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State capitalism and hydrocarbon security in China and Russia

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ABSTRACT

This study seeks to investigate how and why state capitalism developed in China and Russia in the oil and gas sectors and explain why two countries that have contrasting energy-security challenges use state capitalism to solve them. It argues that state control over the oil and gas sectors has succeeded in achieving their respective goals, bolstered bilateral hydrocarbon ties between the two countries, buffered each against the geopolitics and financial volatility of oil and gas markets, and offered greater flexibility to shape their respective energy regimes over the last two decades. Still, state capitalism presents geopolitical and commercial challenges as the energy transition away from hydrocarbons advances in the coming decades.

1. Introduction

The twentieth century began as a multipolar world, but, after two world wars, a bipolar system emerged during the Cold War based on different political economies: capitalist democracy in the U.S.-led Western Block and socialist autocracy in Soviet Bloc. The dissolution of the Soviet Union in 1991 initiated another shift, this time to unipolarity, with the United States as the predominant power [1,2]. Yet, even at that moment, many argued that the century had come full circle, and world order was returning to multipolarity [e.g., 3]. However, the rise of China as an economic superpower after the 2008 financial crisis [4,5] and the reemergence of Russia in the 2000s have now rendered multipolarity indisputable [6,7]. In this multipolar world, however, all countries must compete on economic terms in a global market birthed in the nineteenth century by the European colonial powers and then expanded in the twentieth century by the United States. To do so, China and Russia have turned to "state capitalism" over the last two decades.

State capitalism is an amorphous term. The phrase came into use in the late nineteenth century in the cases of Germany and Russia, but the United States and Europe used state-directed economic mobilization during the Second World War and third world countries used it in the 1970s and 1980s [8, p. 103–107]. It was previously associated with government intervention into markets, central planning, governments favoring big business, and even outright expropriation of private property [9]. Sperber [8, p. 101] argues that state capitalism "mostly serves to denote, in the present period, the political economies of a subset of non-Western countries, including Brazil, Saudi Arabia, Russia, India, Singapore and – *primus inter pares* – China." Other definitions include: "the use of government-controlled funds to acquire strategic stakes around the world" [10, p. 119]; "a system in which governments use capitalism and free markets to advance their own power and interests" [11]; "widespread influence of the government in the economy, either by owning majority or minority equity positions in companies and/or through the provision of subsidized credit and/or other privileges to private companies" [12, p. 4]; and, simply, "state-owned publicly listed corporations" [13, p. 838].

This amalgamation of definitions captures the key features of state capitalism that guide our discussion of how China and Russia have used government intervention and state-directed companies to control their oil and gas sectors, enhance their respective energy security, and pursue political objectives [14,15]. China uses state-owned enterprises (SOEs), such as PetroChina Company Limited (PetroChina), its parent company China National Petroleum Corporation (CNPC), the China National Offshore Oil Corporation (CNOOC), and the China Petroleum & Chemical Corporation (Sinopec) to advance their geopolitical interests and secure energy supplies. These companies have increased the share of their foreign-based production capacity by 20% in the last two decades, and PetroChina now exceeds ExxonMobil in volume of oil production [16]. Russia also deploys SOEs such as Gazprom, Rosneft, and Zarubezhneft as well as other private companies such as LUKoil to advance its international interests and geopolitical strategies and secure demand for its oil and gas exports [17].

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Energy security has different meanings in different countries and contexts, depending on development levels, economies, administrative systems, energy systems, investment capacities, legal and administrative systems, rates of demand increase, and levels of dependence on foreign sources, natural resources, geography, etc. [18–21] Energy-supply security, which the International Energy Agency (IEA) defines as "the uninterrupted availability of energy sources at an affordable price"[1] is important for import-dependent countries. Energy-demand security is the concern of export-dependent countries, which seek to "guarantee demand for their products because energy exports generate an overwhelming share of their government revenues" [18, p. 69–71]. This definition covers the large producers in OPEC and Russia [22]. More recently, Ediger et al. [21] proposed energy-transit security, meaning that "maintaining a continuous flow of contracted amount of energy from producing to consuming countries in a reliable and sustainable manner." Energy security can only become more operational when it is formulated for "a specific source and country" [23, p. 14] and China has "energy-supply security," whereas Russia "energy-demand security," and "energy-transit security" is important to both. China found a solution in state capitalism that addresses its hydrocarbon supply-security problem, while Russia used it to secure hydrocarbon demand. Energy-transit security is needed to maintain safe and reliable transit routes for their oil and gas imports and exports.

This study seeks to investigate how and why state capitalism developed in China and Russia in the oil and gas sectors and explain why two countries that have contrasting energy security problems are able to harness state capitalism to solve their energy problems, be they on a global or regional scale. It argues that state control over the oil and gas sectors has succeeded in achieving their respective goals, bolstered bilateral hydrocarbon ties between the two countries, buffered each against the geopolitics and financial volatility of oil and gas markets, and offered greater flexibility to shape their respective energy regimes amidst the ongoing energy transition away from hydrocarbons. State capitalism has become particularly helpful in managing the political economy of gas over the past decades, which present both Russia and China with regional challenges, unlike oil, which has a thoroughly global market.

Still, state capitalism presents geopolitical and commercial challenges as the energy transitions advance and variate in the coming decades. Having empowered specific companies to secure access to hydrocarbon supplies, China and Russia could be left flat-footed if large-scale investments in bilateral Chinese-Russian hydrocarbon projects as well as unilateral ones if there is another major geopolitical shift such as a Russian-U.S. rapprochement or if the world moves away from hydrocarbons more quickly than expected. Path dependency is a challenge for every country to secure their energy future, and natural gas, with its high level of capital expenditure for pipelines or LNG facilities and longer-term payoffs from their projects, could lock China and Russia a relationship that reduces flexibility and thus weaken their respective energy security.

2. China's quest for oil and gas supplies

In 2008, China surpassed the United States to become the largest energy consumer in the world. According to BP [24], China consumed 141.7 EJ of primary energy, consisting 24.3% of the world total in 2019. Of this amount, 57.6% is coal, 19.7% is oil, 8% is hydropower, 7.8% is natural gas, 4.7% is renewables, and 2.2% is nuclear. Although oil and gas consisted of 27.5% of its primary energy consumption, they are China's most important energy sources due to the country's high import dependency.

2.1. China's increasing oil and gas import dependency

China's oil imports have grown rapidly over the past three decades (Fig. 1). After it became a net importer in 1993, the difference between consumption and production increased from 1.8 million tons (MTons) in 1993 to 459.1 MTons in 2019. China domestically produced only 29.4% of its oil consumption in 2019. It was also the second largest oil importer after the EU, importing 507.2 MTons of crude oil and 78.4 MTons of oil products, accounting for 22.7% and 6.3% of the world total, respectively. It imported 244.8 MTons from the Middle East, constituting 41.8% of its total imports. The second largest source of oil imports was from Africa (95.8 MTons) with a share of 16.4% and the third was Russia (80.8 MTons) with a share of 13.8%.

China's natural gas imports have also surged in the last 15 years (Fig. 2). After it became a net importer in 2007, the difference between consumption and production increased from 1.3 billion cubic meters (Bcm) to 129.8 Bcm in 2019. China, which domestically produced 57.8% of its gas consumption, was the world's largest natural gas importer, importing 84.8 Bcm of liquefied natural gas (LNG) and 47.7 Bcm of pipeline gas, consisting 17.5% and 10.6% of the world total, respectively, in 2019. It imported 60.9 Bcm from the Asia-Pacific region, constituting 71.8% of its total LNG imports. The second largest source of LNG was the Middle East (13.1 Bcm) with a share of 15.4% and the third was Africa (4.6 Bcm) with a share of 5.4%. In contrast, almost all of its pipeline gas import was from CIS countries. It imported 31.6 Bcm from Turkmenistan, constituting 66.3% of its pipeline gas imports. The second largest source of pipeline gas was from Kazakhstan (6.5 Bcm) with a share of 13.7%, and the third was from Uzbekistan (4.9 Bcm) with a share of 10.2%. The inauguration of the Power of Siberia gas pipeline from Russia to China in December 2019 is slated to supply 38 Bcm by 2025 [25].

Oil and gas imports have always been important for China's energy-supply security. Geopolitical developments in the Middle East and Central Asia, including the Gulf War and the U.S.-led invasions of Afghanistan and Iraq, as well as the dissolution of the Soviet Union influenced these policies. In 1993, for instance, China's oil imports came from the Middle East (61%), Asia (20%), and Africa (8%), but after the 2003 U S.-led invasion of Iraq, China's imports from the Middle East fell to roughly 38% [26,27]. On the other hand, China began importing natural gas through pipelines from the CIS countries such as Turkmenistan, Kazakhstan, Uzbekistan, and Russia after the dissolution of Soviet Union. Gas import from these countries reached to 90.9% of total pipeline imports at present.

2.2. State capitalism to meet oil and gas demand

China's embrace of state capitalism to assure access to international oil and gas sources must be regarded as a preemptive strategy. Since the authoritarian market structure did not meet the WTO's standards, China tried to liberalize its domestic market. The communist tradition, however, did not trust the liberal international economic order, so a state-owned, enterprises-driven market structure became a suitable hybrid model. Global competition for power with the United States also played a significant role in this development.

Chinese state capitalism emerged after the 2008 global financial crisis [28], when it began to develop as a hybrid model – known in Chinese as "*guo jin, min tui*," or "the state advances, the private sector retreats" – to grow its economy while maintaining political control, after it realized that a centrally planned economy could not compete with a free market economy [29]. State capitalism in the energy sector also became necessary for China to meet the energy needs of its fast-growing economy, and a close relationship developed between energy geopolitics and China's energy-security strategy. Most notably, China has strengthened energy cooperation with energy-exporting countries [30]. After becoming a net oil importer in 1993 and a net gas importer in 2007, China grew acutely more concerned about oil and gas-producing

[1] https://www.iea.org/topics/energysecurity/whatisenergysecurity/.

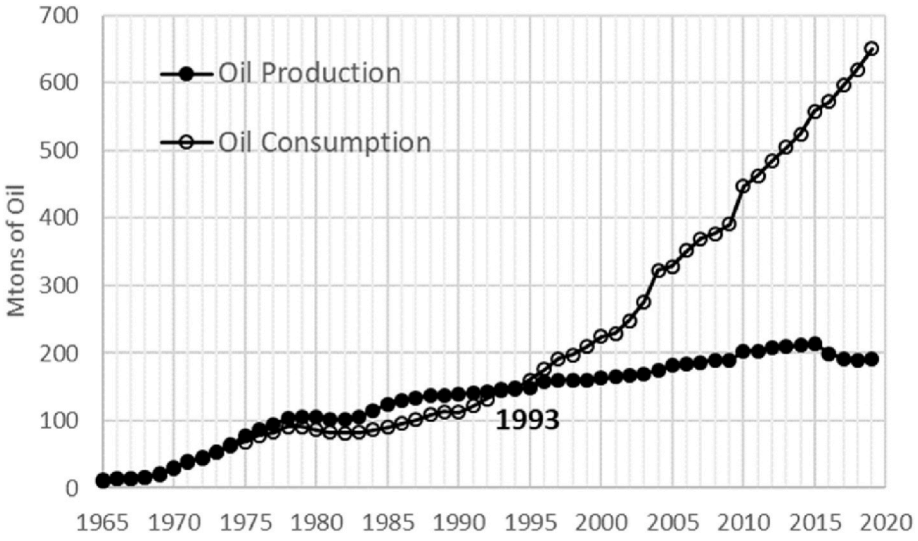

Fig. 1. Oil production and consumption of China, 1965–2019.

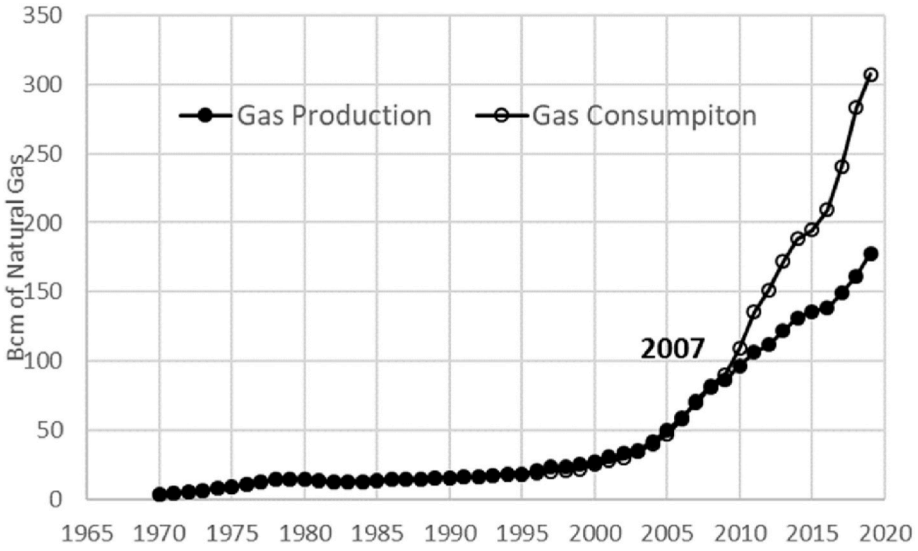

Fig. 2. Natural gas production and consumption of China, 1970–2019.

regions as well as large reserve-owners. SOEs, also known as national oil companies (NOCs), were chosen as useful tools to implement this policy [10,31], and the State-Owned Assets Supervision and Administration Commission of the State Council (SASAC) supervised them [32].

Deng Xiaoping's reforms in the 1990s had initiated profound changes in China's energy sector towards energy mercantilism. The Ministry of Energy was reconstructed, a new taxation system was established, pricing systems were changed, existing state-owned energy companies were restructured, and new ones were created [33]. In this regard, China reconstituted its SOEs with more market-driven models that could be more compatible in the global energy market [34]. As the president of CNPC Wang Tao said in 1993, creating a "good environment for developing overseas oil cooperation" was crucial for Chinese foreign policy and its energy-security policy [35].

In the first decade of the new century, the main goal of Chinese energy-security policy was to provide adequate energy supplies that would sustain rapid economic growth and to promote the modernization of the economy. A pillar of this strategy was to diversify its oil supplies away from the Middle East. In 1999, China thus launched a "Go Out" or "Going Out" policy to promote Chinese entrepreneurs and NOCs abroad [36]. Foreign direct investment (FDI) by Chinese NOCs diversified the country's energy supplies by expanding its sources of supply from "three strategic regions": Central Asia, Middle East and North Africa (MENA), and South America [37]. These regions were chosen because the West already dominated traditional oil-producing areas such as the Middle East that were closed to FDI. NOCs employed different methods in this strategy, including partnership in exploration, production, guaranteed purchases to governments, partnerships in different sectors such as infrastructure, and purchase of shares of foreign oil companies. At the same time, Beijing strengthened political relations with these countries.

In 2000, China was active only in two African states, Sudan and Angola, but by the end of the decade, it had reached agreements with several African countries, including Libya, Nigeria, Sudan, Congo, Algeria, Egypt, and Angola. Chinese national oil companies first replaced Chevron and later other Western oil companies in Sudan. CNPC invested in Sudan in 1995 and soon China became its largest foreign investor and trading partner [38]. China then used two methods to maintain FDIs: "exceptionalism" and "aid-for-oil" [39]. Chinese exceptionalism, which meant non-interference in domestic affairs, enabled the country to establish strong ties with regimes, while aid-for-oil offered a pragmatic policy to strengthen diplomatic and economic relations with such countries, through humanitarian aid, infrastructure

projects, medicine, and more [40]. As a result of these policies, Chinese oil imports from Africa increased to 25% of total oil imports in 2005. Meanwhile, China has remained consistent in its tolerant approach and respect of the sovereignty of its African partners [41]. Forums on China-Africa Cooperation further buttressed its improved relations with African countries [42].

New trade relationships with Latin America in the 2000s marked another phase of China's strategy. From 2000 to 2005, Latin America's exports to China increased 38% annually. In 2005, Latin America was China's key supplier of several products, including soy, fishmeal, sugar, copper, nickel, and iron [43]. That same year, China launched energy diplomacy ventures with untapped energy markets on the continent, including Brazil, Peru, Bolivia Colombia, Venezuela, and Ecuador [44]. These again included non-interference in domestic politics, economic and technical cooperation, and, in some cases, aid-for-oil. Brazil became the first Latin American country to establish a strategic partnership in 1993, followed by Venezuela, Mexico, and Argentina after 2000. In 2008, China injected $50 billion of aid to address infrastructure and economic problems in Venezuela in return for oil deals for Chinese NOCs [45,46]. After president Hu Jintao's visit to Brazil in 2004, Chinese investments and joint ventures on railways, ports, and energy extraction and export grew [47]. Meanwhile, in May 2008, China became the world's second largest oil importer.

China also used economic influence to become a major importer of oil and gas from Central Asia [48]. It began buying oil through the Kazakh-China oil pipeline, which doubled its capacity in 2009, while Chinese companies entered the upstream to compete with U.S.- and European-owned companies. In 2009, subsidiaries of CNPC produced roughly one-fifth of Kazakh oil. In the same year, the China-Turkmenistan gas pipeline was completed, marking the most important economic turning point for Turkmenistan since the collapse of the Soviet Union [49]. In 2010, China built a "super ministry," the National Energy Commission (NEC) to enhance country's energy-security strategy [50].

After the 2008 global financial crisis, Chinese foreign direct investment increased dramatically, from $90 billion in 2009 to $126 billion in 2015, with the energy sector accounting for approximately 25% of the total [51]. According to Zhang [52], China took advantage of the global economic slowdown to increase foreign direct investments in energy abroad. China now enlarged its area of interest including the major Middle Eastern oil-producing countries such as United Arab Emirates. China has already become a major player in country's oil and gas sector through CNPC, despite the dominant position of the Abu Dhabi National Oil Company (ADNOC) [53].

2.3. Belt and Road Initiative

The Belt and Road Initiative (BRI) is China's most high-profile case of energy diplomacy and was developed as a tool of state capitalism within the framework of oil and gas supply security. It is the largest infrastructure project in history in terms of investment and geographic reach. In 2013, Chinese President Xi Jinping explained, while in Kazakhstan, that he wanted to create a network of railways, energy pipelines, highways, and streamlined border crossings, both westward and southward to the rest of Southeast Asia. Such a network would also expand the international use of China's currency and "break the bottleneck in Asian connectivity by building a financing platform" [54]. He later announced plans for the Maritime Silk Road at the 2013 summit of the Association of Southeast Asian Nations (ASEAN) in Indonesia [54].

The BRI is considered crucial to global sustainable development in energy and environment [55], and brings an abundance of opportunities and challenges to local jurisdictions. Its central purpose is to facilitate trade among BRI countries. It has already been found that BRI countries and regions with larger bilateral trade scales or more shares of technology-intensive imports from China have experienced an energy-intensity convergence rate [56]. Yet the BRI poses significant risks as well, particularly in terms of how Chinese investment in renewable energy will reshape the politics, economics of resource extraction and consumption [57]. It has made significant investments in coal in BRI countries, particularly in south and southeast Asia, which illustrates that China is foisting its own energy regime on others and undermines its claims that the BRI will help slow the growth of global CO_2 emissions [58].

The BRI also must be viewed in the context of China's maritime strategy and its global rivalry with the United States. China will be unlikely to challenge American naval power, which could, in theory block Chinese hydrocarbon imports by blockading the Strait of Hormuz or Strait of Malacca, prompting Tata [59] to argue: "Beijing's highest strategic priority is to ensure energy security by connecting friendly major oil and gas producers to China via pipelines transiting through land routes beyond the effective military reach of the United States." The construction of a China-Pakistan-Iran-Turkey energy corridor is one avenue to enhance its land-based strategy [60]. Seeking international energy cooperation, building new energy transport corridor and supply channels, and diversifying its energy import regions are China's strategic thrusts to secure oil and gas supplies.

2.4. South China sea

China's land-based strategy is also designed to reduce its reliance on the Malacca Strait. The U.S. navy's dominance of the seas threatens both to close the strait to imports and China's access to oil and gas supplies from the South China Sea (SCS). China first began developing offshore hydrocarbon deposits around the Pearl River Mouth basin in 2010, which transformed the SCS into an area of geopolitical contention [61]. U.S.-Chinese rivalry in the West Pacific intensified, as both powers have the desire to secure themselves as the only hegemon in the region [62]. Both have declared their support for the free navigation of commercial vessels in the region but disagree on freedom of navigation for military vessels [63]. The United States believes that all nations should be able to conduct military activities, whereas China argues that U.S. military activities in the SCS infringe on its sovereignty. For instance, China considered the sailing of a U.S. warship through disputed waters in the SCS in November 2015 as a direct challenge to its territorial claims [64]. The Chinese government announced in 2010 that the SCS was a "core interest," putting it on par with Taiwan and Tibet as a matter of Chinese sovereignty. For the purpose of offshore oil and gas development, China claims veto power over any new project [65]. The SCS carries additional importance to China both as a trade route—one-third of the world's shipping passes through it—and because of vital stocks of seafood [62,66].

The SCS remains a highly disputed region based on several countries' competing claims of sovereignty [62]. Beijing sees unilateral energy development by Vietnam or the Philippines as a territorial challenge, even in areas that are generally recognized as international waters [67]. This dispute has resulted in several confrontations at sea between China and these two nations. On May 2, 2014, CNOOC's only homegrown deep-water semisubmersible drilling rig began, without an announcement, offshore operations for natural gas in the Vietnamese waters [67]. The U.S. State Department described the move as "provocative." According to Friedman [68], China, which is becoming "an increasingly aggressive country prepared to challenge the United States, must assert a naval capability in the region without triggering an American response that the Chinese are not ready to deal with." Li [69, p. 123] counters: "it is in Beijing's interest to build up Chinese naval capabilities in order to protect its energy security in the Malacca Strait."

2.5. Future challenges

Over the last three decades, China has succeeded in securing its fast growing energy demand through internal reforms, ambitious strategies

abroad, and new policies that marry them. On the one hand, China increased domestic fossil fuel production, especially coal, and secured oil and gas supplies from foreign countries through its SOEs. By reorganizing the decision-making mechanism of national oil companies through the creation of the National Energy Commission, two of its SOEs, Sinopec and CNPC, are now permanent members of the top-five list of the largest companies as ranked by *Fortune 500* magazine [52]. China has also grown into the world's largest developer of wind, solar, and nuclear energy technologies, which it uses to compensate for its tremendous production and consumption of coal [70]. On the whole, these policies have indisputably strengthened China's energy-supply security.

On the other hand, several experts express concern about how long this success can continue. The future of state capitalism and SOEs, for one, faces uncertainties about China's future economic structure [71]. According to Lin and Milhaupt [32, p. 759], state capitalism in China remains a "black box" that raises many questions for scholars and policymakers. Bremmer [28, p. 40–41] argues that the concentration of economic power and political influence in the hands of central authorities could increase populist politics and high-level corruption and claims: "commercial decisions are left to political bureaucrats, who have little experience in efficiently managing commercial operations. Their decisions often make markets less competitive and, therefore, less productive." He [28, p. 44–46] identifies other problems for state capitalism for oil and gas markets as: (1) the decline of entrepreneurs and their investments, which will decrease overall investment since investment decisions may be motivated by political rather than economic factors; (2) NOCs have more cash to spend than IOCs and pay above-market rates to suppliers to lock in long-term agreements; (3) NOCs that provide developmental loans to supplier countries will distort markets by increasing the cost that everyone pays for oil and gas; and (4) development of new hydrocarbon reserves will slow, as few state-run oil corporations have the equipment or engineering expertise needed for this kind of work.

More recently, Yu et al. [72, p. 1] worried about "overinvestment: although the Chinese economy has experienced tremendous reform in the past decades, 'red tape' and bureaucratic burdens remain principal obstacles for the daily operations of Chinese firms, including energy firms, leading to irrational behaviors such as overinvestment." They [72, p. 1] argue: "political connection can act as a 'helping hand' that enables energy firms to obtain more government support to invest and a 'grabbing hand' that forces politically connected energy firms to heavily overinvest for the promotion benefit of local politicians." Yu et al. [72] reported that over 12.5% of installed capacity for coal power plants and 30% for wind power plants has never been utilized.

Regardless, China faces several energy challenges going forward. Its Energy Production and Consumption Reform Strategy (2016–2030), which set clear measures to improve total energy consumption, intensity, and mix, has not yet succeeded. Some policies have effectively reduced consumption, but many others increased it [73,74]. Energy consumption is also still growing because of increasing investments in energy-intensive industries and general population growth [74]. Thus, China is likely to meet its consumption target for 2020 but not for 2030 [75]. China's energy-intensity target allocation, moreover, still needs improvement, even if its energy intensity has declined in most Chinese provinces during the 11th and 12th Five-Year Plans [76]. In addition, China has not decoupled its economy and energy consumption in primary industry; this decoupling has occurred primarily in secondary industry [74]. Parallel to energy consumption, CO_2 emissions remain a major concern both locally and globally. China is likely to reach the upper limit of its carbon intensity target in 2020 and the lower limit in 2030, if it maintains its current abatement efforts [75]. Renewable energy development also faces headwinds. For instance, more than twenty different organizations have independently or jointly issued wind energy policies, while the main organization issuing these policies is not in charge of wind energy [77]. The marine renewable energy (MRE) industry, which will contribute to actualizing sustainable development in China, is still in its nascent stage, and effective policies are needed to improve the development of this emerging sector [78]. In ocean energy (OE) sector, China lacks a long-term development plan, special laws, and an information publicity strategy, while several market incentive strategies remain incomplete and have shown limited effectiveness in being implemented [79]. China's energy policies in rural areas [80] and energy challenges of urbanization such as smart energy towns (SET) and neighborhood energy vehicle (NEV) [81,82] also raise questions for the future.

3. Russia's quest for oil and natural gas exports

In contrast to China, Russia is a net energy-exporter and uses state capitalism to secure energy demand. According to BP [24], Russia is the fourth largest primary energy consumer after China, the United States, and India. In 2019, it consumed 29.81 EJ with a share of 5.1% in the world. Of this amount, 53.7% is gas, 22% is oil, 12.2% is coal, 6.2% is nuclear, 5.8% is hydropower, and only 0.1% is renewables. If China is the king of coal, Russia is the king of natural gas.

3.1. Russia's increasing oil and gas export capacity

Russia has always been a net oil and gas exporting country. The gap between oil production and consumption has varied from 144.7 MTons in 1994 to 417.3 MTons in 2019 (Fig. 3). That year, Russia was the largest oil exporter, exporting 286.1 MTons of crude oil and 164.6 MTons of oil product, consisting 12.8% and 13.3% of the world, respectively. It exported 259.1 MTons to Europe, constituting 57.5% of its total export. The second largest source of oil export was to China (80.8 MTons) with a share of 17.9%, and the third was to the United States (24.9 MTons) with a share of 5.5%.

Russia's gas-export capacity is also increasing (Fig. 4). It is the world's largest gas producer with a share of 23.1% and the second largest gas consumer after the United States (21.5%) with a share of 11.3%. The gap between production and consumption has increased from 68.8 Bcm in 1985 to 234.7 Bcm in 2019. It is the world's largest natural gas exporter, exporting 217.2 Bcm of pipeline gas and 39.4 Bcm of LNG, consisting of 27.1% and of 8.1% of the world market, respectively. The largest consumer of Russian gas is Europe; pipeline and LNG totals 208.5 Bcm, constituting 81% of Russian gas exports. Pipeline gas is exported to Europe (188 Bcm), CIS (28.9 Bcm), and Asia-Pacific (0.3 Bcm), constituting 86.6%, 13.3%, and 0.3%, respectively. The major destinations of LNG exports are Japan (8.7 Bcm), France (6.9 Bcm), and China (3.4 Bcm), constituting 22.1%, 17.5%, and 8.8%, respectively.

3.2. State capitalism to secure oil and gas export

Soviet and then Russian dependence on hydrocarbon revenues have made their exports a strategic priority and a tool with which to influence other countries. This process started with increased oil sales to Europe after the 1956-7 Suez Crisis [83] and with inroads into European gas markets starting in the late 1960s [84]. The Soviet legacy is a powerful factor in explaining the continuity with Russian state capitalism today [85]. Russia's recent embrace of state capitalism in the energy sector, like China's, began to unfurl itself in the early 2000s with the establishment of new large holding companies and the state's expanded presence in existing companies [86]. This process was borne out of the 1998 Russian debt crisis and subsequent devaluation of the ruble, which rendered Russian oil exports more valuable and led to a revival of the industry from 1999 to 2004 on the back of rising global prices [87].

Russia's embrace of state capitalism, however, owes itself to the vision of Russian President Vladimir Putin, who ascended to power in 2000, to use hydrocarbon resources to build up Russia's economy and project its influence globally. During the 2001 EU-Russia Energy Dialogue, Putin expressed a desire to be a rule-taker in its gas relations with

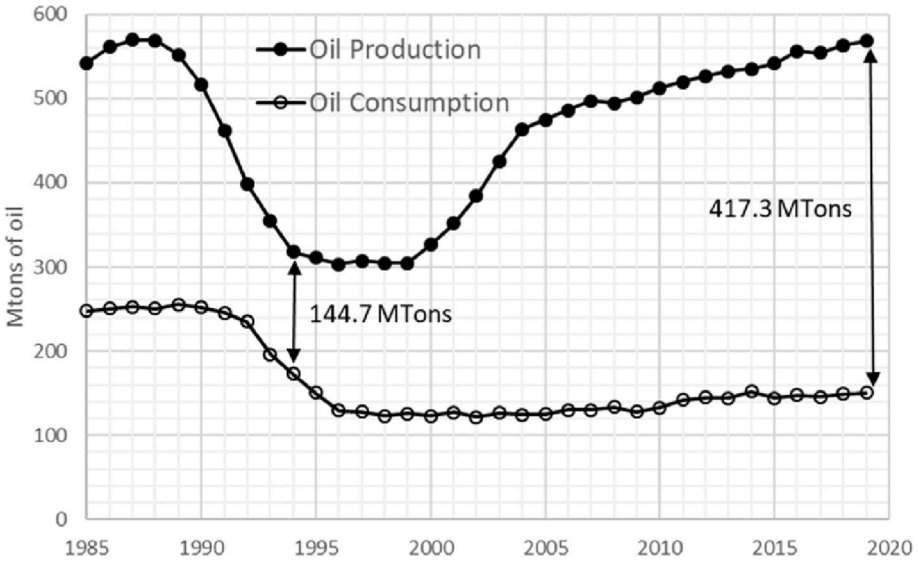

Fig. 3. Oil production and consumption in Russia, 1985–2019.

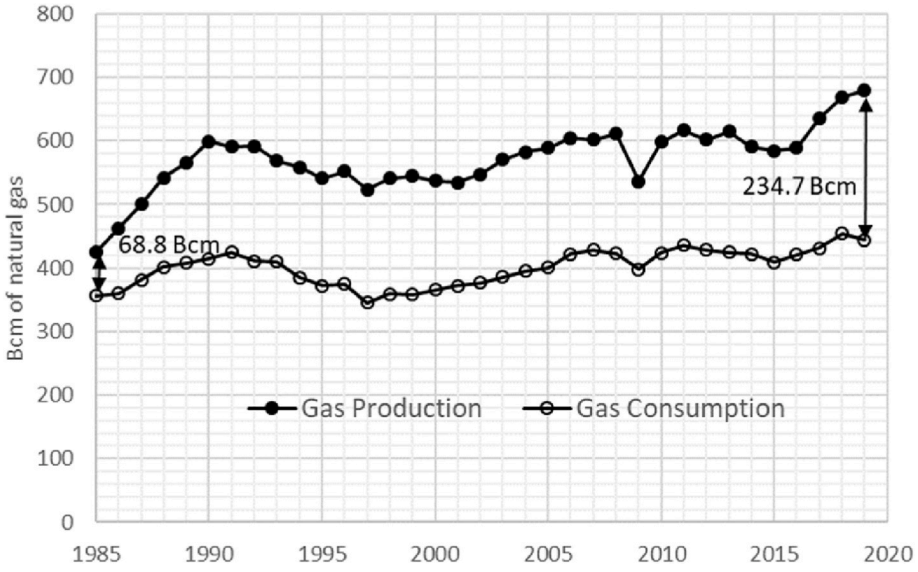

Fig. 4. Natural gas production and consumption in Russia, 1985–2019.

the EU, but the following year's meeting saw a more assertive Russian position, arguing that Russia provided the EU with reliable, long-term gas security [85]. In 2001, the United States and Russia also launched a series of summits to encourage cooperation, including the potential for U.S. companies to work in Russia itself and help the United States alleviate its own oil-supply security concerns [88]. However, the 2003 U S.-led invasion of Iraq ended this dialogue. That same year, the Russian state seized shares of the country's most profitable international company, Yukos, from Mikhail Khodorkovsky [89]. As oil and gas prices continued to rise, Russia's strength grew and its embrace of state capitalism firmed.

Russian state capitalism in energy has a foreign and domestic component. Abroad, Russia champions vertically integrated groups to compete with Western multinational companies. Of Russia's 20 largest multinational companies, 14 are from the hydrocarbon or mining sectors, and these companies held 87% of foreign assets among the country's top 20 foreign investors in 2011 [17]. Rosneft and Gazprom are the most prominent state-owned examples and two largest hydrocarbon companies, while private company Lukoil, owned by oligarchs close to the Kremlin, holds the most foreign assets. Lukoil, Rosneft, Gazprom, Zarubezhneft are the most prominent players abroad [17]. Lukoil made its first investment in Azerbaijan, within the former Soviet Union and made downstream investments in the United States and Europe in the 2000s. It was also active in Iraq before the U.S.-led invasion in 2003 [90]. Gazprom, Russia's state-owned gas behemoth, is the prime example, owning 17% and 11% of global gas reserves and production in 2017 [85]. Gazprom succeeded in providing gas-supply security to the EU from 2000, but the EU's Third Energy Package limited the influence of non-EU suppliers on EU policy and forced the company to abide by the liberal market system. On the other hand, the lack of market development in the Russian gas sector has reduced its competitiveness in the European market in recent years [85].

Domestically, resource nationalism is a major driver of Russian state capitalism, which seeks to apply regulatory and legal pressure on foreign companies so that its own companies remain strong and the state's control of the industry firm [31]. This has resulted in a dearth of IOCs working in or partnering with Russian companies to develop the country's prodigious hydrocarbon resources. The lack of joint ventures,

production sharing agreements, strategic alliances, service contracts, and other international partnerships and primarily stems, according to Gustafson [87], from the country's "inadequate legal and regulatory structure, a deep-seated resistance to the presence of foreigners in strategic sectors," and "a lack of demand for the skills and resources that foreign companies and individuals might bright, because of the rich legacy of low-cost conventional resources lying within traditional Russian capabilities." The 2008 law limiting foreign investment in strategic companies codified these trends [17], but the fact remains that there are few practical ways for Russia to engage with foreign companies, which can be attributed to the application of Western sanctions in 2014 on the financing of the Russian oil industry and transfer of Western technology, about which more is discussed below.

The primary exception in 2000s was the cases of the Tyumen Oil Company (TNK)-BP partnership, which grew into the third largest oil producer in Russia. But this venture proved a veritable saga for BP, which included a major legal battle and final backing from Putin himself, to allow the partnership to proceed, and was ultimately purchased by Rosneft in 2013 [86]. More recently, Novatek, CNPC, and French IOC Total partnered to develop the Yamal LNG project in the Arctic, which came online in 2018 [91]. This highly technical undertaking benefitted from diversifying project and financial risk through bringing in Total, which could skirt sanctions because it owned a stake in Novatek since 2011. Rosneft and Italian IOC ENI also partnered from 2012 in an attempt to develop gas in the Black and Barents Sea, but ENI walked away of the partnership in the Black Sea in 2018 due to poor results [92].

The result of the industry's isolation has placed a greater burden on domestic producers to make up for declines in the state's spending on social services. The Russian state often directs producers where to invest, but then demands active assistance for such advice [93]. State coercion thus drives the economy in the absence of strong institutions [17]. Moreover, since the state takes majority stakes in its enterprises, the smaller companies that often lead to technological innovation and explore riskier oil and gas fields are stifled [11]. Due to this arrangement, Russia's energy-demand security in Western Europe and energy-transit security through Eastern European countries, especially those of ultimately rely on the current Putin-led regime staying in power [94–96]. As a petrostate, any challenge to the political status quo in Russia will imperil the country's energy future [97,98].

3.3. Ties with Europe, the United States, and China

The European market has long provided Russia with hydrocarbon-demand security, but new sources of supply for Europe and U.S. and European anxiety about the continent's dependence on Russian hydrocarbons has placed the future of this market in jeopardy, especially since Russia's annexation of Crimea in 2014 and the subsequent imposition of sanctions on Russia that prohibited Western financing and technology transfer. A divide has also emerged between the state capitalism approach of Russia and the EU strategy, encapsulated in the EU Energy Union and Third Energy Package, which seeks to develop a free market on the continent and remove Russia's dominant market position [99,100]. State capitalism has shown its flexibility in permitting Russian companies to adapt to European legislation. Moreover, despite this legislation, Russia will remain a vital source of gas supplies for Europe [101,102].

On the other hand, oil and gas have been the bedrocks of the growth in Chinese-Russian bilateral trade over the last two decades. Since 2004, Russia has sought to sell directly to the Chinese market with pipeline connections, which it first achieved with the Eastern Siberia-Pacific Ocean (ESPO) oil pipeline in 2009. After 2009, China became Russia's largest trading partner in 2009 [103]. Oil being a global commodity, however, meant that this project was far easier to convince China to finance, as it would not lock Beijing into a dependent relationship. China, moreover, viewed the project as vital to its oil-supply security. In this process, China became a major financer of Russia's hydrocarbon industries, including the purchase of a share in in 2005 Yukos and the financing of the ESPO pipeline [91]. In 2011, it then provided $25 billion of "loans for oil" in 2011 that it would receive through ESPO, and Russia became China's largest source of imported oil by 2016 [104].

Bilateral ties in gas with China followed. In 2013, China purchased a 20% stake in Yamal and pledged to purchase gas from the project, while the China Silk Road Fund purchased an additional 9.9% stake in Yamal in 2016 from Novatek [105]. With the onset of Western sanctions in 2014, China agreed to a $12-billion loan to Russia, to finance the $47-billion Power of Siberia gas pipeline that opened in 2019, and to buy gas over a 30-year period, in exchange for low-priced supplies [92]. From 2014 to 2019, Russian-Chinese trade volume increased by 17% [103]. The opening of the Power of Siberia Pipeline and plans for Power of Siberia-2, which will bring Russian gas to western China, portends growth in Russian gas sales to China in the coming decades. The two countries, moreover, embraced ruble and yuan trade in 2019 amid continuing U.S. sanctions on Russia and the U.S.-China trade war [104]. Much as the United States has relied on Saudi Arabia to provide oil-supply security for the world, and by extension the United States, since the 1940s, it appears that China has found its own Saudi Arabia in Russia for its oil and gas-supply security.

3.4. Western sanctions

The most significant challenge facing Russia's oil and gas industry has been the decline of production from its conventional resources in Western Siberia and the Urals-Volga regions [87]. Russia's power as an oil and gas producer stems from its ability to bring vast amounts of oil to the market from these regions, producing 12.1% of the world's total oil in 2019 [26]. Yet, the fields in these regions will begin declining in the early 2020s and be in permanent decline by 2030 [106], and Russia's total current proven conventional reserves stand at only 6.2% of the world total [24]. The country possesses significant exploration potential in Eastern Siberia and the Arctic [106], but it has yet to develop it due to its deficit in high-end technology thanks to Western sanctions against Russia in 2014, which bars financing and technology transfer. Russia has weathered these sanctions due to a devalued ruble and the continued production from its traditional oil-producing regions, but likely faces a period in the 2020s, when it will have to move to produce new areas in the Arctic, Eastern Siberia, offshore or using shale technologies.

Khodorkovsky of Yukos envisioned China playing a major role in the development of Eastern Siberia before he was sidelined. The ESPO pipeline was prioritized thereafter, but the gas breakthrough did not come until 2014 [107]. The Chinese do not possess upstream technologies that can advance Russia's hydrocarbon exploration and production performance, but there have been notable breakthroughs in Russia itself that could support its import-substitution strategy for such technologies in the face of Western sanctions [107]. The lifting of sanctions, of course, would solve these problems, as Western companies would likely return to Russia in this scenario.

3.5. Future challenges

The fundamental challenge facing Russian state capitalism beyond its dependence on the current regime is that it depends upon the continuation of the fossil fuel-dominated global energy system. The transition of the global energy system to renewable energy resources is expected to pose critical questions for many of the world's largest oil and gas producing countries [108–110]. Claiming that geopolitical power will be more evenly distributed after an energy transition, Overland et al. [111] note that most of the world's major oil and gas exporters such as Russia will experience a weakening of their energy-related geopolitical positions, especially since high oil prices substantially bolstered Russia's political and military outlook in the past, both in the 1970s and 2000s. Russia's continued pursuit of oil and gas strength, moreover, is no longer a source of national pride, according to Rutland

[112, p. 84], "after 2011 we have seen increased emphasis on religion, patriotic values, military achievements, and defending the rights of ethnic Russians – and a downplaying of the oil and gas upon which Russia's prosperity actually rests." Resource nationalism no longer inspires like it used to.

The growing use of renewable energy and energy efficiency are the core elements of the energy transition [113,114], but oil and gas-exporting countries such as Russia show little ambition to transition [115]; instead, they appear determined to increase its reliance on the oil and gas sectors [116]. Pickl [117] has demonstrated that as proved oil and gas reserves of the major international oil companies increase, their renewable energy activity decreases. However, the integrative dynamic capabilities that the companies will develop will be more important in their adaptation to energy transition than actual assets such as oil or gas reserves [118]. Fossil fuel exporters must prepare themselves for the energy transition to prevent tensions and conflicts that could undermine the collective action required to address climate change [119].

4. Conclusions

The main conclusion drawn from this study is that China and Russia have used state capitalism as a geopolitical tool to solve their respective energy security problems: energy-supply security for China, energy-demand security for Russia, and energy-transit security for both. However, has this strategy reached its limits? As the center of global supply chains and the world's largest importer of oil, China faces major uncertainties going forward, chief among which is its competition with the United States and its challenge to the U.S.-led liberal international trade order [120]. Geopolitical and geo-economic rivalry could lead China and the United States to fall into the Thucydides trap—that declining hegemons and rising powers usually end up fighting wars, much like Sparta (hegemon) and Athens (rising power) fought in the fourth century BCE—as the United States' soft-containment policy has elevated the threat perception of both countries [121]. However, although a war between China and the United States is unlikely and both countries will overcome such a trap by expanding their economic, political, security and cultural cooperation [122], such a rivalry will be a fundamental factor in world politics in the coming years. If tensions escalate between Beijing and Washington, China's energy SOEs could come attack, much as the Trump Administration recently went after Huawei and TikTok [123], in which case the global competitiveness, especially in developing transnational corporations, as well as its access to foreign capital of Chinese energy SOEs would suffer [124].

These dynamics underpin China's embrace of renewable energy technologies, which create energy independence, but its state-capitalist model will, in turn, limit its ability to export these technologies globally, except to countries that share a similar state-capitalist model, oftentimes developing countries, which forge mutual strategic benefits through such imports. In the new era of energy transition, exerting geopolitical influence changed from hard power to soft power resources, which are "the ability to persuade other countries of the attractiveness of low-carbon energy solutions" [125, p. 2]. As a leader in renewable energy technologies alongside the United States and, to a lesser extent Germany, China is a central actor in the on-going energy transition, but it lacks the economic strength and soft power to lead such a grand initiative [126].

As global order shifts, the United States and China decouple their economic interdependence of the last three decades, and the global energy system evolves, China will have to reassess how state capitalism meets its energy-supply security strategies. China's 14th Five-Year plan, announced in March 2021, included deeper carbon cuts, including a 18% target reduction in carbon intensity and 13.5% target reduction in energy intensity, as well as a renewed focus on the energy transition [127]. As China continues to develop green energy sources to cut carbon, it will have less need for Russian oil and gas. State capitalism should provide it the flexibility to adapt to this situation, and anyways China holds the upper hand in the relationship with Russia. Yet an alternative scenario could emerge in which China has to increase its dependence on imports to meet its oil and gas needs, if it is unable to shift to green energy as it targets.

Russia has far less flexibility than China and faces a different and more onerous set of challenges. The emergence of U.S. unconventional oil and gas production last decade, for one, presents a veritable challenge to Russia's energy-demand security. According to BP [24], from 2012 to 2019, U.S. oil production rose from 8.9 million barrels per day (Mbpd) to 17.0 Mbpd, elevating U.S. global market share from 10.4% to 17.9%. During this period, Russian production rose only 884,000 bpd and its market share remained unchanged. In gas, U.S. production rose from 649.1 Bcm to 920.2 Bcm, elevating its global market share from 19.5% to 23.5%. Again, Russia's overall production rose by 77.2 Bcm, but its global market share fell from 18.1% to 17.0%. U.S. hydrocarbon production has increasingly wrestled market share in Russia's traditional cash cow, Europe, especially in gas. According to Eurostat [128], Russia accounted for 29.5% of EU oil imports in 2012, but only 24.1% in 2019, while the United States went from exporting no oil to the EU in 2012 to accounting for 7.0% of the EU's imports. In gas, Russia's market share in the EU has grown from 31.2% in 2012 to 44.7% in 2019 due to the decline in imports from Norway (29.4% in 2012 to 21.3% in 2019) and in production from the Netherlands. But U.S. gas imports to Europe have risen steadily, reaching 4.1% in 2019 and 6.7% in the first half of 2020. U.S. CAATSA sanctions have, moreover, targeted Russian gas exports to Europe, delaying the Nord Stream II gas pipeline for more than two years, and now threatening Russia's TurkStream II gas pipeline [129]. The shale revolution has also led the United States to use sanctions on oil and gas production against its enemies and Russian allies, Venezuela and Iran [91, p. 61–62]. The short-cycle dynamic of U.S. shale is also disadvantageous to the Russian hydrocarbon industry, which requires longer time horizons to explore and produce and thus has less flexibility to adapt to shifts in the global price of oil [130].

Moscow's other problem might be its dependence on the Chinese market for its energy-demand security, which will make it desperate to avoid any rupture with Beijing, lest its primary source of financing for new fields evaporate. China, meanwhile, will want more direct stakes in Russian oil and gas fields, something it has already achieved with CNPC's 10% share in Vancorneft [107]. More broadly, of course, the energy transition will depress global demand for hydrocarbons, something state capitalism in the Russian hydrocarbon sector has successfully countered, and what guided Gazprom's history over the last three decades [86]. To be sure, Russia's investment in nuclear power is noteworthy as a clean energy option, and hydrogen offers long-term potential for it to continue to harness its fossil fuel resources to produce hydrogen, as well as its oil and gas pipelines, if they choose to repurpose them to transport hydrogen. The construction of oil and gas pipelines to China and investments in upstream assets to supply them has created Russia's path forward.

As in China, state capitalism allowed Russia to marry its geopolitics and energy strategy within the global liberal trading order. Russia has long depended on hydrocarbon export revenues to finance its position as a global power, and state capitalism has allowed it to continue, even if the strategy is not all that new and has not yielded notable results, outside of its new ties with China. Assuring its future hydrocarbon-demand security, moreover, will be no easy task with shifting developments in natural gas markets and the ongoing energy transition away from fossil fuels. Overland et al. [111] recognize that Russia may have moderate solar radiation intensity, but the country's vast space means could allow it to overcome this through scale. Nuclear offers another clear avenue for Russia to shift to clean supplies. Nevertheless, Russian power will hinge on its ability to continue to monetize its hydrocarbon assets.

State capitalism birthed a robust bilateral relationship between China and Russia that succeeded because of their unique assets. China provides markets for Russia's resources, as well as financing and

technical expertise for its hydrocarbon projects. Russia, meanwhile, helps China operate in Central Asia and the Arctic, facilitating the opening of supply and export routes. Despite Russia's and China's energy alliance, "economic complementarities," and geographic proximity, the bonds between them have yet to transform into "genuine cooperation" [131, p. 22–23]. Its energy ties do, however, constitute a sort of geopolitical alliance. Russia is already the junior partner to China in energy, and its position will only weaken over time, barring a massive and sustained disruption of oil and gas supplies, a proposition that appears exceedingly unlikely. Russia's future ability to monetize its hydrocarbons will hinge on China, which ultimately seeks to wean itself off importing them for economic, environmental, and diplomatic reasons, as it seeks to be the leader in clean energy industry and technology.

Author statement

All three authors "performed writing - original draft, review, and editing - and conceptualization".

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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