Critical resources, imperialism and the war against Russia

Gabriel Black
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All the major wars and military interventions of the United States over the last quarter century have begun with pretensions of grand moral purpose.

In Iraq, the American population was told a madman was developing weapons of mass destruction. In Afghanistan, the Taliban Jihadists needed to be removed to free the country and Osama Bin Laden found. In Libya, Muammar Gaddafi obstructed the country's yearning for "democracy" and "human rights."

By conservative estimates, between 755,000 to 786,000 people have died directly from combat in Afghanistan, Iraq, Syria, Pakistan, and Yemen since US led conflicts began there, largely civilians. In Libya, where tens of thousands were killed, the country has been ruined by a decade of civil war. Total estimates of deaths from American-led conflicts over the last quarter century begin far higher, from 3 million to as high as 12 million, due to the catastrophic impacts of medical, nutritional and infrastructural breakdown.

This staggering destruction belies the pretension that these wars of aggression were based on anything remotely resembling a moral purpose.

It is no secret that war has at its base more fundamental economic and geopolitical causes.

Why would it be the case that in the United States—a land where everything revolves around money—war, one of the country's greatest exports, would be an exception? Does the Middle East, the centerpiece of the "war on terror," just happen to be the global focal point of the cheapest future reserves of oil and gas? Is it merely a happy coincidence for the Pentagon that Gaddafi and Hussein sat on two of the largest untapped supplies of that sought-after commodity?

As Alan Greenspan, former Chairman of the Federal Reserve and key architect of US economic policy, stated in a 2007 memoir, "I'm saddened that it is politically inconvenient to acknowledge what everyone knows: The Iraq war is largely about oil." Greenspan was harshly rebuked for even making this simple observation.

Wars, of course, require vast mobilizations of economic and political resources. Tens of trillions of dollars have been spent by the US conducting war over the last twenty-five years. And, while some grow horribly rich off this expenditure, the high costs would not be paid unless they reaped an outcome.

Imperialism and the driving forces behind US/NATO encirclement of Russia

It is in this context that the current drive towards war against Russia must be understood. A serious understanding of any major military conflict must analyze these economic and geopolitical forces. However, the media coverage of the escalating war in Ukraine is devoid of any such analysis.

To the extent that these issues are mentioned, it is in the most puerile and one-sided fashion: Russia bullies its neighbors through its important supply of natural gas, and the US and Europe seek to heroically intervene to stop this. No questions, however, are asked, as to what interests the United States and its European allies have in Ukraine or, for that matter, Russia.

If an honest historian of war sought to understand this conflict, they would be compelled, regardless of their conclusions, to at least ask the following questions:

• What are the economic and geopolitical interests of expanding NATO and the EU eastward?

• What is the importance of geopolitically and economically controlling Ukraine?

• What interest would the United States have in dismembering Russia into smaller states with no military forces? How might they seek to accomplish this?

• What is the relationship between the present war in Ukraine and the United States' geopolitical goals in Eurasia?

The American ruling class does have answers to these questions, they just prefer not to share them too publicly.

As far back as 1997, Zbigniew Brzezinski, the former US national security advisor and architect of US foreign policy in Ukraine, stated, "America's capacity to exercise global primacy" depends on whether the US can prevent "the emergence of a dominant and antagonistic Eurasian power."

Brzezinski, speaking for American imperialism on the heels of the dissolution of the USSR, had specifically in mind Russia. He argued that Ukraine was critical to the US asserting its hegemony against Russia in Eurasia. "Without Ukraine," he wrote, "Russia ceases to be a Eurasian empire." Of course, Brzezinski's friends at the State Department and the Pentagon never questioned the central premise, that the US has the right to "exercise global primacy," nor tallied the corpses of that ambition.

Following the 2014 coup in Ukraine, during which the US and Germany intervened to remove pro-Russian president Viktor Yanukovych, Brzezinski laid out the American military's intention of drawing Russia into a prolonged and costly invasion of Ukraine.

In an article, "The West Should Arm Ukraine," published by the Atlantic Council in 2014, Brzezinski speaks of a Russian invasion of Ukraine as a near certainty. He emphasizes that US and NATO countries should provide

> weapons designed particularly to permit the Ukrainians to engage in effective **urban warfare** of resistance. There's no point trying to arm the Ukrainians to take on the Russian army in the open field… If the major cities, say Kharkiv, say Kiev, were to resist and street fighting became a necessity, it would be

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> **prolonged and costly**. And the fact of the matter is—and this is where the timing of this whole crisis is important—Russia is not yet ready to undertake that kind of an effort. [Emphasis in the original]

Ultimately, the US and EU gave over $20 billion of military and economic aid to Ukraine between the 2014 coup and 2019—backing Ukraine's war against Russian separatists in the Donbas which took the lives of thirteen thousand people, mainly ethnically Russian civilians, another fact conveniently absent from the war coverage. Now, the US is in the process of flooding Ukraine with armaments, including advanced anti-tank missiles, artillery, and other gear. The US is on track to spend over $40 billion this year alone, which does not include arms from European states.

Brzezinski's strikingly accurate anticipation of the present "prolonged and costly," largely urban war contradicts, in its logical anticipation of what was to come, the two-dimensional propaganda that Putin, a mad man, invaded Ukraine out of irrational, imperial ambitions. However desperate and reactionary Putin's decision to invade Ukraine was, the fundamental causes of the war are found in these deeper, calculated ambitions of US imperialism in Eurasia following the dissolution of the USSR, involving the aggressive expansion of NATO eastward.

Lenin on imperialism

In his work, *Imperialism: the highest stage of capitalism*, written in 1916, Lenin argued that the increasing technical development of world capitalism—the socialization and concentration of the forces of production—had ushered in a new and final era for capitalism, the imperialist epoch. While the incredible development, or socialization, of the productive forces called for socialist ownership, an increasingly narrow handful of financial oligarchs controlled the productive forces in the form of tightly controlled cartels and monopolies ruled by finance capital—what today appears as the gigantic multinational corporation, connected in a web of ties to the major banks and financial institutions.

Lenin stressed that imperialism was not a policy choice but an inescapable drive of advanced capitalist production in the imperialist epoch. "Domination," Lenin wrote, "and violence that is associated with it—such are the relationships that are most typical of the 'latest phase of capitalist development'; this is what must inevitably result, and has resulted, from the formation of all-powerful economic monopolies."

Lenin emphasized that, among other things, this development and concentration of the productive forces under finance capital would motivate a rapacious hunt to control the world's key resources. "The more capitalism develops," he wrote, "the more the need for raw materials arises, the more bitter competition becomes, and the more feverishly the hunt for raw materials proceeds all over the world, the more desperate becomes the struggle for the acquisition of colonies."

The transformations in the world economy identified by Lenin in 1916 have only intensified. The development of the productive forces over the last 100 years makes the turn of the century capitalist economy seem only like a shadow of its current size and complexity.

Controlling raw materials is not crudely about a country hoarding resources for its own use. It is equally, if not more so, about ensuring that key commodities and markets remain in the hands of an alliance of imperialist powers led, in today's world, by the United States.

In this context, the importance of denying access to these materials (or having the capacity to deny access in the event of war) to adversaries is also pivotal. In the RAND Corporation's detailed analysis of how the United States could win a war against China, for example, it states, "If China is vulnerable to critical shortages in a war with the United States, it could be… in oil supplies, of which it imports about 60 percent and has a declared strategic reserve of just ten days." The bulk of China's oil comes from the Persian Gulf region, which the US dominates.

Importantly, Lenin also noted that it was not just a question of the current production of raw materials. Lenin explained that finance capital "is also interested in possible sources of raw materials, because present-day technical development is extremely rapid, and because land which is useless today may be fertile tomorrow…"

In other words, the leading capitalist firms strive to anticipate their future need for raw materials from across the globe, to prepare themselves for the incessant pace of technical development.

The vast riches of Russia

The purpose of this essay is to contribute to the *World Socialist Web Site's* analysis of the historical and political origins of the escalating threat of armed conflict between the US and Russia. Particularly, it examines the role of geostrategic resources in the drive of US/NATO forces to dominate the Eurasian landmass.

Russia is the largest country in the world. While its economy is relatively minuscule compared to the imperialist powers, its landmass spans across two continents, with a total size of 6.6 million square miles. The runners up, Canada (3.8 mi²), China (3.7 mi²) and the US (3.6 mi²) are significantly behind in terms of size. Russia alone comprises 11 percent of the entire world's landmass.

In this vast landmass are an array of important minerals and resources.

Russia produces roughly 40 percent of the EU's natural gas and almost 12 percent of the world's oil. Russia is also the second largest holder of coal reserves in the world, 175 billion tons. These resources play a key role in the ongoing conflict. Amid tightening global energy supplies, these resources are a major impediment to US imperialism globally, but particularly in its effort to combat the rise of China. This issue will be the subject of a future article.

In addition to hydrocarbons, Russia contains massive quantities of basic metals. Russia is the third largest reserve holder of iron, with 25 billion tons. It also holds the second largest reserve of gold (6,800 tons) and is near tied for the fifth spot in silver. The country is also the largest producer of diamonds, producing, on average, about a third of the world's diamonds in recent years.

While each of these resources deserves attention in understanding the geostrategic ambitions of the United States and its allies, this article looks at a lesser-known aspect of global resource politics: critical minerals. Critical minerals refer to a host of metals and minerals increasingly vital to global production which, over the next two decades, are expected to explode in demand. Russia sits on substantial sources of a diverse array of critical minerals that the US believes will be crucial to global economic and political power in the 21st century.

Critical minerals and the growth of the productive forces

The United States and its imperialist allies are in a scramble for so-called critical minerals and metals. The US currently has a list of fifty minerals it deems critical. Some, like aluminum or platinum, are relatively well known. Others—such as neodymium, a rare earth, or rhodium, a

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member of the platinum metal group—are barely known even though they are increasingly vital to the global economy.

Driving the growth of the importance of these minerals is the advancement of the electronics industry and its integration into many other manufacturing processes and finished products.

Industries once conceived of as separate from electronics have driven new demand for all sorts of advanced digital and high-performance equipment. Cars, for example, "now have more tech in them than computers," according to a report by the logistics company DHL. McKinsey, the global consulting firm, predicts the semiconductor industry will grow from $590 billion in 2021 to over $1 trillion in 2030, with automobile semiconductors tripling in size from $50 billion to $150 billion.

Critical minerals are necessary for this explosion in high-tech gadgetry. As the Semiconductor Industry Association writes, "In many instances, there are no known alternatives to these materials that satisfy our functional needs, and therefore a secure and continuous supply of critical materials is of critical importance to our industry." Some $40.4 billion worth of minerals goes into the semiconductor industry alone each year.

Another key force behind the rush to control these resources is the renewable energy transition. While insufficient for the dramatic changes needed to address climate change, substantial demand increases have begun in renewable technologies. The electronic vehicle (EVs) and battery storage market are set to grow explosively from $185 billion in 2021 to $980 billion by 2028.

The International Energy Agency (IEA), which operates under the Organization for Economic Cooperation and Development (OECD), released a report in 2021, *The Role of Critical Minerals in Clean Energy Transitions*, which made careful estimates of the future demand growth for a series of minerals. The IEA noted that even in its less ambitious Sustainable Development Scenario, global demand for lithium would increase 42-fold between 2020 and 2040. During the same time, the agency predicts that global demand for graphite would *multiply* by 25, cobalt by 21, nickel by 19, and rare earth metals by seven.

These astonishing estimates are a cause of concern for the OECD and the US-led geopolitical order it represents. As Fatih Birol, the IEA's director, stated last year, "the data shows a looming mismatch between the world's strengthened climate ambitions and the availability of critical minerals that are essential to realizing those ambitions." This "mismatch" has the potential to plunge economies into disarray and, importantly, constrain the imperialist ambitions of the United States.

The United States, China and critical minerals

Among the fifty critical minerals cited by the US government, what is remarkable is that barely any of them are primarily produced within the United States. Due to a mixture of geology and economics, the US only produces the majority of its supply for five out of the fifty minerals on the list. Twenty-nine of the fifty minerals are 100 percent imported, and forty are 75 percent or more imported.

This reliance of the US on foreign supplies of critical minerals has been a source of deepening worry within the American ruling class, especially as it prepares for a military confrontation with China.

In September 2020, the Trump administration signed into law Executive Order 13953 which declared a national emergency confronting the US in its securing of critical minerals. The order stated, "These minerals are indispensable to our country," but "we presently lack the capacity to produce them in processed form in the quantities we need … For 31 of the 35 critical minerals, the United States imports more than half of its annual consumption. The United States has no domestic production for 14 of the critical minerals and is completely dependent on imports to supply its demand."

Almost half a year later, in February 2021, the Biden Administration signed Executive Order (EO) 14017 to "strengthen the resilience of America's supply chains." The order added to Trump's EO 13953, giving jurisdiction to the Department of Energy to investigate supply chain risks and offer recommendations.

The results of the first year of this order were released on February 24, 2022, the same day as Russia's invasion of Ukraine, in a "Plan to Revitalize American Manufacturing and Secure Critical Supply Chains." Two days prior, a meeting promoting the measures as they pertain to critical minerals was held. In attendance was the head of the United Steelworkers, Tom Conway, who Biden then met with privately to ensure the union would stop a national oil strike and back the war drive. During this meeting, Biden stated that his administration had helped facilitate billions of dollars of new investments into "critical minerals like lithium, graphite, rare earths… which are badly needed for so many American products."

On March 31, 2022, Biden invoked the Defense Production Act to secure "reliable" supplies of these minerals. The act is a war time order dating to the Korean War that allows the government, in the name of national defense, to control and direct private investment.

The concern of the American state is not simply that it does not produce and control these vital resources, but rather that China, the principal target of its geostrategic ambitions, does.

China dominates the processing of critical minerals. It also plays a major role in the extraction (mining) of many minerals as well. In contrast, the United States leads neither the extraction nor processing of any of these major minerals. The strongest example is the rare earths. This set of 17 minerals, now vital to the global electronics and defense industry, is almost exclusively processed in China. The US produces more than 10 percent of the world's rare earths but is dwarfed by China.

For a period, the US had been content enough to allow China to dominate the processing, and to a lesser extent, the mining of these minerals. Extracting and processing metals and minerals is one of the most environmentally hazardous parts of global industry. Doing so cheaply means rampant pollution and toxic waste that constitutes a major human health problem. China has served as the sweatshop of the capitalist economy for several decades. With the productive operations of the imperialist nations concentrated in the immense factory towns of China, including electronics, it made sense to concentrate global economic mineral processing there, including its waste.

Increasingly over the last fifteen years, however, the United States has viewed China as an existential threat to its global hegemony and has reoriented its global military strategy to "contain," that is hem in and subjugate, China. Creating competing supply chains for these vital materials is a key part of this effort.

Under the Obama administration, a massive re-pivoting of the US armed forces was conducted to encircle China and assert American political and economic power in the Asia-Pacific region. In 2016, then Army Chief of Staff General Mark A. Milley, noting a "rising China," declared that in the coming decades a war between the United States and a major adversary "is almost guaranteed." In March 2021, outgoing head of the US Indo-Pacific Command, Admiral Phil Davidson, warned of the potential for war with China within six years. Just a few months later, in November, General Milley, now Chairman of the Joint Chiefs of Staff, stated that a war could even occur within the next two years.

It does not take much imagination to consider how a war, directly comprising 40 percent of the world's economy and almost two billion people, could quickly unravel into a third world war of catastrophic proportions.

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While the US military spends trillions of dollars preparing for this conflict, it is particularly concerned about the question of rare earth and other critical minerals which are vital to the general economy as well as sophisticated weaponry. The general strategy of US imperialism to stop the rise of China and subjugate its vast domestic market to American finance capital, thinks the Pentagon, will not succeed without larger, better protected supply chains for these critical minerals. The US has major leverage over China when it comes to China's oil imports, but China has leverage over the US when it comes to critical minerals.

As the March 31 White House press conference announcing the use of the Defense Protection Act to secure critical minerals stated, "The United States depends on unreliable foreign sources for many of the strategic and critical materials necessary for the clean energy transition—such as lithium, nickel, cobalt, graphite, and manganese for large-capacity batteries… We've had to import a significant portion of them—close to 100 percent importation—from other countries, particularly China."

A similar sentiment has been expressed in the European press, with an article from the *Telegraph* stating, "China's dominance of critical minerals may be as dangerous for Europe as Russia's energy weapon… Europe has woken up very late to the global scramble for critical materials."

Russia's critical minerals

The deep need of American finance capital to dominate current and future sources of critical minerals, as well as the disproportionate control of China over them, forms an important part of the backdrop to the drive to war against Russia.

While Russia is not the exclusive provider of any major critical mineral, the analysis below details how it plays a leading role in the production of a variety of key minerals, holding an important piece of global reserves. In understanding the broader drive of the United States to dominate Eurasia and subjugate Russia, the role of these key resources cannot be overlooked.

Nickel

Russia is one of the largest extractors of nickel in the world. It is usually ranked third or fourth, following Indonesia, the Philippines, and near tying with South Africa.

The world extracts almost 2.5 million tons of nickel every year. The largest use of this critical metal is steel. Stainless steel production requires infusing steel with other elements to create an alloy. So-called class one nickel, the purest form of nickel, makes steel stronger and harder, especially in low temperatures. It also provides heat and rust resistance.

Two-thirds of nickel production goes into stainless steel, which is in turn used in construction, ships, some cars, in the medical industry (for a variety of instruments), in energy and industry (particularly when lightweight, corrosive-resistant storage is required), as well as in cookware. Nickel also forms a variety of more sophisticated alloys used in the production of turbine blades (for jet engines, the shipping industry, and power plants), electronics (laptops, phones, digital cameras), and high precision measurement tools.

The IEA predicts that global nickel production needs to increase by a factor of 19 in the next 18 years to meet its Sustainable Development Scenario (SDS), a staggering multiplication of current production. Nickel sulfate powder is a key component of lithium-ion batteries, forming the main part of the battery's cathode.

Russia's role in global nickel production is reflected in the soaring price of nickel following the outbreak of war. Nickel was trading at less than $20,000 per ton in 2021. Now, it is just short of $30,000 per ton. In the first weeks of the war the price briefly increased by 100 percent. Russia has 6.9 million tons of nickel reserves, or seven percent of the world's total. Russia is the fourth largest holder of reserves.

Virtually all of Russia's production occurs in the Norilsk Arctic circle region under the Nornickel company, Russia's largest metal company (excluding iron and steel). Nornickel is frequently ranked as one of the top two nickel-producing companies in the world. The Kola Division of Nornickel, its major source of production, is located near the border of Finland in the Arctic circle, a border that could rapidly become militarized following Finland's request to join NATO. The region is also the seat of substantial copper and palladium production.

The quality of Russia's nickel is also of note. While Russia only produces 10 percent of the world's nickel, it produces 20 percent of its class one nickel—the more valuable refined form used in advanced steel and alloy production—due to the higher quality reserves found in Russia.

Platinum-group metals (PGMs)

Russia is one of the leading producers of platinum-group metals (PGMs). PGMs include six metals that have similar chemical and physical properties and are also frequently found together in mineral deposits. Though distinct from nickel, PGMs are found in the same ore and sometimes extracted in tandem. The three most important are palladium, platinum and rhodium. The others are osmium, iridium and ruthenium. A remarkable 25 percent of all manufactured goods either contain PGMs or require it in the manufacturing process, according to the commodity consulting firm Agiboo.

Russia is roughly tied with South Africa as the leading producer of palladium. A report by Columbia University on critical minerals notes, however, that the South African supply of palladium has been "wracked by strikes for the past decade," making it less reliable. The world produced roughly 210,000 kilograms of palladium in 2019, according to the US Geologic Survey. Russia produced 40 percent of that.

As in nickel production, Russia's extraction of this critical mineral is centered on Nornickel, which is the world's largest private producer of palladium. Production is dominated by two specific mines run by the company, Oktyabrsky and Taimyrsky, both located in the Arctic circle, in the far north of Siberia. The two mines are so important that a flood that affected them last year halted one fifth of the world's palladium supply. Both mines produce rhodium and platinum as part of the same general extraction process.

The price of palladium has surged in recent years. Before 2019, the price hovered around $30,000 per kilogram. Over the last two years it has grown to an average of roughly $75,000 per kilogram. At the beginning of the war, it briefly went over $100,000 per kilogram as commodity traders reacted to Russia's invasion of Ukraine.

Palladium's central use is as a catalyst. Half of the world's supply of palladium and platinum is used for catalytic converters. Catalytic converters transform toxic combustion exhaust from cars (carbon monoxide, nitrogen dioxide) and other vehicles into carbon dioxide and water. They are found in virtually every modern vehicle and are essential for reducing pollution. The two other main PGMs, platinum and rhodium, are also used for the same purpose. More stringent exhaust regulations require larger quantities of these PGMs.

Rhodium has experienced an even greater surge in price the last few years. Rhodium went from $2,500 per ounce at the beginning of 2019 to $23,890 per ounce in 2021 (after the scare of the Oktyabrsky and Taimyrsky floods in Russia). It is now closer to $17,000 an ounce, about seven times its price a few years ago.

The surge in the price of rhodium and palladium is so strong it has led to a massive rise in catalytic converter thefts. According to the US state of Colorado, thefts of catalytic converters in the state increased over 5,000 percent between 2019 and 2021. Russia is the second largest producer of rhodium and platinum in the world. However, unlike with palladium,

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South Africa is substantially ahead of Russia in their production due to South Africa's larger reserves.

Beyond catalytic converters, PGMs are used in virtually all electronics and a wide variety of other devices and industries. While they are used in small quantities, their ubiquity in electronics leads to strong demand. Four of the PGMs are used to coat electrodes, making them essential for the electronic industry. Platinum and ruthenium are necessary for the magnetic component of hard disk drives, which still make up most of global electronic storage.

Platinum is also used in fiber-optic cable and in aircraft turbines (coating the blades to protect against corrosion). The medical industry requires PGMs. For example, palladium is used in dental crowns and PGMs are generally used in chemotherapy drugs and radiation therapy. Other PGM uses include petroleum hydrocracking, sensors, water treatment, pacemakers and defibrillators, jewelry, LCD screens, fuel cells, and high-end industrial crucibles in the metallurgic industry.

Rare earth minerals

At present, China dominates global rare earth mineral production and processing. Rare earth elements (REEs) are a collection of 17 different minerals increasingly important to advanced electronics production. They are not rare absolutely speaking, but they are rare to find in sufficient concentration to make them economical to extract.

Usually divided between the heavy and light REEs, these minerals are found in combination with each other. China extracts 60 percent of and processes close to 90 percent of rare earths. Their common application in advanced electronics, including military hardware, has prompted the American ruling class to raise alarm bells at China's ownership over the rare earth value chain. In 2022, the Biden administration announced a major initiative to stimulate billions of dollars of investment into domestic REE production and processing.

Russia does not yet constitute a substantial portion of the REE processing or production chain. However, it does have major reserves that, if tapped, could contribute to global REE production. Russia has roughly 10 percent of global REE reserves, making it fourth after China, Vietnam, and Brazil in the rankings. REEs are used in the engines for electric cars, portable electronics, magnets (frequently required for electronics), generators in wind turbines, and military hardware. For example, a Virginia-class nuclear submarine is thought to require 4.2 tons of rare earths, and a F-35 fighter jet requires 427 kg.

The extreme climates of Russia's REE deposits, the technology required to process REEs, and the high capital intensity of REE projects has, so far, prohibited Russia's REE development. A leading research consultant at Deloitte, Dimitry Kasatkin, told S&P Global Market Intelligence in 2019, "Russia will require time and favorable external conditions, such as low geopolitical and economic risks," to develop its REE potential. However, the breaking apart of Russia into smaller states with close economic control by US and other imperialist nations could provide that investment and the "low geopolitical and economic risk" needed to develop those REE projects.

Niobium

Niobium, atomic number 41 on the table of elements, is another critical mineral that Russia is endowed with. The chemical's primary use is as an alloy to strengthen important structures. A small amount—0.1 percent of the final product—can be added to steel to increase its strength. This special steel can be used in gas piping and other critical infrastructure projects. Niobium is also used to create so-called superalloys—extremely high-performance alloys that go beyond the best steel—for use in rocket engines. In its form as ferroniobium (used for steel), the market for niobium is set to double between 2015 and 2025.

Production of niobium is dominated by Brazil, which makes 66 out of the roughly 75 thousand tons produced yearly. Last year, however, Polymetal, Russia's largest gold and silver producer, announced that the Tomtor mining project in the far east of Russia would add 700,000 tons of niobium oxide to global reserves. This is about four times the amount of reserves the United States contains, albeit far short of Brazil's 16 million tons of proven reserves.

Tomtor is already known for its massive reserves of phosphate, one of the three major fertilizers used in agriculture. The Tomtor mine is likewise the seat of Russia's most significant REE reserves. Polymetal claims the mine is the third largest single deposit of rare earth minerals, following Mt. Weld in Western Australia and the untapped Kvanefjeld in Greenland, which is expected to be developed this decade into a major REE extraction site.

Cobalt

Global cobalt production is dominated by the Democratic Republic of Congo (DRC), which produces 70 percent of it. The DRC's cobalt production is notorious for its reliance on slave-child labor. A little more than two years ago, the International Rights Advocates group sued Apple, Alphabet, Dell, Microsoft and Tesla alleging that the companies were complicit in the death of 14 Congolese child miners. The incident is just the tip of the iceberg of atrocities that are committed to produce this substance.

Like REEs, cobalt is essential for many electronic devices in small quantities. Cobalt is particularly important for the renewable energy transition. The IEA suggests that cobalt production must increase by 21 percent in its Sustainable Development Scenario (SDS).

Russia is the second largest cobalt-producing country. It produced about 6,100 tons, or four percent of the global share, in 2019. While far behind the DRC's towering role, Russia has previously stated plans to increase its production by another 2,000 tons per year, raising its share of global output to eight percent this year. Some of these reserves are located on the seabed off Russia's Pacific coast, north of Japan.

Graphite

Russia is the sixth largest producer of graphite in the world. Graphite, after lithium, is expected to increase the largest amount during the renewable energy transition.

Graphite is used for a variety of industries. Because it is highly conductive, it is frequently used in solar panels, electrodes, and batteries. Graphite is not as rare or expensive as the other minerals and chemicals listed above. Its production is also more geographically spread out, with the substance—a crystal form of carbon, commonly used in pencils—relatively abundant across the globe.

However, it is principally mined from China (650,000 tons), creating a deep source of unease in the American ruling class. The next largest producers are Mozambique (120,000 tons), Brazil (95,000), Madagascar (47,000), India (34,000), Russia (24,000) and Ukraine (19,000).

Russia, however, is trying to dramatically ramp up its production. It has two major companies, Dalgraphite and Uralgraphite, both of which are seeking to increase production as demand booms for EV batteries that use graphite in large quantities.

Lithium

While Russia is not a substantial producer of lithium, Ukraine's eastern and predominately Russian region has substantial reserves. Lithium is the key ingredient of lithium-ion batteries used for electric cars, cell phones, laptops, and other electronics. A Tesla has an amount of lithium equivalent in weight to a bowling ball.

A 2022 paper from the Ukrainian National Academy of Sciences suggested that Ukraine had some 500,000 tons of lithium that could be profitably mined in just its eastern region. While reserves are estimates that often get reassessed once production begins, this would make Ukraine the fifth largest holder of lithium reserves in the world, following Chile, Australia, Argentina and China.

In November 2021, an Australian-owned firm called European Lithium announced that it had agreed to purchase a Ukrainian oil company, Petro

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Consulting, that had begun the permitting process to explore and potentially extract from two of Ukraine's largest lithium deposits. Because many of these deposits are in the contested east of Ukraine, where the Ukrainian government has been waging a civil war against Russian separatists, how these reserves are developed is tied to the fate of the current war. The company's announcement, however, noted that these reserves are still considered "conceptual" in nature and that further exploration was required to assess their potential.

Other important critical minerals

Russia is the third largest producer of scandium, a mineral sometimes classified as part of the rare earths. Scandium is used primarily in the production of super-lightweight alloys for high-performance metallic items.

Scandium is, according to a Columbia University report, "used extensively in aerospace and defense sectors," specifically in its form as an aluminum-scandium alloy. High-performance sports gear also makes use of the alloy. These alloys only contain less than a percentage of scandium, but that is enough to strengthen the material significantly. For example, only 15 to 25 tons of it is produced globally each year.

According to the US Geological Survey, Russia has been in the process of figuring out if it can make scandium effectively as a by-product of alumina refining in the Ural Mountains, this could significantly increase its output.

Russia is the third largest producer of titanium sponge. Titanium is produced in two ways, as a sponge for its use in metallurgy or as a pigment. While Russia does not play a leading role in the pigment production of titanium, which is geographically dispersed, it plays a major role in the more valuable sponge production. Following Russia's invasion of Ukraine, Boeing announced that it would stop buying Russian titanium for its aircraft.

Russia produces about 6 percent of the world's aluminum. Tesla has been a major customer of this aluminum, primarily produced by the RusAl corporation. Much of RusAl's operations are based on importing bauxite and alumina from Australia where it is mined. The refining process, like in other minerals, is extremely toxic and requires factories costing in the hundreds of millions or billions of dollars.

Russia is a leading producer of polysilicon. Polysilicon is the most refined form of silicon, used in photovoltaic cells, or solar panels. Polysilicon is more the result of processing silicon ore and is therefore not particularly rare. China dominates over 80 percent of the supply of polysilicon. However, previously, as recently as 2009, Russia was the leader. Several projects, including one by Russia's Nitol Solar company, have failed due to price volatility and insufficient capital, but with investment Russia could increase production. The price has tripled since 2019 due to booming solar use.

Conclusions

In the preface to *A Quarter Century of War: The US Drive for Global Hegemony 1990–2016*, WSWS international editorial board chairman David North wrote:

> The existence of the Soviet Union and an anti-capitalist regime in China deprived the United States of the possibility of unrestricted access to and exploitation of the human labor, raw materials, and potential markets of a large portion of the globe, especially the Eurasian land mass. It compelled the United States to compromise, to a greater degree than it would have preferred, in negotiations over economic and strategic issues with its major allies in Europe and Asia, as well as with smaller countries that exploited the tactical opportunities provided by the US-Soviet Cold War.
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> The dissolution of the Soviet Union in December 1991, combined with the restoration of capitalism in China following the Tiananmen Square massacre of June 1989, was seen by the American ruling class as an opportunity to repudiate the compromises of the post-World War II era, and to carry out a restructuring of global geopolitics, with the aim of establishing the hegemony of the United States.

The escalating war between NATO and Russia is the devastating result of this process. Today, the military and policy strategists have their eyes set on one outcome: the total dismemberment of Russia.

Anders Östlund a fellow at the US State Department-funded Center for European Policy Analysis, and resident of Kiev, wrote, "Russia's war against Ukraine will end with the break-up of the Russian Federation. It will be replaced by small, demilitarized and powerless republics with neutrality written into their constitutions." Östlund's vision of a broken apart, "powerless" series of states is a window into the general ambitions of the United States and its European allies in Russia.

Amidst the incredible development of advanced electronics and renewable energy technologies, critical minerals are expected to boom in the coming decades. Russia is a leading source of these materials. In the future it could play an even larger role given sufficient investment.

The breaking apart of Russia and its domination by American capital would be a strategic stepping stone in the efforts of the American ruling class to impose a "new American century" through the subordination of China and Eurasia more broadly to its aims. Resources play a role in this. Amid the enduring need for oil and natural gas, as well as the rapidly growing need for critical minerals, Russia is seen as a vital landmass with a vast array of riches.

The duty of socialists is to oppose these reactionary proceedings. The striving for hegemony and resources by the United States, its attempt to offset its multi-decade economic decline, threaten a catastrophe for the international working class.

But as the WSWS explained in its 2022 May Day celebration, "The contradictions that threaten world war also create conditions for world socialist revolution. The challenge that confronts the working class is this: to strengthen and accelerate the objective tendencies that lead to revolution, while undermining and weakening those that lead to world war." These are the tasks of the Socialist Equality Parties around the world.

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