Futures for the Russian Coal Sector: Alternative Paths until 2035

INSIGHTS REPORT

CLIMATE Strategies

COLOPHON

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Note: Climate Strategies continues to undertake research, monitoring and provide evidence-based insights on developments in the Russian energy and climate sectors due to international sanctions. This research is co-authored by a group of experts in fossil fuel transitions and climate policy. However, a number of our experts appear under pseudonyms to protect their identity, as expressing critical views on Russian government policies incurs personal risk.

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EXECUTIVE SUMMARY

In response to the full-scale war Russia launched against Ukraine in February 2022, the EU, which purchased 23% of Russia's coal exports in 2021, banned coal imports from Russia in August 2022, and the UK followed suit at the end of 2022. Further, Switzerland closed its hub for Russian coal exports in August 2022, and Japan, a significant buyer of Russian coal, pledged to end coal imports from Russia. In 2024, many major Russian coal producers were added to the U.S. Specifically Designated Nationals sanctions list, blocking assets and complicating payments.

Although not significant in terms of GDP generation, the Russian coal sector is economically and socially crucial for a number of coal-producing regions. It is also a significant source of greenhouse gas emissions domestically as well as globally due to coal exports, which comprised 213 million tonnes (MT), or 48.6%, of the 438 MT of coal produced by Russia in 2023.

On the basis of Russian coal production and exports, including profits, during the first two years of the war in Ukraine, it appeared that the coal sector had successfully adjusted and managed to alleviate the impacts of Western sanctions. However, this was largely explained by peak coal prices in 2022–2023 and newly available export markets, as other suppliers shifted to replace Russian coal in sanctioning countries. In 2024, mounting costs of transport and increasing fiscal burden, as the war economy demands extra revenues, have greatly reduced the competitiveness of Russian coal exports: **In January-April, Russia's coal exports declined by 12.1% and in January-June, half of Russian coal producers were making a loss.**

This report argues that, since geopolitical developments are a critical factor, the Russian coal sector could still face a range of futures, from favourable developments to a serious decline that would shift the coal sector's focus mostly to the domestic market by 2035. We apply the backcasting method to outline how particular futures could take place, asking: **what are the future options for the Russian coal sector, and which political and economic conditions would facilitate the various development paths?**

Our research proposes that **Russia losing the war** or agreeing on a just peace to end the Western sanctions **could facilitate a recovery and even growth of the coal sector** in the shorter term. The **continuation of the current geopolitical path,** including normalizing coal prices and export-hindering sanctions, **is likely to continue the 2024 trend of declining coal exports to Asia.** This will come with social costs in many coal producing regions. Should **the war expand resulting in greater geopolitical tensions**, followed by tighter sanctions and development of Russia into an even deeper authoritarian state, the **prospects for the coal sector are bleak and socially disastrous in many regions**. Over time, **global decarbonization trends will start influencing coal exports regardless of the scenario**, and the main distinction is whether the coal producers can maximise the remaining years of global coal demand.

We apply our findings to Russia's **four major coal exporting regions: Kuzbass, Khakassia, Yakutia and Krasnoyarsk t**o underline the regional diversity of the Russian coal sector. Coal export-based revenues and welfare will decline in our Siberian case regions, Kuzbass and Khakassia, under all scenarios, while the opposite will be true in Yakutia in the Far East. This may be framed simply as regional competition, especially by the coal exporting regions in decline, however, in fact **the war economy divides the winners from the losers, i.e. the profitable coal exports and regions from those that are unprofitable**. This is because prior to the war, the latter at least partly relied on government subsidies, such as discount prices on rail transport. **As a result of the war, the economic viability of exports from the coal producing regions in Siberia have been contested**. The Developing coal sector scenario would ease the conditions, and thus, allow government subsidies to coal exports to continue. The Declining coal sector scenario, which would turn the coal sector inwards with disastrous impacts for most of these regions, illustrates the crucial role of China, and the political stakes the coal sector has in the relations between the two countries. After all, **there is no Plan B if Russia loses China's support.**

Furthermore, low-carbon policies may be delayed but are underway, and **Russian coal sector stakeholders should not fool themselves that Asian markets are immune to this transition**. Alongside rapid developments in renewable energy capacity, both China and India are increasing domestic coal production to avoid supply security issues, meaning the transition from coal imports to renewables could be quite sudden. The relative stability of the coal sector in Krasnoyarsk, which is focused on the domestic market, under all three scenarios, underlines the uncertainties related to coal exports; their success makes or breaks the coal sectors of the export dependent regions. In addition, Krasnoyarsk is likely less vulnerable to the global decarbonization trend due to the lack of serious domestic mitigation policies in Russia, while the exporting regions will have to adjust to the shrinking global coal markets.

The Shift to the East scenario would be the closest continuum of the status quo in September 2024. As long as this status quo at the time of writing continues, the slowly declining coal export industry will surf the waves of domestic policy-making concerning rail tariffs and capacities, fiscal burden and coal price in the (mostly) Asian market. While the peaceful Developing coal sector scenario would be geopolitically the most desirable – at least for the West – the opportunities available to the coal sector in Europe depend on its timing as well. If Europe continues several years without Russian coal, its return seems less likely because the EU is phasing out coal altogether.

INTRODUCTION

Although not significant in terms of GDP generation, the Russian coal sector is economically and socially crucial for a number of Russian coal-producing regions. It is also a significant source of greenhouse gas (GHG) emissions domestically as well as globally due to coal exports, which comprised 213 million tonnes (MT), or 48.6%, of the 438 MT of coal produced by Russia in 2023.[1] Exports largely account for the growth of coal production in Russia since 2000s.[2] In the 2020 'Development Programme for the Coal Industry until 2035', the Russian government foresees a shift of the sector towards the East to replace the EU market, which is expected to decline as a result of climate mitigation policies, with the main global markets for coal in Asia.[3]

The EU, which purchased 23% of Russia's coal exports in 2021, banned coal imports from Russia in August 2022,[4] and the UK followed at the end of 2022. In addition, Switzerland closed its hub for Russian coal exports by banning the transport and provision of related services, including financial services, in August 2022, and Japan, a significant buyer of Russian coal, also pledged to end coal imports from Russia.[5] In 2024, many major Russian coal producers were added to the U.S. Specifically Designated Nationals (SDN) sanctions list. Thus, their assets were blocked, and U.S. citizens and companies were prohibited from interacting with them. This development has complicated payments as well, as major banks in the US and beyond want to avoid the secondary sanctions, which would cut them off from the dollar financial system.[6] However, the sanctions were countered by peak coal prices in 2022–2023 and the sanctioning countries switching to new suppliers, which freed markets for Russian exporters.

Based on its performance in terms of production and exports as well as profits during the first two years of Russia's war in Ukraine, it seems that the coal sector has not suffered greatly from the Western sanctions and has coped well with the required adjustments. However, the coal sector's performance was facilitated by record high coal prices in 2022 in international markets translating to significant profits for coal exporters. While the high coal prices granted the sector more leeway than expected to survive the impacts of the sanctions, the situation has been changed by the decline of coal prices since early 2023, although they remain significantly above the long-term average.

Since early 2024, the coal exporting industry has been in decline. The growing costs of exports related to the scarcity of rail capacity to Asian markets and the growing fiscal burden are making a large share of Russian coal exports unprofitable. Furthermore, the addition of the main Russian coal producers to the U.S. sanctions list in 2024 will likely reduce exports over time in 2024 and 2025.[7] In January–April 2024, Russian coal exports declined by 12.1% compared to the same period in 2023,[8] driven by declining coal prices and increasing transport costs.[9] The widespread profitability problems in the sector have become obvious as well, as 50% of Russian coal companies experienced losses during the first quarter of 2024 in comparison to 39% a year earlier.[10]

The Ministry of Energy expected 2024 coal exports to reach 2023 levels[11] and surpass them as the capacity of Russia's eastern railway system, the Eastern Polygon, is expanded and the large new coal mine Elga in Yakutia, next to China, starts producing at full capacity.[12] However, in June 2024, the Vector X investment company estimated that Russia's coal exports would decline by 15–20 MT in 2024.[13] It is estimated that U.S. sanctions alone will cut exports by 23.5% in 2024 and by 30.5% in 2025 compared to exports in 2023.[14]

This report argues that the Russian coal sector could still face a range of futures since geopolitics are a source of change for the sector. These futures range from favourable developments to a serious decline that would shift the coal sector's focus mostly to the domestic market by 2035. We apply the backcasting method to outline how particular futures could take place, and we choose

somewhat conservative options to cover as much ground as possible with three future paths. Our main research question is, 'What are the future options for the Russian coal sector, and which political and economic conditions would facilitate the various development paths?'

Our research proposes three alternative futures for the Russian coal sector in response to varying geopolitical and domestic development paths: (1) Russia loses the war or agrees on a just peace to end the Western sanctions – and probably changes its leadership, though not necessarily its political system – which could facilitate the recovery and even growth of the coal sector in the shorter term; (2) The continuation of the current geopolitical path, including normalising coal prices and export-hindering sanctions, which would likely continue the 2024 trend of declining exports of Russian coal to Asia and would come with social costs for many coal-producing regions; (3) The continuation or expansion of the war, which would result in greater geopolitical tensions, tighter sanctions, and the development of Russia into an even deeper authoritarian state, leading to bleak prospects for the coal sector that would be socially disastrous in many regions. Regardless of the scenario, global decarbonisation trends will start to influence coal exports over time; thus, the main difference between the alternative futures is whether or not the coal miners will be able to capitalise on the remaining years of the global coal demand.

We apply our findings to Russia's four major coal-producing regions: Kuzbass, Khakassia, Yakutia, and Krasnoyarsk (Figure 1). Kuzbass, in Southwestern Siberia, is the traditional coal-producing region in Russia and produces more than half of the country's coal as well as a large but declining share of exported coal. Khakassia, in Southern Siberia, retains a similar economic and social dependency on the coal industry to Kuzbass but is much less significant overall in terms of production volumes. Yakutia, an upcoming coal production region in the Far East, close to the Asian markets, has commissioned substantial new coal mining capacity as well as transport infrastructure in the 2020s. Finally, Krasnoyarsk, located in Central Siberia and adjacent to Khakassia and Yakutia, produces coal for the domestic market.

This report is structured as follows. Section 2 outlines the methodology and approach. In Section 3, we outline the status of the Russian coal sector at the time of writing (September 2024), with the developments across Russia's main coal regions provided in Section 4. In Section 5, we describe the three possible outcomes of Russia's war in Ukraine by 2035. Section 6 presents three alternative futures for the Russian coal sector for 2035 and discusses the conditions under which such futures could take place. In Section 7, we examine whether the proposed developments are realistic by applying backcasting and detail how to arrive at these particular futures in 2035. In Section 8, we explain the developments of the four main coal production regions in the context of the above future paths. Their differences underline the regional diversity of the Russian coal sector. Finally, Section 9 concludes our findings.

Figure 1. Major coal-exporting regions in Russia

2.Methodology and approach

This report examines the possible development paths – or 'scenarios', in futures studies terminology – for the Russian coal sector. By examining the potential futures, we aim to illustrate the consequences of Russia's war in Ukraine and global decarbonisation trends for the coal sector. Thus, we treat geopolitics and the global pace of climate mitigation as the drivers of development in Russia's coal sector.

Our methodology consists of four steps. We will first sketch three alternative background scenarios for Russia indicating how the war and Russia's political system could develop (Step 1). We will then evaluate what the future of the coal sector would look like in 2035 under each of the scenarios (Step 2) and conduct a backcasting exercise for each of these alternative futures in order to explain how they could be achieved (Step 3). Finally, we will apply these conditions to our case study regions to similarly outline three alternative future paths, for each of them (Step 4).

The backcasting method is used to define a future (or futures, in our case) and determine ways to achieve it. This method is typically used to generate alternative paths to desirable target-fulfilling images of the future (e.g. low-carbon targets) and how they can be achieved.[15] [16] This is where our task departs somewhat from the typical backcasting approach: we chose the futures not based on their desirability but rather to sufficiently cover the different paths the Russian government could take in its war in Ukraine. Since the government's decisions focus on geopolitical interests, the coal sector itself has little choice between such futures.

The backcasting method has previously been applied to only a few Russian cases. Sharmina[17] has conducted a study on Russia's decarbonisation paths but applied a quantitative approach, whereas ours is qualitative. Qualitative backcasting studies typically use a participatory approach, which involves interviewing experts to define the scenarios.[18] Our own previous work on the Russian coal sector,[19] together with the in-depth background in Section 3 on the status quo, replace the discussions with experts in this study.

Our data sources are diverse. To examine the developments of the coal sector and trade, we used statistical data deriving from both Russian sources (statistical service, federal and regional offices) and foreign sources, particularly the trade statistics of the countries which import Russian coal. In the case of the main coal-producing region, Kuzbass, the regional Ministry of Coal has provided useful monthly statistical data. Our main source for tracking political developments related to the coal sector, such as fiscal measures, railway costs, and allocation of transport capacities, and political debates around the future of the coal sector, were regional and federal newspapers and international expert publications. Regional developments of the coal sector were tracked by examining regional newspapers and mentions of the coal-producing regions under study (Kuzbass, Krasnoyarsk, Yakutia, and Khakassia) in federal newspapers, particularly Kommersant, which reports actively on this sector. Finally, our perceptions related to the more general future developments of Russia are based on having followed the country over the long term. The project team has recently published shorter pieces on political developments[20] and the economic future[21] of the country.

3. Coal sector developments since February 2022

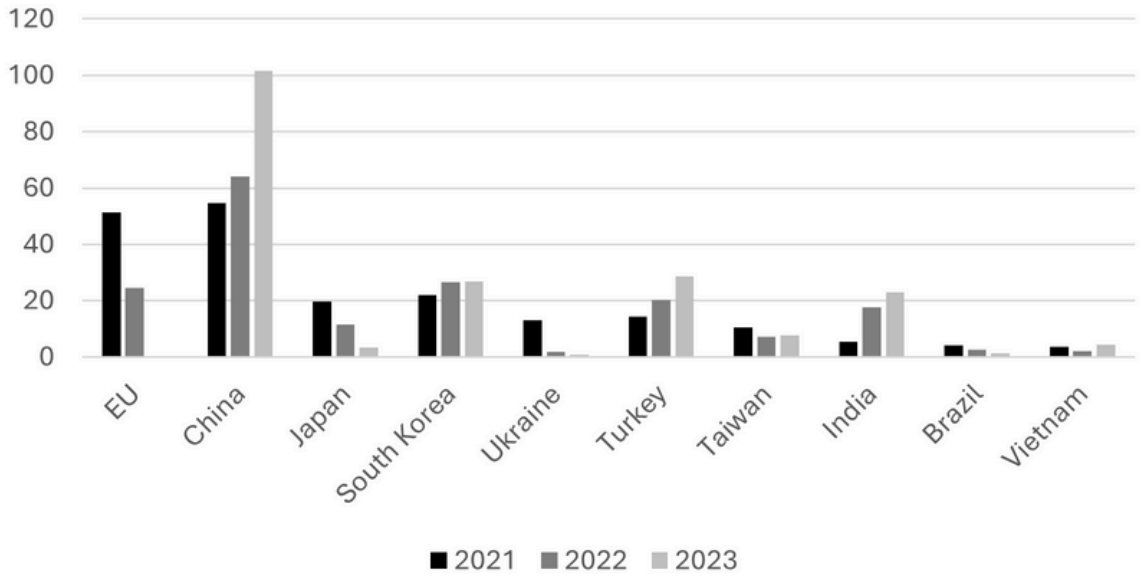
3.1. Domestic demand

Coal accounted for 15% of Russia's total energy supply and over 15% of its heat generation in 2021.[22] Its importance is significantly higher in the Far Eastern Federal District (72%) and the Siberian Federal District (59%),[23] where most of the country's coal is produced. The primary domestic consumers of thermal coal in Russia are combined heat and power plants, energy producers such as coke and blast furnaces, and heating facilities, and their consumption has been fairly stable over the years. The recent U.S. sanctions together with the mounting costs of export have already increased the attractiveness of the domestic market for some coal producers, including Sibanthracite[24] and Mechel.[25] However, switching to the domestic market reduces the profitability of the coal sector and puts pressure on domestic coal prices since coal export subsidises coal supplies to the domestic market in Russia.[26] In 2023, domestic prices for thermal coal in Russia (averaging about $30 per tonne) were approximately four times lower than world prices ($120–130 per tonne).[27]

3.2. Export

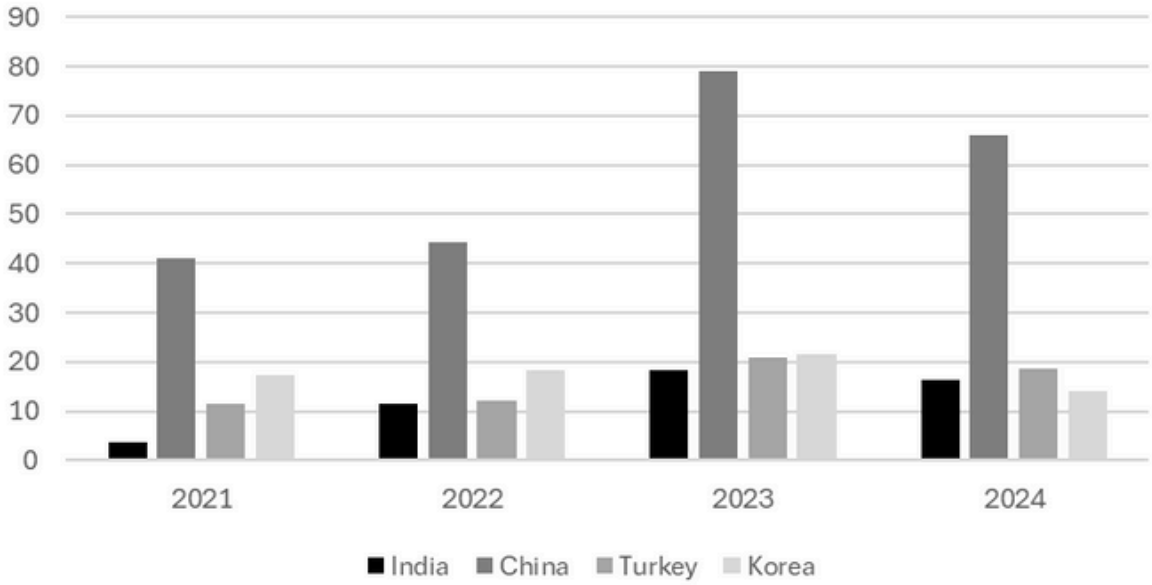
In 2023, 48.6% of Russian coal production, including both thermal and coking coal, was exported. Expanding exports accounted for 84% of the growth in thermal coal production from 2000 to 2021,[28] but Western sanctions have undermined this trend. Russia's coal exports declined by 7% in 2022, and while they recovered to exceed 2021 exports by 1% in 2023,[29] a further downhill slide occurred in January–April 2024, when Russian coal exports declined by 12.1%.[30] Russia's share of the global coal market has also declined from 17.1% of global coal supplies in 2021 to 14.6% in 2024.[31] Figure 2 illustrates, in terms of volume, Russia's turn away from Europe towards new markets in Asia, including China, India, and Turkey. China in particular has dramatically increased its coal imports from Russia.

Figure 2. Main importers of Russian coal, 2021–2023



Source: Customs data of importer countries

Figure 3. Volume of coal imports from Russia, Q1-Q3, MT



Source: Customs statistics data

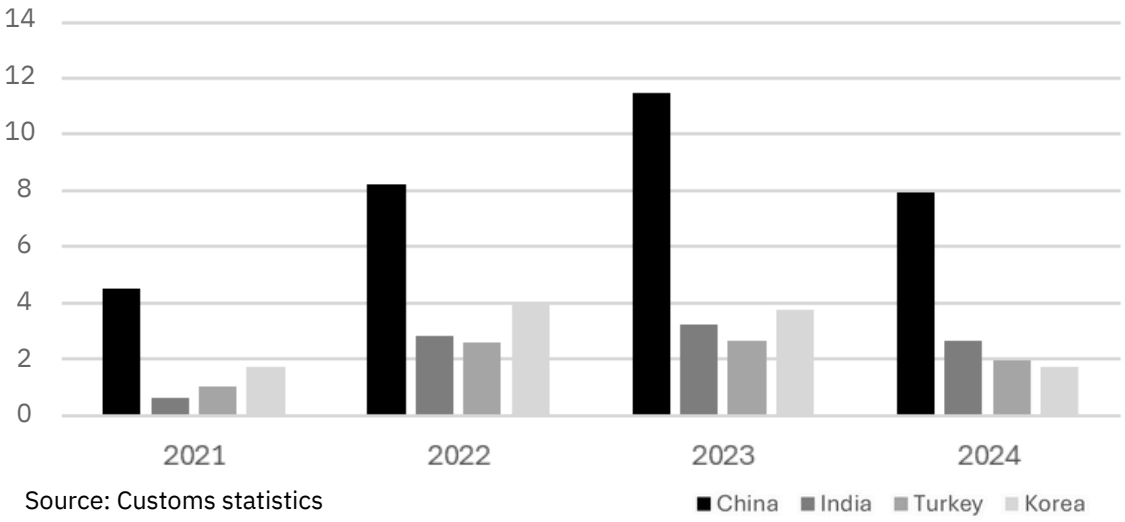
Figure 3 depicts the decline of exports to China, India, Korea, and Turkey since the beginning of 2024 after the massive growth in 2023. The decline of Korea's imports was the most significant at over 35%, while China, Turkey and India reduced their imports by 16.5%, 11% and 10.6%, respectively, during first three quarters of 2024. In absolute terms, China accounted for the largest reduction (13.1 MT) but still continued to import more than the other three main importers combined. Given the reliance on China and India, the future of these markets is a key concern for Russian coal exports.

China was the world's largest importer of coal in 2023 (28.7% of global imports).[32] In 2022, China and Russia agreed that Russia would supply China with 100 MT of coal 'in the coming years'.[33] The Russian government has been advocating for an annual 100 MT supply agreement since at least 2023.[34] However, in January 2024, China introduced import duties of 3% on Russian coking coal and anthracite and 6% on Russian thermal coal.[35] This hindered Russia's competitiveness in the Chinese market, as other major suppliers from Indonesia and Australia are exempt from these duties through a free trade agreement with China.[36] China is developing its domestic coal production in order to reduce its import dependency by 2027.[37] During the first half of 2024, the share of coal in power generation declined to 59.6%, whereas it was 79% in 2011.[38] China's decarbonisation pace and plans will reduce Russia's opportunities to rely on exports to China, which has already been recognised in Russia.[39]

The International Energy Agency (IEA) expects India to become the driving force of global coal demand until 2026.[40] In 2023, India's coal demand grew by 9.8%,[41] and coal was the source of 74% of the nation's electricity generation.[42] Although renewable energy development has been rapid, power demand in India also grew by 7% in 2023,[43] and, unlike in China, the share of coal in electricity generation is continuing to rise.[44] However, the competitiveness of Russian coal in the Indian market has declined in 2024,[45] and India aims to increase its domestic coal production by 40% by 2030.[46] India and Russia have conducted governmental discussions about India increasing its annual coal imports from Russia to 40 MT by 2035; such cooperation would be subject to logistical solutions, but they could be facilitated by upgrading the Eastern railway network over time.[47]

Regardless of the declining volumes, the value of exports to China and to India was 1.8 times and 4 times higher, respectively, during first three quarters in 2024 than in the equivalent period in 2021 (Figure 4). Likewise, Turkey's exports were 1.9 times more valuable. However, Russian coal exporters did not reap all the benefits of the significant price hike in international markets as they had to offer discount prices to secure new customers in Asia.[48] While coal prices remain significantly above the long-term average at the time of writing, the decline of coal prices (Figure 5) and increased export costs have made discounted prices unsustainable.

Figure 4. Value of coal imports from Russia, Q1-Q3, Bln USD



Source: Customs statistics

Figure 5. Coal prices, 2020–2024

Source: https://tradingeconomics.com/commodity/coal. Accessed 2 October 2024.

3.3. Coal transport and growing costs of export

Transport costs have also added to the profitability problems, as the transport capacity in the eastern direction has become scarce. Coal can be transported to the Asian markets by rail via both eastern and western routes, but the eastern route is more profitable and, thus, more congested. Therefore, the extension and upgrade of the Eastern Polygon (i.e. the Baikal-Amur Mainline and the Trans-Siberian Railway; Figure 6) is a key project for improving coal export capacity.[49] As of February 2024, the demand for capacity of the Eastern Polygon was double the available capacity.[50] The Eastern Polygon's capacity was approximately 160 MT of cargo in 2022, and it was planned to expand to 180 MT by 2024 (second stage)[51] and to 270 MT by 2035[52] (third stage).[53] The expansion works have been financed by the National Wealth Fund.[54] However, according to Russian Railways (RZD), subsidised coal rail tariffs jeopardise the agreed-upon investments in the Polygon.[55] The estimated costs of developing the Eastern Polygon are 1.1 trillion rubles (RUR) in the second stage and 3.7 trillion RUR in the third stage.[56] The expansion project has faced many delays, and the bargaining process has involved a range of actors and lobbyists.[57]

Figure 6. The Eastern Polygon - upgrades to the railway infrastructure

Source: Ilyina, N (2022) The Eastern Way, Kommersant 15 November, https://www.kommersant.ru/doc/5667402. Accessed 11 October 2024. In Russian.

There are several private transport infrastructure projects ongoing in the Far East in Yakutia to bypass the Eastern Polygon. Elgaugol, the owner of Russia's largest coal deposit, Elga, is building a private railway and coal port to transport 50 MT of coal to the Asian market at an estimated cost of 146.6 billion RUR.[58]

For many years, coal transport was subsidised by RZD. Coal still accounts for about 70% of the export cargo traffic of the Eastern Polygon, of which the so-called guaranteed transport quota, which ensures the coal-producing regions a certain amount of exports to the East by rail, accounts for about 90%.[59] In 2024, the quota accounted for some 100 MT, up from 93.7 MT in 2023 (Table 1).[60] Regions have criticised RZD for not fulfilling the quota.[61] The renegotiation of the quota is constant, and RZD is regularly challenged by the regions about its fulfilment.[62]

Table 1. Regional rail transport quota to the East for Russia's major coal-producing regions, 2022-24, MT

Region	2024	2023	2022	2021
Kuzbass	54.1	53.1	58.0	53.0
Yakutiya	26.3	26.0	-	-
Khakassia	6.5	6.2	8.6	-

The share of railway logistics costs exceeded 50% of the Kuzbass thermal coal FOB Far East[63] prices in April 2024. This coal was exported at a loss of about USD 5.00 per tonne to maintain the Asian markets.[64] The absolute costs of transport are now at their highest level since 2020.[65]

RZD, which is expected to finance and conduct the extension of the Eastern Polygon, has argued that discounts on coal cargo (i.e. subsidies to coal exporters) would stop the agreed-upon infrastructural investments.[66] The company has repeatedly called for a reduction of the share of coal in the Eastern Polygon. It estimated that discontinuing the guaranteed coal transport agreements with regions would save the company 1 billion RUR per quarter,[67] and downgrading the priority of the coal quota would facilitate a significant increase in the export of higher-value cargo.[68] Furthermore, RZD has advocated for applying a higher transport cost category for coal, which coal companies claim would lead to closures of some coal mines.[69]

Coal transport subsidies also reduce the availability of railway facilities for products with higher added value, such as metals and oil, which have gained importance in the war economy. This issue has been addressed since 2022 with so-called non-discriminatory access, which cut discounts in fees for export transportation of coal by rail to free up transport capacity to the East.[70] In addition, RZD freight railway tariffs have increased several times since 2022, typically by over 10% at a time,[71] and more increases are planned.[72] It is estimated that the current tariffs threaten to reduce Russian exports by 30–40 MT in 2024.[73]

The coal sector is expected to contribute more to the Russian war budget since its tax burden is low. The share of rent taxes is 2%, whereas it is 10% for ferrous metallurgy and 15% for non-ferrous and precious metals.[74] For the first quarter of 2023, the mineral extraction tax was temporarily increased by a flat surcharge of 380 RUR (USD 5.00) per tonne. This issue has been under discussion since, but there is ongoing political struggle over the issue.[75][76] The export duty is tied to the ruble exchange rate.[77] Coal lobbyists have been able to influence this instrument, as it has been applied on and off since 2022.[78] Most recently, the duty was abolished for May–August 2024 to support the coal exporters.[79] These numerous changes demonstrate that the Russian government is searching for a delicate balance between budget revenues and keeping the coal industry afloat. However, the coal industry is clearly not capable of becoming a stable source of additional budget revenue.

Sources (Table 1): Telegram account of RZD, 26 December 2023, https://t.me/telerzd/4230. Accessed 20 September 2024, in Russian; Larina, A (2023) Russian Railways has increased the quota for the export of coal in the eastern direction, 26 December, https://www.kommersant.ru/doc/6427365. Accessed 20 September 2024. In Russian; RBK, 12 January 2022, Putin agreed on quotas for the export of coal from Khakassia, Buryatia and Tuva But they will be provided only with the expansion of the BAM and the Trans-Siberian Railway, https://www.rbc.ru/business/12/01/2022/61dd699d9a7947a8ce2c1580. Accessed 20 September 2024. In Russian.

3.4. Investments and access to technology

Sanctions have limited the coal sector's access to foreign financing. The U.S. sanctions prohibit 'new US investment in Russia's energy sector' and 'financing or enabling foreign companies that are making investment to produce energy in Russia'.[80] The EU has also blocked the Russian state, government, and the Central Bank from accessing the EU's capital and financial market and discontinued Russia's access to the international financial transfer system SWIFT. In practice, this has made most transactions impossible between EU and Russia-based entities.[81] Nevertheless, investments in fixed assets of the Russian coal sector have been at an all-time high since 2022, at the federal level, as well as in the main coal production region, Kuzbass. This high investment could be explained by the significant capital that the coal sector accumulated in 2022 and 2023, when coal prices were at a record high, by the large investments in new coal mines in the Far East, and/or by the hiding of profits to avoid profit-based taxes.[82] However, Russian coal companies' investments fell by 4.4% during H1 2024, which was the first six-month fall since 2020.[83]

The dependence of the Russian coal sector on imports of technologies and equipment,[84] which account for 80% of all equipment on average, has remained unchanged since 2018.[85] The coal sector's access to foreign technology, including spare parts, was already causing acute problems in 2022.[86] By the end of 2023, the depreciation of equipment was 53% in underground mines and 43% in open-pit mines.[87] Import substitution, which has gained importance since Russia's invasion of Ukraine in 2022, has been promoted as a response to the first Western sanctions by the federal government already since 2015.[88] The policy has mostly succeeded in developing domestic low-tech products, but it has mostly failed at the crucial high-tech end.[89] Foreign technology imports have continued – and even increased significantly in 2022 in the case of Kuzbass [90] – because domestic coal technologies did not fulfil the criteria of the coal companies.[91] [92] Technology supplies from Russia's newly vital non-Western allies, especially China, provide one solution.[93] [94] However, they are not free from logistical problems and high prices.[95] There are no data on the Russian coal industry's imports of Western equipment and spare parts via third countries, but Western imports seem likely given the ongoing dependence on imported technologies.

3.5. Employment

The coal sector is a major employer, with more than 140,000 people directly involved in coal mining in Russia.[96] Coal mining enterprises were central in forming most of the cities in the regions. Therefore, the regional budgets, and even many unrelated jobs in the regions, are dependent on the coal sector. Some coal companies are still hiring and plan to continue creating new jobs.[97] However, the current situation overall in the Russian coal industry is not favourable to increasing employment. In the future, employment in the Russian coal mining industry will largely depend on the logistics and profitability of exports. The crisis in the coal industry and the possible layoffs of miners in the near future will have a particularly negative impact on Kuzbass as well as other coal-mining regions and coal single-industry towns, as none of them have diversified their economies.

4.Regional developments across Russia's main coal regions

4.1. Kuzbass

In Kuzbass (Kemerovo), Russia's traditional coal production region in Southwestern Siberia, the coal sector employs some 97,000 people (up from about 90,000 since new mines opened in 2024).[98] In 2023, 152 companies in Kuzbass were responsible for 49.2% of the coal produced in Russia and 43.5% of the coal exported from Russia.[99] The regional budget is dependent on revenue from coal exports, and an average of 42% of tax revenues originated from coal mining between 2019 and 2022.[100] The coal cluster is therefore seen as the provider of regional welfare and is highly influential in regional politics. Kuzbass coal exports have been impacted heavily by Western sanctions, with a 18.5% decline in 2021–2023[101] and a further 6.6% decline in January–August 2024.[102] In April 2024, a number of medium and small coal companies employing over 30,000 people started to reduce their production in Kuzbass.[103] While there have been some bankruptcies and wage arrears in the coal sector since the start of the war,[104] official reports seem to be downplaying such problems, as they contradict the declining exports from the region.

4.2. The Republic of Khakassia

The Republic of Khakassia in southern Siberia has two major export products, aluminium and coal, which contributed about 20% of the republic's budget in 2023.[105] Coal accounted for 40% of exports in 2021.[106] Export data are unavailable, but press reports indicate that Khakassia exported 22 MT in 2022 and 15.7 MT in January–August 2023, with 20–21 MT expected to be exported by the end of the year.[107] Coal production declined by 11% in 2021–2023.[108] Khakassia's quota for exports to the east was significantly smaller at just 6.5 MT in 2024 compared to 8.6 MT in 2022.[109] Other costlier western transport routes have been used.[110] The share of logistics costs, which reduce the profitability of coal exports, reached 70% in August 2024.[111] In April 2024, it was reported that 40–50% of coal mining capacity was suspended as unprofitable,[112] and miners were frequently being put on forced leave.[113] Social tensions may have also escalated in the region in 2024.[114] Thus, it seems that the Khakassian coal industry is still in decline – or even in crisis – at the time of writing.

ilkaydede / Getty Images via Canva

4.3. Yakutia

Yakutia's (Republic of Sakha) coal sector in the Far East, close to the Chinese market, doubled its production to 32.3 MT in 2022–2023.[115] In fact, the governor even claimed a production volume of 38.5 MT in 2023.[116] Thus, the region is implementing the federal government's longer-term plan for the coal industry to 'turn to the East' in response to Western sanctions. Yakutia's coal production has increased during the war and reached 26.8 MT in January–July 2024.[117] About 90% of the coal produced is exported, mostly to China.[118] Therefore, the development of the sector is dependent on access to export markets. The coal industry is a significant employer in the region and provided employment for 30,000 people as of August 2024.[119] Elgaugol, which operates the Elga coal deposit, Russia's flagship coal project, is building a private railway and its own port on the Pacific.[120] Other coal deposits are also building private transport infrastructure in the region.[121] Despite its proximity to the Asian market, Yakutia has experienced some problems with rail transport capacity and suspended some coal washing operations in early 2024.[122] Nevertheless, the region's coal production increased again by 30% in January–July 2024 in comparison to the same period in 2023.[123]

4.4. Krasnoyarsk

Coal mining is a significant part of Krasnoyarsk's regional economy, and the biggest coal mine in Russia – the Borodino open-pit mine – is located in the region. Siberian Coal Energy Company (SUEK) operates three major open-pit coal mines as well as logistics, maintenance, and repair enterprises which employ 5,000 people.[124] While a large amount of coal for export is transported to the East via the Krasnoyarsk region, the region itself produces coal mostly for the domestic market.[125] Domestic demand has increased due to low water levels in rivers in 2022 and 2023, which reduced hydrogeneration in Russia and increased the demand for coal by an average of almost 12% over the demand in 2021.[126] This situation boosted Krasnoyarsk's coal production to a historical high, with 28% growth in 2023 (46.9 MT) compared to 2021.[127] Production grew by an additional 2% during the first quarter of 2024.[128]

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5. Background scenarios for Russia until 2035

While it is not possible to forecast how or when the war will end, imagining alternative future paths for the coal sector required settling for some alternative assumptions as **Step 1** of our methodology. These hypothetical development scenarios were chosen to cover as much ground as possible to illustrate how Russia's different development paths may affect the coal sector. Since the report focuses on the developments of the coal sector, these more general scenarios should be considered as strawmen ideas of Russia's future.

Since February 2022, there have been extensive discussions of Russia's future scenarios, mostly in sketches such as ours. Scenario discussions have typically been presented in thinktank papers and can be divided into those regarding Russia's internal political development, such as Michel's scenarios for the Atlantic Council, [129] and those concerning how the war could end, as in the Chatham House discussions in February 2024 [130] and the military scenarios by Jonsson and Norberg.[131] Perhaps the most extensive set of scenarios comes from the Clingendael Institute, which combines the two types and focuses on the factors influencing such futures.[132] While not a scenario exercise, our recent paper has briefly discussed the drivers of resilience and change in Russia's current political system through an approach that is somewhat similar to the Clingendael Institute's approach to factors influencing possible futures.[133]

From a military perspective, such scenario exercises range from Russia winning the war to Russia losing the war and typically include a frozen conflict option one way or another. The possible scenarios for Russia's political future are broader and range from a democratic Russia (largely recognised as a very unlikely option) to some form of Stalinist system and finally to chaos and the disintegration of Russia. However, the majority of analysts consider the most likely option to be some kind of continuation of the current direction with or without Putin.

To keep the task manageable, our approach was to discard options that seem unrealistic, particularly in view of the 2035 timeframe.[10] For instance, while democratisation is perhaps not an implausible development in Russia, launching and establishing a functional and stable democratic system would take longer than a decade, and such a system would not be up and running by 2035. Furthermore, while we assumed that some kind of centrally controlled political system would continue in Russia, our analysis included the option of democratic developments within the system. The scenarios address the end of the war as a background factor and focus on Russia's position in the world, as this factor is the most relevant to coal transport. In the following paragraphs, we outline three scenarios which combine developments in the war and Russia's political system. They are used to set the scene for our alternative futures for the coal sector.

Scenario 1 - End of hostilities

In this scenario, Russia's war in Ukraine is over, and more peaceful times have returned to Europe. Russia either lost the war or was not victorious as defined by the Putin Administration. A new leadership has secured peace and an end to hostilities with the West, and the Western sanctions hindering the Russian coal sector have been lifted. Regarding the political system, the new leadership has softened the current authoritarian rule in the absence of both the war and the previous political leadership's historical burden, potentially even allowing for democratic openings and meaningful public participation in decision-making. By 2035, the Russian economy moves away from the war economy modus and refocuses on improving the standard of living. Exports of industrial products and fossil fuels to Western countries contribute budget revenues. Globally, national low-carbon targets, which influence coal demand in export markets, are being met and have even been tightened or surpassed in some cases.

Scenario 2 - Geopolitical tensions
This scenario involves unresolved conflict in Ukraine or what could be defined as a partial victory for Russia but with ongoing geopolitical tensions. Western sanctions against Russia are still in effect and being tightened over time, including with measures to prevent the evasion of the sanctions. The political system remains more or less the same as in 2024 with totalitarian features, but the political leadership has changed as a result of Putin's death or resignation. The new political leadership has had the opportunity to distance itself from some of the Putin Administration's policies regarding Ukraine, including through the reduction of military activities, but has not chosen to find common ground with the West.

Consequently, in 2035, the Russian economy remains dependent on the military sector, while the budget continues to receive some revenue from fossil fuel exports, albeit less than in 2024. Overall, societal welfare continues to decline. Decarbonisation policies are being implemented internationally as pledged but not exceeded, so their impact on international coal demand is less significant than in the previous scenario.

Scenario 3 - Expanding war
In this scenario, Russia's active warfare has continued in Ukraine and even expanded to include smaller conflicts with NATO countries. Over the years, this situation has led to high tensions and further isolation of Russia, even from China, due to threats to deploy tactical nuclear weapons. Both Western countries and China have imposed tighter sanctions against Russia, and the U.S. secondary sanctions have extended to most Russian coal producers. Under this scenario, Putin remains the president and further tightens his authoritarian rule, which leads to an even more closed society than in 2024. As his power weakens over time, and the chaos in the country intensifies, power struggles emerge in some more remote Russian regions.

The Russian economy is dependent on the war machine, and the country is preparing for a major conflict with NATO. Societal welfare is in significant decline. A significant share of export revenues have been lost, including from the fossil fuel sector and from coal in particular. The uncertainties surrounding ongoing conflicts and havoc in the energy markets disrupt the implementation of decarbonisation policies in some countries.

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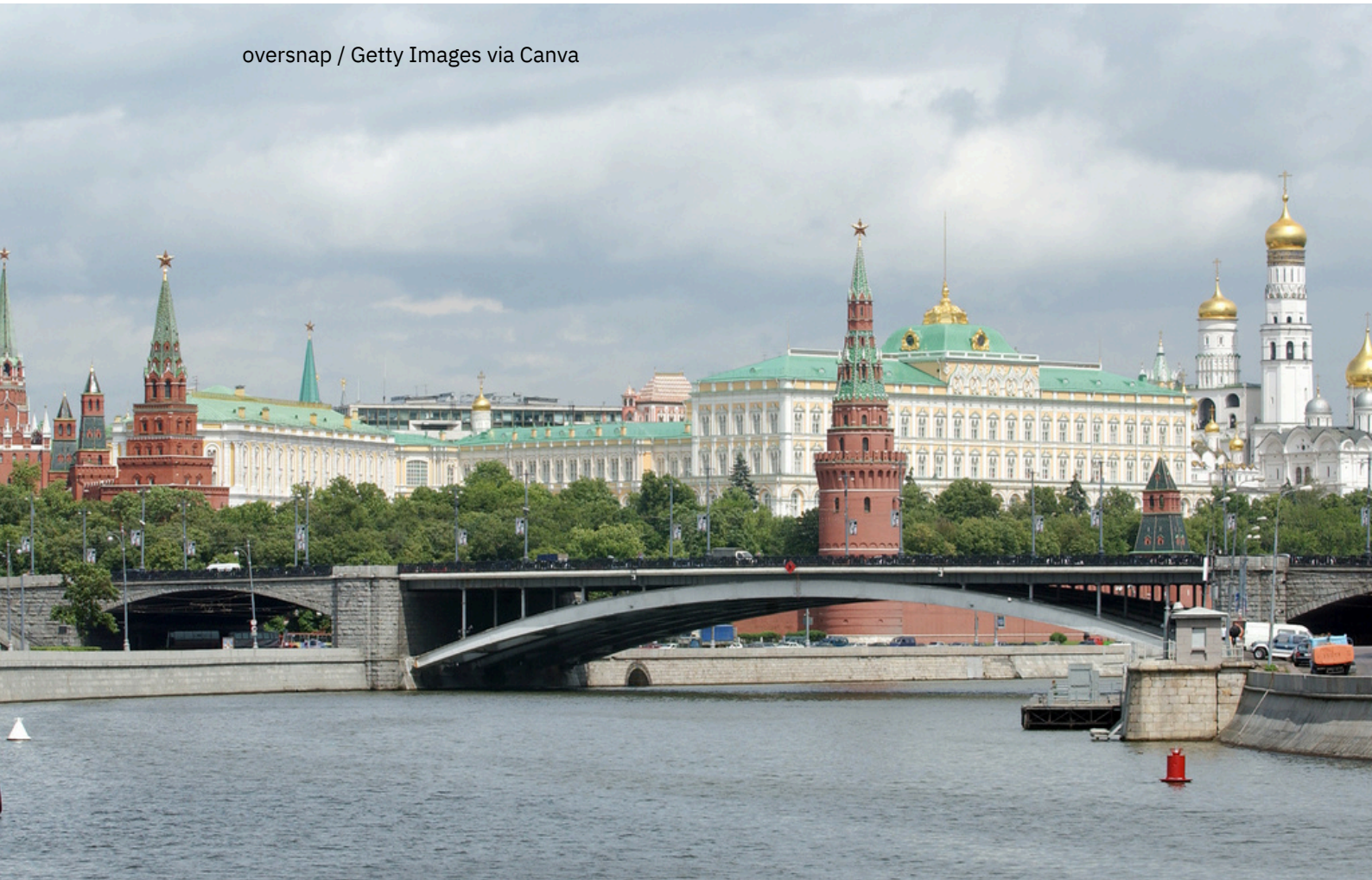

Table 2. General assumptions of geopolitical, internal, and global developments relevant to the Russian coal sector in the three scenarios

	End of hostilities	**Geopolitical tensions**	**Expanding war**
War/Geopolitics	• The war concludes with Russia losing • Geopolitical tensions are resolved	• Russia wins, or there is a frozen conflict • Geopolitical tensions are ongoing • Russia remains somewhat isolated	• Active war continues • Smaller conflicts emerge between Russia and NATO countries • Geopolitical tensions are high • Russia is further isolated, even by China
Sanctions	• Sanctions are lifted	• 2024 sanctions continue • Sanctions gradually tighten	• Sanctions become tighter • Secondary sanctions are imposed on those trading with sanctioned Russian coal companies
Political system	• New leadership • Softening of authoritarian rule • Some democratic movement and opening for public participation in decision-making	• New leadership • Putinist system remains but does not intensify • Putin's exit allows for a decline in war activities	• Putin retains leadership • Aggression extends beyond Ukraine • Authoritarian rule intensifies • Society becomes more closed
Russian economy	• Economy reorients from military to civilian sectors • Fossil fuel export revenues are generated	• Military share of the economy remains important • Some fossil fuel export revenues are generated • Societal welfare declines	• War economy is strong • Country prepares for conflict with NATO countries • Societal welfare significantly declines • A significant share of export revenues from the fossil fuel sector are lost • Regional collapses increase poverty and migration within Russia
Global low-carbon trend	• Countries are on track with their decarbonisation goals or even tighten or surpass them in some cases	• Countries are mostly on track with their decarbonisation goals but are neither tightening nor surpassing them	• Ongoing war and high geopolitical tensions disrupt the achievement of national climate goals • Some goals are postponed or missed

6. Alternative futures for the Russian coal sector until 2035

In this section, we outline three alternative futures for the Russian coal sector in 2035, which represents **Step 2** of our methodology, and builds on the background scenarios for Russia that are outlined in the previous section.

Future 1 - Developing Coal Sector
This future, enabled by the End of hostilities scenario, is a positive one for the Russian coal sector that represents a significant improvement over the sector's current situation in 2024. In this future, Western sanctions have been lifted following the return of peaceful times, and (at least some) cooperation has resumed between Russia and the West. Resuming exports of products other than coal to Europe has freed up rail capacity for continuing exports to Asian markets Russian coal producers have been developing since the Western coal embargo was announced. Thus, the Russian coal sector has enjoyed the fruits of what is probably the last active decade of the declining global coal market. The global low-carbon trend has been accelerated by more peaceful times, which has reduced international demand for coal at a slightly faster pace than would be the case in the less peaceful futures.

Future 2 - Shift to the East
This future, which corresponds to the Geopolitical tension scenario, is more or less a continuation of the 2024 track from the coal sector point of view. Western sanctions have been gradually tightened, but the Asian market has been able to maintain a coal sector, albeit with limited logistical access for coal. Exports have continued but have declined over time. Coal exports have experienced short-term ups and downs depending on domestic policies defining the costs of and access to rail transport as well as changes to coal prices in international markets. The coal sector has 'turned to the East' earlier than planned, and some of the traditional coal production regions that are located further from the Asian markets, such as the Siberian regions of Kuzbass and Khakassia, have not been able to rely on coal sector revenues as much as they did before.

Future 3 - Declining Coal Sector
This future, which unravels in the context of the Expanding war scenario, represents a 'perfect storm' for the Russian coal sector. Both domestic and international conditions have worsened as the geopolitical situation has escalated, and even China has become less supportive of Russia. As coal exports have significantly declined, coal production is predominantly for domestic use. Over the observation period, these changes have led to a sharp decline in the standard of living in the main coal-producing regions further from Asian markets, and social tensions may have emerged in these regions.

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7.Backcasting: How could the three futures for the coal sector unfold?

Step 3 of our approach presents the development paths leading to each of the possible futures for the coal sector in 2035, outlined in the previous section. This section discusses how the status quo would have to change to arrive at these alternative futures. Most of the circumstances are, of course, beyond the control of the coal sector.

7.1 Pathway to Future 1 – Developing Coal Sector

The Putin regime is replaced in 2025, and the new regime, while not especially Western-minded or democratic, finds a way to agree on genuine peace with Ukraine and end the hostilities with the West. Peaceful times return to Europe, and sanctions against Russia are lifted in 2025. This less hostile political environment continues until 2035. In the early 2030s, democratic elements even appear in the Russian polity, and a genuine participatory civil society emerges. Non-democratic governance still prevails in decision-making.

Coal exports, which plummeted in 2024, start recovering from 2025, soon after the sanctions are lifted. European markets are recovered only partially for a number of reasons, including political reservations about the energy supply from Russia, the continuation of practices developed during the embargo of Russian coal, and Europe's ongoing process of phasing out coal. Japanese and Korean markets recover to pre-2022 levels. In China and India, the demand for coal, although still significant, declines due to growing domestic coal supplies and more competitive alternative suppliers, and is overall less influenced by the lifting of sanctions when compared to other markets. However, the removal of the U.S. sanctions is influential because it reduces the risk of secondary sanctions for companies which import Russian coal. Domestic demand remains mostly stable but is less crucial to many coal companies since the export market demand is sufficient for production growth.

Coal production starts growing slightly from 2025–2026 after the 2024 decline, although it plateaus by around 2030. The end of growth is due to the coal phase-out policies in Europe and the decarbonisation measures included in the subsequent five-year plans, especially in China but also in India, which are launched in the mid-2020s. However, in regards to production and exports, the Russian coal sector manages to capitalise on the last five to ten years of global coal demand prior to the decarbonisation trend taking effect from 2030–2035, which puts coal consumption – and, thus, demand – in global decline.

The exports of many other products beyond coal resume to Europe, which reduces the congestion of the Eastern Polygon and allows for more rail capacity for coal from 2025–2026. This also limits the need to increase the costs of rail transport and allows RZD to increase and fulfil regional transport quotas. The upgrade of the Eastern Polygon is implemented with only a slight delay after the removal of the Russian state's pressure to spend money on warfare in Ukraine. The capacity of the Eastern Polygon reaches 270 MT of cargo by 2032 (+88% over the 2021 level).[134] The end of the war economy also reduces the need to press for further fiscal measures on the coal sector, which, together with the return of transport subsidies by RZD, improves the profitability of coal exports.

Resumed access to Western technologies facilitates investments in further coal mining and processing capacities, especially in the Far East, and leads to the diversification of regional economies in areas located further from the Asian markets. Investments in the late 2020s are facilitated by the super profits gathered during the coal price peak in 2022–2023. Most new mines produce coking coal in response to predictions of declining global demand for thermal coal in the 2030s, due to decarbonisation measures. In particular, China's 15th five-year plan in 2026–2030 leads to a reduction in China's coal consumption, which is reflected in Russia's declining exports to China over time.

Employment initially recovers in the sector from 2025 onwards as the coal mines and processing plants start producing at full capacity. The level of employment remains steady until 2030 in the traditional coal production regions and continues increasing in the Far East. In the 2030s, the number of jobs starts declining in the traditional coal production regions as the sector shifts towards the East. Additionally, automation begins to reduce the need for a large workforce and shifts jobs from manual mining to more highly qualified positions which are harder to fill. In the short term, this becomes a major limiting factor for coal sector development.

7.2. Pathway to Future 2 - Shift to the East

President Putin steps down or dies in 2025–2026, and his replacement leadership continues the current political system. More importantly, the new leadership does not renege on the goals Putin set for Russia's war in Ukraine. By 2026–2027, the situation resembles a frozen conflict, or Russia even advances its control of Ukrainian territories, but no clear victory occurs by 2035. There is no peace agreement or serious negotiations, and both sides maintain their positions while engaging in sporadic warfare. The Western sanctions regime is tightened or revised partially over time but is not joined by any new countries. Russia's tensions with the West continue, and no cooperation is resumed by 2035. Europe is divided into two blocks for more than a decade. European industrial production and foreign trade evolve and follow new paths, which makes it more difficult to re-establish trade with Russia.

Russian coal production and exports are in decline from 2024. The fear of U.S. secondary sanctions cuts off many previous importers entirely, particularly Japan and South Korea. Many major Chinese and Indian companies and banks also scale back their commitment to Russian coal. Here, the increasing domestic coal production capacity plays a central role, as the uncertainties around rail delivery and the declining competitiveness of Russian coal boost supply security–related actions in both India and China. Russian coal producers endeavour to find new markets, but these markets are more remote and less profitable due to the higher transport costs.

The regional shift already observable in 2024 continues until 2035, by which time the structure of coal production has changed; the central parts of Russia are focused on increasingly valuable products, and the volumes of coal production have declined significantly. The Far Eastern new mining region becomes the centre of development at the sectoral level. New coal sector investments target the Far Eastern region but are complicated by ongoing technology sanctions.

The upgrading of the Eastern Polygon continues throughout the observation period but is somewhat delayed by the lack of sufficient workforce and financing, which resulted from the on-off approach to domestic subsidies supporting coal exports from otherwise unprofitable coal production regions. The coal sector occasionally benefits from the growing transport capacity in the 2030s. However, most of the capacity is allocated to more valuable export products to maximise tax revenue for the federal budget, which struggles to finance the ongoing conflict in Ukraine and achieve a social balance over time.

Throughout this period, Russian coal loses its profitability due to the tax burden, which remains high. Furthermore, non-discriminatory access works against the coal sector, as more valuable export products are prioritised. However, the fluctuation of coal prices opens occasional opportunities for profit-making for Russian coal exporters. Employment remains uncertain, and layoffs and wage arrears are commonplace throughout the country, especially in the traditional coal production regions of Kuzbass and Khakassia. By 2035, the workforce has declined, though regional differences are significant.

7.3. Pathway to Future 3 - Declining Coal Sector

President Putin remains in office until 2035 or well into the 2030s and continues to tighten the authoritarian regime. Active warfare in Ukraine continues, and smaller conflicts with NATO countries occasionally emerge, which keeps geopolitical tensions high. Russia loses China's indirect support as a result of its aggression and threats to deploy tactical nuclear weapons in the battlefield in the late 2020s. Western sanctions are tightened, and China joins in the sanctions regime to try to force President Putin to accept peace.

Coal exports are in decline from the mid-2020s, and Russian coal miners lose most of their export markets following China's decision to join the coal embargo. Other buyers start rejecting Russian coal or encounter difficulties with finalising their transactions with Russian coal companies, as most Russian coal companies are on the U.S. sanctions list. By the early 2030s, most of Russian coal exports have practically ceased. The domestic demand for coal declines alongside the declining economy, which substantially decreases the coal production in Russia throughout the observation period.

The last major investments in coal production are made in the Far East in the mid-2020s, as it becomes obvious that the sector's future prospects are bleak. Some coal-producing regions manage to invest the capital generated during the peak coal price period in 2022–2023 to diversify their economies to serve the needs of the war economy; others experience social tensions and poverty as well as population migration to other regions. Employment in the coal sector declines dramatically to around half of 2022 levels. As the remaining coal sector mostly relies on lower quality, domestically produced technologies, Russia reaches its 'technology sovereignty' goal. Nevertheless, there is plenty of equipment available from the closed coal mines and processing plants which can be recycled and cannibalised to keep the equipment functional.

The upgrades of the Eastern Polygon have not been finalised. Russia's isolation from the world economy has escalated to such an extent that there is no need for growing rail capacity in any direction. Even if the Putin regime falls soon after 2035, the Russian coal sector will have failed to tap into what is expected to be the final years of demand for coal before it is mostly phased out globally by the low-carbon trend.

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8.Regional futures

As **Step 4**, this section discusses the implications of the alternative futures for the Russian coal sector for Russia's four largest coal-producing regions.

Kuzbass – The declining coal heartland

Developing Coal Sector: Kuzbass resumes its position as the main coal producer and exporter for five to ten years until the planned shift of the Russian coal sector to the East takes place around 2035. It re-enters the European market – not to the same extent as before the war, but enough to ease the pressure on the Eastern Polygon's capacity. Employment and standard of living return to pre-war levels and improve over the next decade. Reorienting some of Kuzbass coal exports to Europe allows time for the diversification of its economy before coal exports start to dwindle and enables the development of the coal sector towards higher-value processed coal products for export beyond 2035.

Shift to the East: The shift to the East continues due to Western sanctions as the war lingers on. The profitability of Kuzbass coal in the Asian export markets depends on the fluctuating price of coal, federal-level political decisions regarding the transport quota and tariffs, and the fiscal burden. In the period up to 2035, the coal sector continues its steady decline, which includes the reduction of its once-significant contribution to the regional budget. Other regions located closer to the Asian markets win the internal competition for export markets. In their search for budget revenues, federal-level authorities consider the profitability of Kuzbass coal production to be too low to justify higher subsidies by 2030. Employment, standard of living, and investments in coal are also in steady decline. Some diversification plans are implemented within the regional economy but remain half-hearted, as coal sector stakeholders continue to dominate regional politics for too long.

Declining Coal Sector: The Kuzbass coal sector mostly collapses once exports to China are stopped. However, some production and processing remain to supply coal for the domestic market and local use. Some coking coal exports and coal technology industry remain in business. The dramatic decline of coal sector jobs causes a social crisis, as the standard of living declines rapidly with no alternative jobs available. Due to ongoing war efforts, the federal government has no available funds for a just transition of the coal sector. As the coal sector starts to collapse in the late 2020s, a large number of miners migrate to other regions or are sent to the war in Ukraine to avoid social unrest and protests similar to those which occurred in the last days of the Soviet Union. The budget of the Kuzbass region becomes dependent on federal transfers.

Khakassia – Too far from Asia to rely on coal

Developing Coal Sector: After Western sanctions are lifted, the Khakassian coal sector is revived by the ability to resume some exports to Europe. However, ongoing uncertainties concerning new developments in coal mining capacity in the Far East – and, thus, the approaching shift of the Russian coal sector to the East – reduces investments in the Khakassian coal sector. After the initial reopening of mining capacity, the number of jobs gradually declines, and the sector is unable to maintain the standard of living in the region, which becomes increasingly dependent on the aluminium industry and further diversification of the regional economy.

Shift to the East: The Khakassian coal sector continues to struggle with coal exports due to frequent changes in regulations regarding rail access and costs as well as the fiscal burden, which determine the profitability of Khakassian coal. Some miners are laid off, and no new investments are made in new coal capacity. By 2035, the diminished sector is mostly supplying domestic markets in order to return the investments made before the closure of the mines. The regional economy either relies on other sectors or declines alongside the coal sector. Heavier migration to other regions and social unrest begin by around 2030.

Declining Coal Sector: The coal sector mostly closes in Khakassia with the exception of production for regional use. The sector is no longer a significant employer in the region, which either diversifies its economy or becomes dependent on transfers from the federal level. The sudden final collapse of the coal sector due to the closure of Chinese markets causes some social unrest, which the federal level mitigates by paying wage arrears and quelling local protests. Many miners are sent to the war in Ukraine to limit potential rebellion, and some migrate to other regions. The standard of living of the remaining population in the region declines significantly to below 2024 levels, but the remaining coal industry secures regional supplies of power and heat.

Yakutia – The emerging centre of coal production next to Asia

Developing Coal Sector: Yakutia successfully increases its coal production to 80–100 MT by the mid-2030s and supplies coal to Indian, Chinese, and other Asian markets. The private railways are commissioned in the second half of the 2020s, which reduces regional dependency on the federal centre, and construction of a direct railway to China begins. The number of jobs, investments, and the standard of living rise until decarbonisation policies and the domestic coal production of Asian countries start to curb the demand for coal in the 2030s. Yakutia, which mostly produces coking coal, is initially less affected, and some Chinese demand is ensured by infrastructural links. The last successful decade of the coal export industry generates funds for the development of the regional economy towards niche export sectors. The coal sector never becomes a tradition in the region but just one sector of the economy to rise and fall.

Shift to the East: Yakutia's coal sector focuses on exports, but investments diminish due to the declining demand in Asian countries, particularly China, by 2035. Private transport infrastructure is commissioned in the second half of the 2020s, but delays to the extension of the Eastern Polygon perpetuate problems with transport capacity to the East as coal production in Yakutia grows to 60–80 MT by the mid-2030s. Employment and standard of living remain relatively consistent but do not improve as planned after the late 2020s.

Declining Coal Sector: The loss of the Chinese market reduces Yakutia's coal exports dramatically. However, some exports continue to other Asian countries, especially India. Yakutia produces around 30–40 MT of coal per year in the 2030s. Coal demand in Asia is not curbed as quickly as predicted since global decarbonisation efforts have slowed down. Yakutian coal producers are competitive in some domestic markets, but investments in further coal mining capacity end. Employment and standard of living decline to some extent. While the coal sector remains active, other sectors of the economy gain importance.

Krasnoyarsk – Stable producer of coal for domestic markets

Developing Coal Sector: Following reconnection with the West, the Russian economy and coal sector are in more favourable positions than they were during the war. On the one hand, the recovering economy consumes more coal and exporting regions which had to previously reorient some of their products to domestic markets are able to return to exports, leaving more domestic markets available for Krasnoyarsk. On the other hand, the Carbon Border Adjustment Mechanism, CBAM, reduces the coal demand in some manufacturing industries upon restarting exports to the EU, and the reduced need for the war industry cuts domestic coal consumption. Furthermore, gasification of the region in connection with the construction of the Power of Siberia 2 gas pipeline to China reduces the regional demand for coal. Some of the pre-war investment plans in new coal deposits in the northern part of the region proceed, which increases regional coal exports by 2035. In comparison to export-focused regions, the Krasnoyarsk coal sector remains fairly stable until 2035.

Shift to the East: The continuation of the war or a frozen conflict slowly reduces the extra demand for Krasnoyarsk coal, as export-focused regions located further from the Asian markets, especially Kuzbass and Khakassia, seek out domestic markets to replace exports. As China is the main trade partner, Russia promotes the construction of the Power of Siberia 2 gas pipeline, which brings pipeline gas to the Krasnoyarsk region to compete with the dirtier coal. Nevertheless, the Krasnoyarsk region continues producing coal for the domestic market, and the ongoing conflict with the West has little impact on it.

Declining Coal Sector: The economy is isolated, and the standard of living declines. The end of wider coal exports, even to Asia, makes the domestic coal market more competitive even though many previously export-focused mines have closed. Krasnoyarsk coal production fluctuates depending on the availability of hydropower and the needs of the war industry. Either winning or losing the survival competition between coal producers by 2035 remains plausible. Because of the cooling relationship between Russia and China, the Power of Siberia 2 gas pipeline plans fail to materialise, and Krasnoyarsk coal producers do not lose their markets to pipeline gas by 2035.

9. Conclusion

It is not known what the future holds for Russia and its coal sector. In this report, we have discussed alternative future paths for this socially important sector and drawn attention to the political choices by the Russian government and other governments which facilitate these paths. The external conditions of continuity and change for the Russian coal export sector are driven particularly by geopolitics, economic policies, and the low-carbon trend. Geopolitics has emerged as a decisive factor for whether there is access to coal markets. The economic policies related to the war economy essentially concern the continuation of government subsidies to coal exports versus the expectation that the coal sector will contribute to the war budget. Beyond these two factors, which are defined by government decisions about war and peace, the low-carbon trend is a longer-term decisive factor in the continuity or the decline of the demand for coal, which results from the decisions of foreign governments to introduce and implement climate mitigation policies. Here, the direction of change is generally known, but the speed of such change remains uncertain, especially in different geographies.

Since the Russian government started gathering funds for its war economy, the economic viability of exports from the coal-producing regions in Siberia has been contested. The government has been dismantling the de facto subsidies to make way for more profitable products in the available rail capacity to the East. However, it is clear that the coal sector is keen to continue the past practices of relying on subsidies. The main justifications are typically social and relate to jobs, their cascading effects amongst the population, and the dependence of the regional budget on the sector. It is logical that the government would rather see Siberian coal production regions remain afloat than descend into crisis. Yet, from an economic point of view, when gathering extra revenue for the federal budget, it is hard for the government to justify paying subsidies to maintain coal exports in the Siberian coal production regions. Perhaps the memory of protests by Soviet coal miners who did not receive their salaries supports the continuation of subsidies for the time being. Nevertheless, if the economic situation becomes more dire, it will be more likely that choices must be made between sectors when allocating rail capacity to the East. This choice will likely favour more profitable sectors – and regions, in terms of coal exports – which can contribute to the government coffers.

As long as the current status quo at the time of writing continues – more or less following the Shift to the East future path – the slowly declining coal export industry will surf the waves of domestic policymaking about rail tariffs and capacities, fiscal burden, and coal prices in (mostly) Asian markets. The export-based coal regions in Siberia, Kuzbass and Khakassia, will decline and undergo social changes, while the opposite will be true for Yakutia in the Far East. This development may be framed in terms of regional competition, especially by the coal-exporting regions in decline; however, the fact is that the war economy divides the winners from the losers, i.e. the profitable coal exports and regions from the unprofitable ones. Prior to the war, the latter relied, at least partly, on government subsidies, such as discount prices on rail transport, state investments in sufficient rail capacity, and a low fiscal burden compared to other industrial sectors. The Developing Coal Sector future would ease the conditions, thus allowing government subsidies to coal exports to continue. The Declining Coal Sector future, which would turn the coal sector inwards, illustrates the crucial role of China and the political stakes of relations between the two countries for the coal sector. After all, there is no Plan B if Russia loses China’s support.

Furthermore, low-carbon policies may be delayed but are underway, and Russian coal sector stakeholders should not convince themselves that Asian markets will be immune to this transition. Both China and India are rapidly developing their renewable energy capacities. The transition away from current coal import levels can occur suddenly, as switching from coal to renewables is coupled with increasing domestic coal production to avoid supply security issues. The relative stability of the coal sector in Krasnoyarsk, which focuses on the domestic market, under all three future paths highlights the uncertainties surrounding coal exports, the success of which will make or break the coal sectors of export-dependent regions. Krasnoyarsk is probably also less vulnerable to the global decarbonisation trend given the lack of serious domestic mitigation policies in Russia. Exporting regions will have to adjust to the shrinking global coal markets, while foreign climate mitigation policies could have a lesser, indirect influence on the demand for Krasnoyarsk coal. Reduction of coal consumption by the domestic manufacturing industry in order to achieve a smaller carbon footprint in export markets could reflect also on demand for coal produced in Krasnoyarsk; however, domestic heat and power producers are less likely to face such pressures.

Our future paths can be viewed from multiple angles, including in the short or long term. For instance, the recovery and success of the Russian coal sector would, of course, be socially desirable for the Russian coal-producing regions, at least in the short to middle term. However, the dominance of the coal sector would probably lead to less economic diversification in Russian coal-exporting regions. This low diversification would have socially adverse effects in the decarbonising world in the middle to long term, as no new sectors of the economy would be developed to replace the regional income and employment provided by the declining export-based coal industry. While outside the scope of this paper, paths beyond the coal sector could also hold benefits for the populations of coal-producing regions, especially in the longer term, if the diversified regional economies generate revenue from less uncertain sources than the coal sector. There could also be positive health effects locally from reducing the air pollution caused by coal production and consumption.

Finally, while our exercise did not focus on the likelihood of the future paths, the Shift to the East future would be the closest to a continuation of the status quo as of September 2024. While the peaceful Developing Coal Sector future path is geopolitically the most desirable, at least for the West, the opportunities available to the coal sector in Europe depend on timing as well. If Europe continues without Russian coal for several years, the return of Russian coal seems less likely, as the EU will be phasing out coal altogether.

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