

RUSSIA'S COAL SECTOR: BETWEEN SANCTIONS AND THE GLOBAL ENERGY TRANSITION

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EXECUTIVE SUMMARY

- While coal's contribution to Russia's energy system, economy, exports, and tax revenue is much smaller than that of oil and natural gas, coal mining sustains other key industries, including metallurgy; and coal transportation is the backbone of Russia's rail system. In addition, coal miners and their protests have had political impact in Russia, in both the late Soviet and post-Soviet periods.
- Unlike the natural gas sector, Russia's coal sector was almost entirely privatized during wrenching reforms in the 1990s. These reforms yielded a largely modern and competitive industry geared toward both domestic consumption (roughly 40% of production) and exports (roughly 60% of production).
- The Russian coal industry's structure and markets vary considerably across the country, as demonstrated in Kemerovo, Komi, and Sakhalin. The Kuznetsk Basin (known as Kuzbass) in Kemerovo is Russia's dominant coal-producing region and, due to its location, can efficiently ship coal eastward to Asia or westward to Europe. The Pechora Basin (located in Komi, in the Russian Arctic) largely supplies Russia's highly developed metals sector. Sakhalin, in Russia's Far East, primarily exports to Asian markets but also serves essential energy needs in this isolated region.
- Looking ahead, Russia's coal industry faces significant macro-level challenges, including Western sanctions and global efforts to reduce coal consumption. It also faces operational challenges due to rail capacity constraints, competition for rail access from more profitable goods, a large domestic surplus of natural gas following the collapse of Russia's gas exports to Europe, and competition for Asian markets from other regional suppliers, among others.

Introduction

The coal sector is an essential element of Russia's energy system and an important factor in its social and economic stability. Coal provides over 10% of Russia's energy mix, and though it generates smaller budget revenues than oil or natural gas, coal has an important economic role. The coal sector employs over 140,000 people, or 0.2% of Russia's working population,¹ but it is highly concentrated geographically and is linked to other key industries, such as metallurgy. Coal is also the leading cargo for rail transportation in Russia, comprising 20.1% of domestic cargo and 43.9% of export cargo in 2021,² and thus is a critical revenue source for this key element in Russia's transportation infrastructure.

Russia's government began to restructure the country's coal industry in 1994 and completed the process in about a decade—a remarkably short time.³ The

restructuring program followed International Monetary Fund and World Bank standards to shut down the most unprofitable mines and privatize the remaining facilities. Restructuring affected production, technology, corporate, and financial-economic systems.⁴ The coal sector in modern Russia is the only major industry to have successfully transitioned from full subsidization to full market independence.

In 1998, Russia dissolved Rosugol, the coal sector's state monopoly and an analogue to the gas sector's Gazprom. Today the Russian coal sector consists of a complex web of holding companies, stand-alone private enterprises, and traders, typically integrated into large industrial groups such as SUEK, UGMK, ELSI, EVRAZ, Kolmar, and Mechel. These structural changes not only halted the coal industry's collapse but also spurred recovery and successful long-term development.

Today, Russia's coal sector faces macro-level challenges from Western sanctions and the global

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- 1 The percentage is calculated based on 142,744 workers in the coal industry in 2022 and a total working population in Russia of 71 million. For workers in the coal industry in 2022, see I. Petrenko, "Russia's Coal Industry Performance in January–December 2022" [in Russian], *Ugol' 3*, no. 1165 (2023): 21–33. For Russia's total working population, see Rosstat (Federal State Statistics Service), "Employment and Unemployment in the Russian Federation as of March 2021" [in Russian], https://rosstat.gov.ru/bgd/free/b04_03/IssWWW.exe/Stg/d02/77.htm.
 - 2 See PJSC Russian Railways, *Annual Report 2021: Selecting the Green Future* [in Russian], 2022, 46–47. Russian Railways' most recent available report (*Annual Report 2022: More than Transport* [in Russian], 2023) does not provide any updated information on cargo volumes. Rosstat provides only the shares of various types of cargo in overall loaded cargo (no distinction between export and domestic); the share of coal in railway cargo was 28% during the first 11 months of 2023, down from 29% in 2021–2022. See Rosstat, "Cargo Loaded on Railway Transport (since 2005)" [in Russian], December 27, 2023, <https://rosstat.gov.ru/statistics/transport>; Rosstat, "Cargo Transport by Type of Transport" [in Russian], December 27, 2023, <https://rosstat.gov.ru/statistics/transport>. No other good exceeds coal in volumes loaded for railway transportation.
 - 3 For comparison, the closure of unprofitable coal mines in France spanned almost 50 years from 1956 to 2005. Poland, which began reforms concurrently with Russia, has yet to finalize the procedure for decommissioning unprofitable mines.
 - 4 G. Krasnyansky, "How Has the Coal Industry of Russia Changed in 20 Years" [in Russian], *Rossiyskaya Gazeta* 217, no. 6788 (2015), <https://rg.ru/2015/09/28/promyshlennost.html>.

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energy transition, as well as a variety of other obstacles. Notwithstanding its challenges, however, Russia's coal sector produced record output in 2022.⁵ Available data for the first half of 2023 show persistent growth with higher domestic demand and export recovery.⁶ Whether Russia can sustain its coal production and exports in the coming decade remains an open question.

Russia's Coal Sector

Regional and Organizational Structure

Russia's coal production is concentrated around several core regions (Figure 1). Three of these regions—Kuzbass, Komi, and Sakhalin—provide useful models to understand the wider sector's structure and evolution. Figure 2 displays their relative output.

Kemerovo/Kuzbass

The Kuznetsk Basin, known by the contraction Kuzbass, stands as Russia's foremost coal-producing area. In 2022, enterprises in Kuzbass extracted 223 million tons of coal, constituting over half of Russia's total coal production and 58% of coking coal production for that year. Kuzbass coal production makes up a broadly proportionate share of Russian coal exports, at 57% in 2022.⁷ Kuzbass coal mining is predominantly in Russia's Kemerovo Region, in the south-central portion of the Siberian Federal District. Kemerovo lies to the northeast of Kazakhstan and to the northwest of Mongolia.

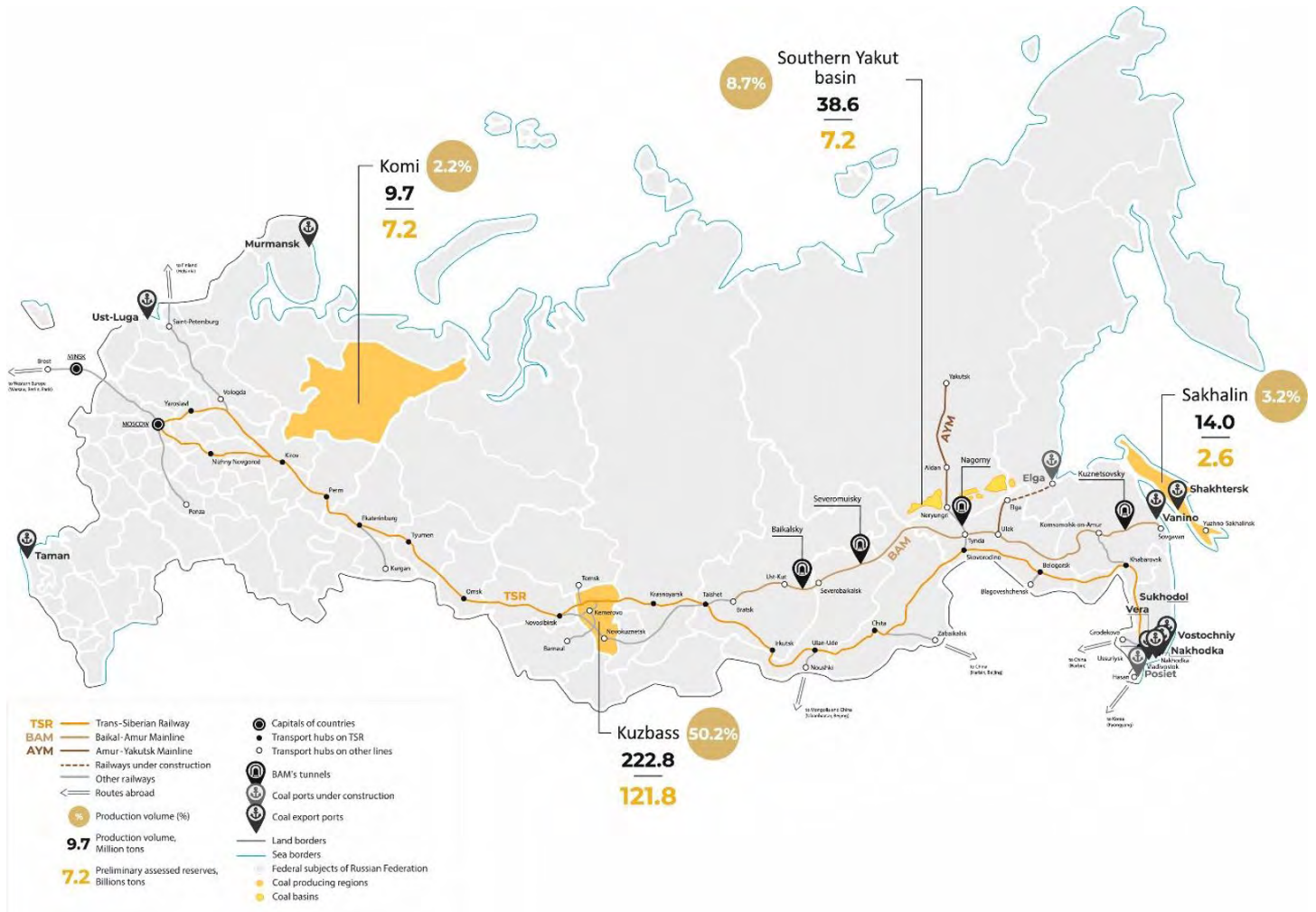
Kuzbass coal production has shaped the Kemerovo Region since World War II. During the war, Soviet officials moved industries eastward in response

5 Energy Institute, *Statistical Review of World Energy 2023*, vol. 72, 2023, <https://www.energyinst.org/statistical-review>; Petrenko, "Russia's Coal Industry Performance in January–December 2022."

6 G. B. Meshkov, I. E. Petrenko, and D. A. Gubanov, "Russia's Coal Industry Performance for 1st Half-Year, 2023" [in Russian], *Ugol'* 9, no. 1171 (2023): 5–13; Petrenko, "Russia's Coal Industry Performance in January–December 2022." Meshkov, Petrenko, and Gubanov, "Russia's Coal Industry Performance for 1st Half-Year, 2023"; Petrenko, "Russia's Coal Industry Performance in January–December 2022."

7 Petrenko, "Russia's Coal Industry Performance in January–December 2022."

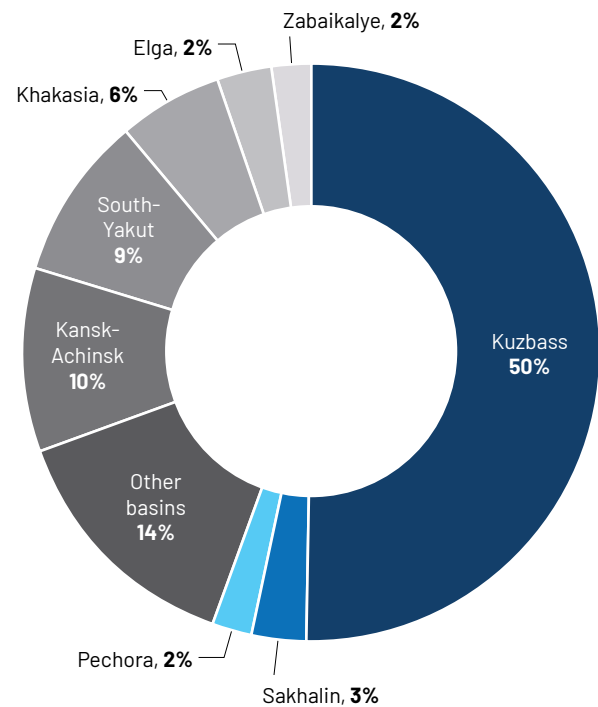
Figure 1. Coal-producing regions and transportation infrastructure in Russia



Source: N. Lomagin et al., *Russian Coal in the Era of Climate Change* (Palgrave Macmillan, 2023), <https://doi.org/10.1007/978-981-99-5370-7>.

to wartime imperatives; this shift contributed to Kemerovo’s emergence as Russia’s largest coal mining region. The Soviet government made wide use of forced labor in the early stages of the coal industry’s development, but by the early 1950s officials had begun developing policies to attract and motivate coal industry workers. The cohesive community of coal workers that resulted had a significant role in Soviet and Russian political development in the 1980s and 1990s.⁸

Figure 2. Geographical structure of coal production in Russia, 2022



Sources: Rosstat and Central Dispatching Department of the Fuel and Energy Complex (CDU TEK); as quoted in I. Petrenko, “Russia’s Coal Industry Performance in January–December 2022” [in Russian], *Ugol’ 3*, no. 1165 (2023): 21–33.

8 In the late 1980s, the coal industry in the Soviet Union operated primarily in mining settlements or single-industry towns, fostering close professional relationships among miners that evolved into neighborly connections. Work-related issues intertwined with community matters, creating conditions in which protests could easily expand in size and in geographic scope. These protests included blocking rail traffic, halting work in underground facilities, and even undertaking “marches” to Moscow. Miners’ political demands ranged from altering the ownership structure of coal enterprises, increasing prices, and permitting the sale of coal in international markets, to establishing independent production standards for enterprises and even restructuring the Soviet government. The miners’ interests aligned with those of the “new industrial bourgeoisie,” including factory managers, and their combined political pressure helped Russian president Boris Yeltsin to prevail in his confrontation with Soviet president Mikhail Gorbachev and steer Russia and other former Soviet republics toward independence. See A. T. Gavrilov and N. I. Lavrov, *Strike: An Unavoidable Measure to Protect Legal Rights, But Is It the Right Way?* [in Russian] (Profizdat, 1989); D. A. Levchik, *Russia at Strike: Miners’ Strike Committees and Professional Unions, 1988–1995* [in Russian] (Direct-Media, 2020), 29, 46–47, 197; N. Lomagin et al., *Russian Coal in the Era of Climate Change* (Palgrave Macmillan, 2023), 50–52, 63, <https://doi.org/10.1007/978-981-99-5370-7>.

The Kuzbass coal industry had largely taken shape by the mid-1980s. Integrated coal and metallurgical production formed the foundation for the regional economy; officials later developed the chemical industry, mechanical engineering, the energy sector, and a construction industry tailored to local demands. Together, these diverse industries came to dominate Kemerovo's economy.⁹ Coal, metals, and related metallurgical products now constitute approximately 95% of the region's exports.¹⁰ Coal fuels local thermal power plants as well, and contributes significantly to the regional budget, providing up to 40% of taxes annually.

Kuzbass coal exports have generally integrated well into global markets, in part due to the region's large, efficient, vertically integrated companies.¹¹ As a consequence, Kuzbass coal production enjoys significant autonomy from Russia's domestic demand patterns. Conversely, however, it is relatively vulnerable to international market pressures and trends.

Kemerovo's location near the mid-point of Russia's trans-Siberian railroad was previously a considerable

geographical advantage relative to other Russian coal-producing regions; Kuzbass mines could seek the best prices for their coal in Europe or in Asia. Sanctions and Russia's loss of the European coal market¹² have eliminated this flexibility.

In 2021, Kuzbass enterprises sent 29% of their hard coal exports to the EU—a proportionate share of Russia's overall prewar coal exports to the EU (Figure 3)—and an additional 9% to Turkey and 6% to Ukraine.¹³ After the EU imposed sanctions, Kuzbass coal companies had to find alternative markets for over two-fifths of their exports. Notably, Kuzbass coal exports do not simply go east or west by rail based on whether they are bound for Asia or Europe. Indeed, significant quantities of Kuzbass coal go to Asia via ports in western Russia, such as Murmansk (Barents Sea), Ust Luga (Baltic Sea), Novorossiysk and Taman (Black Sea), and Azov (Azov Sea). As a result, despite changes in destination, the average share of Kuzbass coal exports among all cargo along Russia's eastern railways increased only slightly in 2022 compared to 2021.¹⁴ Today, Russia's rail transport capacity is

9 A. Korppoo, P. Sakharov, and K. Tsvetava, "New Realities of the Russian Coal Sector: Focus on Kuzbass," *Climate Strategies*, 2023, <https://climatestrategies.org/publication/new-realities-of-the-russian-coal-sector-focus-on-kuzbass/>; E. Sherin, "Historical and Geographical Features of the Formation of the Kuzbass Coal Complex" [in Russian], *Bulletin of Tomsk State University* 2, no. 40 (2016): 56–62.

10 Kemerovo Regional Authority of the Russian Federal Statistics Service, "Foreign Economic Activity" [in Russian], 2023, <https://kemerovostat.gks.ru/folder/38673>.

11 Y. Fridman, G. Rechko, and E. Loginova, "Kuzbass and Coal in the Context of Perfecting Development Harmonization Mechanisms" [in Russian], *World of Economics and Management* 19, no. 2 (2019): 89–98.

12 European Commission, "Ukraine: EU Agrees Fifth Package of Restrictive Measures against Russia," April 8, 2022, https://ec.europa.eu/commission/presscorner/detail/en/IP_22_2332.

13 Korppoo, Sakharov, and Tsvetava, "New Realities of the Russian Coal Sector: Focus on Kuzbass."

14 The share increased to 35% in 2022 from 33% in 2021. *Ibid.*, 29.

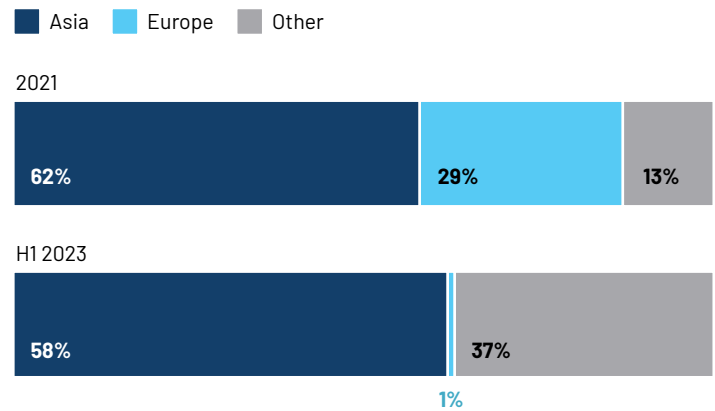
the principal constraint on the ability of Kuzbass to redirect its coal exports.

Other challenges for the region’s coal industry include competition for markets in Asia, enduring labor-management issues, and pressures surrounding the coal industry’s environmental and climate impacts.

Komi/Vorkuta

Russia’s Komi Republic sits along the western edge of the northern portion of the Ural Mountains. Komi is home to the Pechora Basin, one of Russia’s largest coal deposits by reserves, and Vorkuta is Komi’s leading coal mining center. Komi’s coal output ranged between 8 million and 13 million tons from 2015 to 2022, equal to only about 4% of Kemerovo’s; but it has long been a key Russian coal-producing region. Production has declined over the last decade, most notably in 2015–2018 (Figure 4).¹⁵

Figure 3. Structure of Russia’s coal exports in 2021 and H1-2023

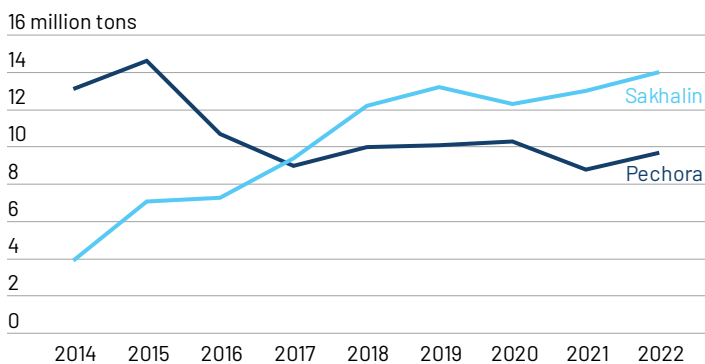


Sources: BP, *BP Statistical Review of World Energy*, 71st ed., 2022, <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2022-full-report.pdf>; G. B. Meshkov, I. E. Petrenko, and D. A. Gubanov, “Russia’s Coal Industry Performance for 1st Half-Year, 2023” [in Russian], *Ugol’ 9*, no. 1171 (2023): 5–13.

Note: In 2021, the “other” category includes Turkey, Morocco, Brazil, and Israel; in 2023 it includes Turkey, the United Arab Emirates, and Belarus.

¹⁵ Data in this paragraph are based on annual statistical reports published in *Ugol’* the Russian coal journal; see I. Petrenko, “Russia’s Coal Industry Performance in January–December 2021” [in Russian], *Ugol’ 3*, no. 1152 (2022): 9–23; Petrenko, “Russia’s Coal Industry Performance in January–December 2022”; I. Tarzanov, “Russia’s Coal Industry Performance in January–December 2015” [in Russian], *Ugol’ 3*, no. 1080 (2016): 58–73; I. Tarzanov, “Russia’s Coal Industry Performance in January–December 2016” [in Russian], *Ugol’ 3*, no. 1092 (2017): 36–51; I. Tarzanov, “Russia’s Coal Industry Performance for January–December 2017” [in Russian], *Ugol’ 3*, no. 1104 (2018): 58–73; I. Tarzanov, “Russia’s Coal Industry Performance in January–December 2018” [in Russian], *Ugol’ 3*, no. 1116 (2019): 64–79; I. Tarzanov and D. Gubanov, “Russia’s Coal Industry Performance in January–December 2019” [in Russian], *Ugol’ 3*, no. 1128 (2020): 54–69; I. Tarzanov and D. Gubanov, “Russia’s Coal Industry Performance in January–December 2020” [in Russian], *Ugol’ 3*, no. 1140 (2021): 27–43.

Figure 4. Coal production in the Pechora and Sakhalin Basins, 2014–2022



Sources: See regular reports on Russia’s coal industry performance in Ugol’, issues 1080, 1092, 1104, 1116, 1128, 1140, 1152, and 1165 [in Russian].

Most of Komi’s coal yield stays within the region, where the Russian steel company Severstal is the dominant consumer.¹⁶ Severstal produced 11.6 million tons of steel in 2021, which made it Russia’s fourth largest producer behind NLMK (17.4 million tons), MMK (13.6 million tons), and Evraz (13.6 million tons).¹⁷ Vorkutaugol, Severstal’s main supplier and former

subsidiary, is the largest coal producer in the Komi Republic. Vorkutaugol also supplies coal to NLMK.¹⁸

Before 2022, the Komi Republic had exported about 1.2 million tons of coking coal annually to metallurgical markets in Europe. The EU’s fifth sanctions package, announced in April 2022, prohibited the purchase, import, or delivery of coal from Russia.¹⁹ The sanctions package came into effect in August 2022 after a brief transition period. Though the European Commission later updated and clarified its directive to specify that EU sanctions on Russian coal would not aim to prevent coal shipments from Russia to third countries, the EU policy effectively closed both EU and non-EU European coal markets to Russian coal exports.²⁰

Sakhalin

While Sakhalin’s coal reserves are modest compared to those of the Pechora Basin, this large island off Russia’s Pacific coast is close to Asian markets and enjoys good access to ports and maritime transport routes as well as experienced managers from Kuzbass.

16 Ministry of Economic Development, *Strategy of Social and Economic Development of the Komi Republic until 2035* [in Russian], 2019, <https://docs.cntd.ru/document/553237768>; Vorkutaugol, “About the Company” [in Russian], <https://vorkutaugol.ru/about>.

17 V. Milkin and D. Kuznetsov, “Largest Russian Steel Producers Increase Production” [in Russian], *Vedomosti*, October 24, 2023, <https://www.vedomosti.ru/business/articles/2023/10/24/1002110-krupneishie-staleliteinie-kompanii-rossii-naraschivayut-proizvodstvo>.

18 Ministry of Economic Development, *Strategy of Social and Economic Development of the Komi Republic until 2035*; Vorkutaugol, “About the Company.”

19 European Commission, “Ukraine: EU Agrees Fifth Package of Restrictive Measures against Russia,” April 8, 2022, https://ec.europa.eu/commission/presscorner/detail/en/IP_22_2332.

20 A. U. Seker, “EU Eases Sanctions on Russian Coal,” Anadolu Agency, September 31, 2022, <https://www.aa.com.tr/en/economy/eu-eases-sanctions-on-russian-coal/2691032>.

Sakhalin's production and transportation systems are also relatively modern.

When the Soviet Union collapsed, Sakhalin's coal industry faced serious challenges due to high production costs and reliance on dwindling government support.²¹ Nevertheless, the Russian government was loath to accept the political, economic, and social costs and risks inherent in closing the mines and frequently delayed closure decisions. Sakhalin's unprofitable coal industry was a major local employer and had historically accounted for nearly three-quarters of the Sakhalin region's total fuel balance.²² Moreover, the isolated region's energy needs exceeded local production: to power both communities and Sakhalin's energy-intensive extractive industries, up to 1 million additional tons of coal had to be transported from the mainland each year.²³ Mine closures would have created an energy crisis across the entire island. Restructuring and privatizing Sakhalin's coal industry was a turning

point. By 2000 the mines had become privately owned entities, and as such they increased production and became profitable.

Since 2013, Sakhalin's coal sector has pursued an export-led strategy. The East Mining Company's operations in the Solntsevsky coal basin are a good example of this. Several factors shaped the decision to adopt an export-oriented policy. First, continuous growth in Russia's coal processing and mining volumes forced producers to explore new markets. Second, Japan's construction of new coal-fired power plants following the 2011 Fukushima nuclear accident provided new optimism for coal producers. Third, the conversion of the Yuzhno-Sakhalinskaya CHP-1 power plant to natural gas slashed Sakhalin's coal consumption by almost 2 million tons annually starting in 2011.²⁴ Finally, Sakhalin's cheaper open pit mining²⁵ and efficient transportation positioned the island's coal to compete favorably in international markets.²⁶ Sakhalin coal production, exports, and revenues have

21 E. Kovalchuk, "Analysis of the Current State and Prospects for the Development of the Coal Industry of Sakhalin" [in Russian], *Mining Information and Analytical Bulletin* 5 (2002): 40–44.

22 P. Leonov, I. Belousov, and I. Pankin, *Region on the Islands: A Brief Outline of the History, Development of the Economy and Culture, the Activities of the Party Organization of the Sakhalin Region* [in Russian] (Mysl', 1974), 98.

23 M. S. Vysokov et al., *History of Sakhalin and the Kuril Islands from Ancient Times to the Beginning of the 21st Century* [in Russian] (Sakhalinskoye knizhnoye izdatelstvo, 2008).

24 I. Andreev, "Eastern Mining Company—Focus on the Asia-Pacific Region" [in Russian], *Ugol'* 3, no. 1056 (2014): 38–39.

25 In Soviet times, Sakhalin's mines were both open and underground; in 1990, roughly one-third of coal production came from open mines and two-thirds from underground mines. During the industry reorganization in the 1990s, many nonprofitable mines closed. These were predominantly underground. Open pit mines have led post-2013 coal sector growth in Sakhalin. See Sakhalin Regional Authority of the Federal Statistical Service, *Industry of the Sakhalin Region* [in Russian], 2001, 314.

26 I. Andreev, "Coal Prospects for Sakhalin" [in Russian], *Ugol'* 3 (1044): 39.

increased significantly since 2014 and have overtaken the Komi Republic's coal sector.²⁷

Sakhalin's coal grades have consistently been of high quality, and the proximity of deposits to the sea has been a significant factor in Sakhalin's competitiveness. However, even during the peak years of the Soviet era, coal production on the island fell considerably short of current records. The success of the East Mining Company, therefore, can be attributed not only to favorable circumstances and natural factors but also to a high level of modern management. (2013).

Transportation

Russia's underdeveloped railway infrastructure in the Far East has been a weakness for decades, if not a century. With Russia's government increasing its focus on trade opportunities in Asia, Russian Railways launched the ambitious Eastern Polygon²⁸ Modernization Program in 2013 and plans to complete

the effort by 2025. The program has concentrated on modernizing the Baikal-Amur Mainline (BAM) and the Trans-Siberian Railway (Transsib) to eliminate bottlenecks and enhance railway capacity from 158 million tons in 2013 to 210 million tons by 2025,²⁹ with a further increase to 255 million tons possible by 2031–2032.³⁰ Russian Railways is financing the project.

Kuzbass coal—for domestic use and for export—makes up the bulk of Far East rail capacity. Remarkably, coal exports to Asia make up over 70% of the eastbound cargo on the BAM and Transsib.³¹ Coal transportation uses so much capacity in part because many eastbound shipments force Russian Railways to return empty railcars westward. Using empty coal railcars for other cargoes via reverse loading (sending cargo from east to west on these two lines) requires cleaning the cars and hence is rarely economically attractive.³²

The Eastern Polygon Modernization Program envisions annual eastbound transportation of 195 million tons of

27 Petrenko, "Russia's Coal Industry Performance in January–December 2021"; Petrenko, "Russia's Coal Industry Performance in January–December 2022"; Tarzanov, "Russia's Coal Industry Performance in January–December 2015"; Tarzanov, "Russia's Coal Industry Performance in January–December 2016"; Tarzanov, "Russia's Coal Industry Performance in January–December 2017"; Tarzanov, "Russia's Coal Industry Performance in January–December 2018"; Tarzanov and Gubanov, "Russia's Coal Industry Performance in January–December 2019"; Tarzanov and Gubanov, "Russia's Coal Industry Performance in January–December 2020."

28 The Eastern Polygon is the eastern section of Russia's rail system, centered around the Trans-Siberian Railway.

29 Federation Council, "The Implementation of the Second Stage of Modernization of the Eastern Polygon of railways was discussed at the meeting of the Federation Council" [in Russian], March 27, 2023, <http://council.gov.ru/events/news/143669/>.

30 N. Skorlygina, and E. Zainullin, "BAM Pulled into the Future" [in Russian], *Kommersant*, November 22, 2022, <https://www.kommersant.ru/doc/5680875>.

31 T. Bulokhova, N. Grigorieva, and V. Olintsevich, "Ways to Increase the Profitability of Transit Traffic on the Eastern Polygon of the Trans-Siberian Railway" [in Russian], *Baikal Research Journal* 12, no. 2 (2021): 21.

32 M. Bazhenov, "Eastern Polygon: New Opportunities or Old Limitations?" [in Russian], *Maritime News of Russia*, October 11, 2020, <https://morvesti.ru/analitika/1687/86211/>.

Russian coal by 2025.³³ This is a very challenging goal, given that current overall capacity is below that figure, let alone that coal's share in total transport capacity is so high. Russian Railways identifies its primary challenges as labor shortages, unreliable contractors, and insufficient financial resources. Russia's ongoing military conscription may further exacerbate labor availability among railway contractors,³⁴ especially among essential skilled workers like machine operators, construction equipment operators, electricians, and bridge construction workers.

Russia's military intervention in Ukraine, subsequent Western sanctions on coal and oil exports, and closure of EU ports to sea transportation from Russia have only intensified existing logistics challenges in Russia's east. Russia's existing rail capacity is insufficient to accommodate both cargo transit (including coal) and rail deliveries of oil exports to the east. The Russian government's decision to grant priority to container transportation and rail-based oil shipments has thus far displaced coal in eastbound traffic. China's increasing use of Russia's transit routes, along with the higher profitability of the goods trade, is also putting downward pressure on coal exports and creating uncertainty for coal companies. This situation is

likely to persist for at least three years until Russian Railways increases the Eastern Polygon's capacity and boosts coal shipments through southern ports in the Black and Azov Seas.

Markets

Despite evident hurdles, 2022 was a record year for Russia's coal production volumes. Russian coal companies produced 437 million tons, 1.2% more than in 2021.³⁵ This trend appears to have continued during the first half of 2023 due to export recovery and domestic demand growth. According to the Russian Federal State Statistics Service (Rosstat), Russia's coal output in the first half of 2023 amounted to 212.6 million tons, up 1.1% (or 2.3 million tons) from the first half of 2022.³⁶

Over 80% of Russia's coal production is hard coal, while the remaining portion is lower-quality brown coal and lignite.³⁷ Russia generally relies upon domestic production for both its domestic needs and its exports, though Russia imports some 5% of its overall supply from Kazakhstan, mainly for power generation.³⁸ Overall, Russia used about two-fifths of its coal

33 Decree No. 1582-r dated June 13, 2020, "On Approval of the Program for the Development of the Russian Coal Industry for the Period up to 2035" [in Russian].

34 Korppoo, Sakharov, and Tsvetava, "New Realities of the Russian Coal Sector: Focus on Kuzbass."

35 Petrenko, "Russia's Coal Industry Performance in January–December 2021"; Petrenko, "Russia's Coal Industry Performance in January–December 2022."

36 Meshkov, Petrenko, and Gubanov, "Russia's Coal Industry Performance for 1st Half-Year, 2023."

37 Rosstat, "Industrial Production in Russia" [in Russian], 2021, <https://rosstat.gov.ru>.

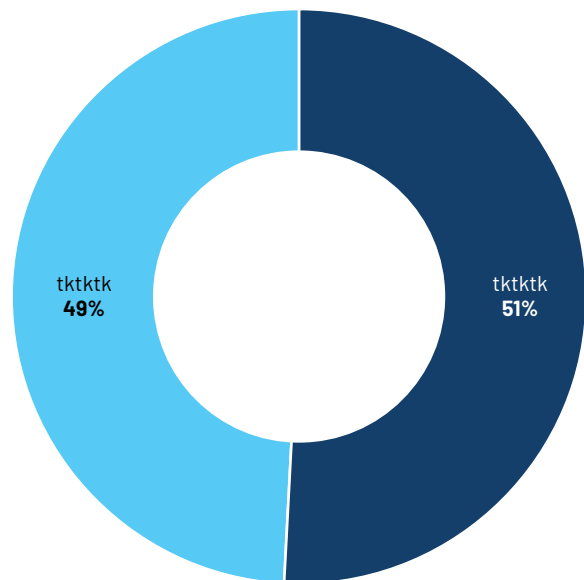
38 Meshkov, Petrenko, and Gubanov, "Russia's Coal Industry Performance for 1st Half-Year, 2023."

production domestically in 2020 and exported the remaining three-fifths (Figure 5).³⁹

Russia's Domestic Coal Market

Russia's electricity sector, including power plants as well as combined heat and power, is the leading source of domestic demand for coal (Figure 6). About one-sixth of Russia's installed power generation capacity is coal-fired, while nearly half is gas-fired.⁴⁰ As in many other countries, coal consumption for power generation is not evenly distributed; European Russia relies chiefly on natural gas and nuclear energy, while smaller and more isolated cities and towns east of the Urals primarily depend upon coal-fired power plants and hydroelectric dams. Fuel switching to natural gas is a plausible option for power generation along natural gas export pipeline routes in Russia's far east.⁴¹ Substantial volumes of natural gas were stranded within Russia following the collapse of Russia's gas exports to Europe, and these could make fuel switching more attractive in the future.⁴²

Figure 5. Hard coal and lignite demand structure, 2020



Source: Rosstat, *Russian Statistical Yearbook* [in Russian], 2022, <https://rosstat.gov.ru/folder/210/document/12994>.

39 Rosstat, *Russian Statistical Yearbook* [in Russian], 2022, <https://rosstat.gov.ru/folder/210/document/12994>.

40 System Operator of the Unified Energy System of Russia, *Unified Energy System of Russia: Preliminary Results* [in Russian], September 2022, <https://www.so-ups.ru/functioning/ups/ups-review/ups-review22/>.

41 V. Milkin, "Ministry of Energy Will Accelerate Gasification of Siberia and the Far East" [in Russian], *Vedomosti*, March 16, 2023, <https://www.vedomosti.ru/business/articles/2023/03/16/966712-minenergo-uskorit-gazifikatsiyu-sibiri-i-dalnego-vostoka>.

42 T. Mitrova, "The Outlook for Russia's Natural Gas Sector," Energy Innovation Reform Project, October 18, 2023, <https://innovationreform.org/eirp-russia-energy-series-russias-natural-gas-sector/>.

Figure 6. Structure of domestic coal consumption in Russia, 2020



Source: I. Petrenko, "Russia's Coal Industry Performance in January–December 2022" [in Russian], *Ugol' 3*, no. 1165 (2023): 21–33.

International Markets

The restructuring of Russia's coal industry allowed Russian firms to enter international coal markets. Since 2000, the country has consistently increased coal export volumes, with exports surpassing domestic consumption in 2014 (according to the Statistical Review of World Energy⁴³) and in 2017 (according to analysis of Russian coal companies' data⁴⁴). Coal exports declined in 2022 due to sanctions and logistical limitations⁴⁵ but seemed to be recovering in the first half of 2023, though not to record 2021 levels.⁴⁶

The geographical structure of Russia's coal exports has changed significantly since 2021 (Figure

3). Exports to China and India have increased substantially, but decreased exports to Japan and South Korea have kept Asia's overall share at a level comparable to 2021. Russia's coal exports to Europe have virtually ceased, with "other" destinations (outside Europe or Asia) absorbing most of what formerly went to Europe. Turkey and the United Arab Emirates are notable "other" markets in which Russian coal exports have considerably increased.

In addition to rail transport capacity limitations, Russia faces two other constraints to increasing its coal exports to Asia: policy-driven efforts to phase out coal and replace coal-fired power plants with natural gas power plants; and strong competition from regional coal exporters. Australia and Indonesia have established export relationships and each benefits from more flexible sea shipping routes.

43 Energy Institute, *Statistical Review of World Energy 2023*, vol. 72.

44 Petrenko, "Russia's Coal Industry Performance in January–December 2022." Petrenko's data suggest that in 2014–2017, the balance between exports and domestic consumption was close to 50/50.

45 Ibid.

46 Meshkov, Petrenko, and Gubanov, "Russia's Coal Industry Performance for 1st Half-Year, 2023."

03

Challenges

Russia's coal sector faces several large-scale challenges in the coming decade. Ongoing Western sanctions, which affect access to markets and logistics, appear likely to endure for some time. Sanctions also have negative tax consequences for the coal sector through impacts on the federal budget. Finally, a global energy transition is encouraging a shift away from coal.

Sanctions

Sanctions pose multiple problems for the coal sector:

- **Access to alternative markets:** Sanctions restricting access to alternative markets for Russian coal include bans on Russian coal imports and the closure of many European ports to Russian vessels. They also include limitations on technical or financial assistance and brokering services (European Union, United Kingdom, Switzerland) and new investment in Russia's energy sector (United States).
- **Logistics inside the country:** Internal logistics pose challenges that exacerbate existing limitations on cargo transit capacity. The reorientation of trade flows from west to east has contributed to these logistical complexities.
- **Competition with other energy resources:** Coal faces stiff competition with other energy

resources, but not solely as a primary source of energy. It also competes as an object of transportation—and in this competition, coal is losing ground to container transportation and oil transportation, which are prioritized.

- **Reduced prospects for exporting coal:**

The higher profitability of other goods has overshadowed coal's prospects for export. This uncertainty poses challenges for coal companies, especially in Kuzbass.

In 2022, Russia's eastward coal exports were affected by sanctions, but in the first half of 2023, the situation improved. Indeed, by the end of 2022, the carrying capacity of the mainlines of the Eastern Polygon had increased by almost 5 million tons per year and reached 158 million tons, facilitating the export of coal through the ports of the Russian Far East. This larger carrying capacity allowed for a 5% increase in coal shipments through these ports, making this route a priority route for exporting coal from the Kuzbass, Khakassia, and Yakutia regions. The export of coal through northwestern ports also increased by almost 20%.⁴⁷

Russia could take a couple of key steps to overcome logistical constraints and strengthen transportation of exported coal in the face of sanctions. First, it could seek to address some of the logistical challenges in the Eastern Polygon—for example, through infrastructure development and streamlining of transportation routes to enhance efficiency. Second,

47 Meshkov, Petrenko, and Gubanov, "Russia's Coal Industry Performance for 1st Half-Year, 2023."

it could focus on southern ports (Black and Azov Seas) as an alternative route for coal exports, potentially bypassing some of the challenges associated with existing routes.

Russia's Federal Budget and Taxes

Russia's federal budget revenue from the fuel and energy complex rests on two pillars: the mineral extraction tax (MET) and export duties. Following imposition of Western sanctions, Russia has raised taxes on fuels and other exports to boost federal revenue.

Russia's MET rate for coal had been set at Rub 57/ton.⁴⁸ Since early 2022, Russia has pegged its coal MET rate to 1.5% of the average Australian coal price (SGX TSI FOB Australian Premium Coking Coal OCT).⁴⁹ Preliminary calculations under actual market conditions demonstrate that the new tax scheme could have increased 2022 MET revenue more than sixfold, from Rub 25 billion to Rub 160 billion.⁵⁰

Russia was not levying export duties on coal and— notwithstanding public discussion of this in 2022—it had not moved forward with such a plan. Nevertheless, Russia's government imposed broad-based export duties on many goods starting on October 1, 2023. These duties will range from 4% to 7% of customs value, depending on the ruble exchange rate, and will take effect when the exchange rate is Rub 80/US\$1 or higher (that is, as the ruble becomes weaker against the US dollar, and exporters earn more rubles for foreign sales). In addition to the coal industry, the most affected industries include other mining sectors, metallurgy, and fertilizers.⁵¹

Overall tax revenues from the coal industry in Russia doubled between 2021 and 2022, reaching Rub 360 billion.⁵² While this is far below the figures for federal oil and gas industry revenue—coal accounts for less than 1.5% of the federal budget, compared to 30–40% for oil and gas⁵³—it is nevertheless quite significant for local budgets in coal-producing regions like Kemerovo.

48 E. Zainullin, "Coal in the Tax Context" [in Russian], *Kommersant*, April 10, 2023, <https://www.kommersant.ru/doc/5925835>.

49 V. Milkin, "Belousov Expects Zero Export Duty on Coal in 2023" [in Russian], *Vedomosti*, October 7, 2022, <https://www.vedomosti.ru/economics/articles/2022/10/07/944453-pravitelstvo-ne-nachnet-vzimat>.

50 Author's calculations based on data from the Central Bank of Russian and from Petrenko, "Russia's Coal Industry Performance in January–December 2022."

51 Interfax, "Russia Introduces Export Duty Linked to Ruble Exchange Rate to a Wide Range of Products" [in Russian], September 21, 2023, <https://www.interfax.ru/business/922039>.

52 Zainullin, "Coal in the Tax Context."

53 In 2023, the share of oil and gas revenue in the Russian federal budget was at a 20-year low (29% for H1-2023); the dynamic resembles that during the COVID19 pandemic in 2020 (28%, down from a decade average of 45%). See Ministry of Finance of the Russian Federation, "Brief Annual Information on the Execution of the Federal Budget (billion rubles)" [in Russian], May 12, 2023, <https://minfin.gov.ru/ru/statistics/fedbud/execute/>; Ministry of Finance of the Russian Federation, "Preliminary Assessment of the Execution of the Federal Budget in January–July 2023" [in Russian], August 8, 2023, https://minfin.gov.ru/ru/press-center/?id_4=38632-predvaritelnaya_otsenka_ispolneniya_federalnogo_byudzheta_za_yanvar-iyul_2023_goda.

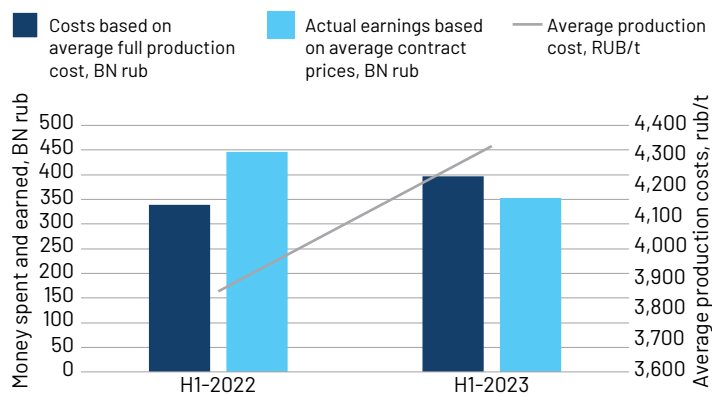
Moreover, there is an important distinction between the oil and gas industries, on one hand, and the coal industry, on the other. Because the Russian government owns shares in major oil and gas enterprises, it earns income directly from its holdings in addition to tax revenue. The Russian government does not have a similar role in the coal sector, in no small part due to the sector's consistently lower profitability.⁵⁴

By increasing taxes in 2022 and the first quarter of 2023, the Finance Ministry aimed to capture excess profits arising from sharp increases in coal prices in 2021–2022. Yet Russian coal producers were unable to capitalize fully on this favorable market situation due to Russia's military operations in Ukraine, which led to significant discounts on Russian coal against global benchmarks. (Discounts reached 50% as early as April 2022). Meanwhile, railway tariffs and bulk freight rates increased. Later in 2022, the stronger ruble also weakened coal export profits.⁵⁵

The coal industry is restoring its export volumes as Russia addresses logistical issues within the country. However, there are underlying challenges in the coal industry, much as there are in the natural gas sector, which could pose serious problems. Domestically, both natural gas⁵⁶ and coal became unprofitable in 2023 due to higher

costs and lower earnings (Figure 7). This new reality will test Russia's coal sector.

Figure 7. Profitability of supplies to the domestic market based on costs and actual supply volumes, H1-2022 and H1-2023



Sources: Calculated based on data from G. B. Meshkov, I. E. Petrenko, and D. A. Gubanov, "Russia's Coal Industry Performance for 1st Half-Year, 2023" [in Russian], *Ugol* 9, no. 1171 (2023): 5–13; I. Petrenko, "Russia's Coal Industry Performance in January–December 2022" [in Russian], *Ugol* 3, no. 1165 (2023): 21–33.

Note: Costs include production only and do not account for transportation.

54 Fridman, Rechko, and Loginova, "Kuzbass and Coal in the Context of Perfecting Development Harmonization Mechanisms."

55 Zainullin, "Coal in the Tax Context."

56 N. Seybil and Elena Petrova, "Vyacheslav Kulagin: 'The Rejection of Gas Exports to Europe Hits Russia's Gasification'" [in Russian], *Novye Izvestiya*, March 4, 2023, <https://newizv.ru/news/2023-03-04/vyacheslav-kulagin-otkaz-ot-evropeyskogo-eksporta-gaza-udarit-po-gazifikatsii-rossii-399650>.

Energy transition

Many argue that Russia is fundamentally opposed to the energy transition or, at the very least, that the transition will disadvantage Russia.⁵⁷ This is an oversimplification.

Soviet archival records demonstrate that Soviet leaders considered environmental concerns in their decision-making as early as the 1920s.⁵⁸ In the 1970s and 1980s, the Soviet Union actively participated in various international environmental agreements.⁵⁹ In keeping with Soviet ideology, Moscow developed a class-based view of ecology. Grigory Khozin, Peter Kapitsa, and Mikhail Budyko made important contributions to the understanding of ecology and the environment as universal values.

While balancing economic and environmental objectives, post-Soviet Russia has like most other governments supported several important international initiatives. After uneasy negotiations with the EU, Russia ratified the Kyoto Protocol, which

ensured that Kyoto would come into force.⁶⁰ The EU had insisted on Russia's ratification of Kyoto as a condition for Russia's accession to the World Trade Organization.⁶¹ While Russia has rhetorically supported international efforts to combat climate change, its energy strategy grants implicit priority to fighting energy poverty, which in turn provides for Russia's coal, oil, and natural gas exports.⁶²

Over time, the Kremlin has become increasingly skeptical toward Western climate initiatives. Kremlin officials describe the EU's climate policy as a foreign policy tool to make Russia less competitive in energy markets. Article 9 of Russia's 2019 Energy Security Doctrine characterizes "the intensification of international efforts to implement climate policy and accelerate the transition to a 'green economy'" as a foreign policy challenge to Russia's energy security.⁶³

From this perspective, the agreement to "phase down" unabated coal power (that is, coal without carbon capture) at the 2023 Conference of the Parties to the United Nations Framework Convention on

57 G. Luciani, "The Impacts of the Energy Transition on Growth and Income Distribution," in *The Geopolitics of the Global Energy Transition*, Lecture Notes in Energy, vol. 73, M. Hafner and S. Tagliapietra, eds. (Cham, Switzerland: Springer, 2020), https://doi.org/10.1007/978-3-030-39066-2_13.

58 V. I. Ponomareva, ed., *Ecology and Authorities: Documents* [in Russian] (Mezhdunarodny Fond Demokraitii, 1999).

59 G. Khozin, V. S. Vasiliev, and V. D. Pisarev, *Ecology and International Relations* [in Russian] (Mezhdunarodnie Otnosheniya, 1978).

60 The Kyoto Protocol was structured to take effect only after ratification by governments representing a defined share of global greenhouse gas emissions. Russia's ratification led to this threshold being reached.

61 P. Aalto, ed., *The EU-Russian Energy Dialogue* (Routledge, 2008).

62 Lomagin et al., *Russian Coal in the Era of Climate Change*.

63 President of the Russian Federation, "Executive Order on Approving the Energy Security Doctrine of the Russian Federation" [in Russian], No. 216, May 13, 2019, <http://static.kremlin.ru/media/events/files/ru/rsskwUHzi25X6lijBy20Doj88faOQLN4.pdf>.

04

Climate Change (UNFCCC)⁶⁴ threatens Russia's coal industry as well as coal production globally. For Russia specifically, decarbonization and the energy transition have very important socioeconomic dimensions due to the history of miner strikes in Russia. Russia's government cannot reduce coal production and consumption without anticipating socioeconomic consequences.

Conclusions

Russia's coal sector is confronting several challenges simultaneously, including Western sanctions, global decarbonization efforts, and additional hurdles to market competitiveness. These challenges are significant because coal is not only an export commodity, but also a contributor to Russia's energy security, to heavy industries (including steel production), and to jobs, federal and local tax revenue, and social services in large parts of Russia. Industry leaders hope that continued demand for coal within the Asia-Pacific region will sustain the industry and encourage continued investment.

In addition to the macro-level challenges, some practical obstacles are complicating the Russian coal industry's search for a path forward. Rail transportation bottlenecks inside Russia pose a significant hurdle. Russian Railways' monopoly on rail transportation adds to flexibility and competitiveness concerns even as other goods become more attractive (and more profitable) as rail cargo. Aging infrastructure, particularly in Komi, adds to these problems, necessitating focused investment and modernization that is difficult to execute under sanctions. A growing domestic surplus of natural gas could affect internal demand even as Russia's access to international markets faces pressure from consumers seeking alternative sources.

64 United Nations, "COP 28 Agreement Signals 'Beginning of the End' of the Fossil Fuel Era," December 13, 2023, <https://unfccc.int/news/cop28-agreement-signals-beginning-of-the-end-of-the-fossil-fuel-era>.

Russia's 2020 Energy Strategy foresees declining OECD demand for coal alongside compensating increases in demand in South and Southeast Asia.⁶⁵ Combining the Russian Energy Strategy's figures for minimum and maximum exports with target shares in global markets in the respective scenarios reveals two possible futures. The first is one of declining global coal trade (the lower scenario); the second includes generally stable global coal trade (the higher scenario).

For comparative purposes, the lower scenario lies between the two scenarios of the International Energy Agency (IEA): the Stated Policies Scenario (STEPS) and the Announced Pledges Scenario (APS). These respectively assume that governments implement their stated policies or that they implement stated policies and meet their announced pledges.⁶⁶ The higher scenario substantially exceeds IEA and other international forecasts for future coal consumption. Since coal demand depends heavily on policy choices, including the coal phasedown policy agreed at the UNFCCC Conferences of the Parties,⁶⁷ the global coal trade volumes projected under the lower scenario appear more realistic under current conditions.

Likewise, the increase in exports in the lower scenario, from approximately 210 million tons/year to 257 million tons/year, is plausible and achievable if Russia successfully completes existing plans to overcome

the transportation constraints. Russia's higher scenario, projecting 392 million tons of coal exports in 2035, seems quite challenging to reach, due both to the probable size of the global market and to Russia's domestic transportation bottlenecks.

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65 Government of the Russian Federation, "Energy Strategy of the Russian Federation for the Period until 2035," No. 1523-r [in Russian], June 9, 2020.

66 IEA, *World Energy Outlook 2023*, 2023, 25, 140–44, <https://iea.blob.core.windows.net/assets/86ede39e-4436-42d7-ba2a-edf61467e070/WorldEnergyOutlook2023.pdf>.

67 UNFCCC, "End of Coal in Sight at COP26," November 4, 2021, <https://unfccc.int/news/end-of-coal-in-sight-at-cop26>.

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