information Administration, 2022, available at: <https://iea.blob.core.windows.net>.

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