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The Geopolitics of Renewable Energy: the Rare-Earth Elements Case Page 8

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Is the new gold rush, the production and processing of rare earth elements? The authors explore the vulnerabilities of countries lacking such infrastructure as they invest in new energy technologies and systems. Without reasonably assured access to these commodities, might countries be degrading their energy security?

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Impact of Geopolitics on India's Crude Sourcing and Refinery Business

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Oil-central Force Behind Geopolitics

Historically crude oil has been at the centre of geopolitical turbulence. Oil directly or indirectly impacts economic growth & prosperity, industrial productivity, poverty, trade, and the environment. Oil no longer remains a commodity; instead, it evolved as a subject of political economy. In the 20th century,¹ oil assumed the most critical role in global geopolitics, which was responsible for the shaping of global citizens.

The politics of oil have wider ramifications, including "preserving regime stability, civil wars, inter-state conflicts, invasions, producer cartels, and international oil governance".² Oil was believed to be the prime driver behind the Anglo-American invasion of Iraq.³ Various scholars have studied the reasons behind the Iraq war. Many of them converge on the point that oil multi-nationals wanted a stake in Iraqi oil fields, thereby controlling the production and supply of crude to global markets. A book entitled 'Fuel on the Fire' by Greg Muttitt provides more in-depth insights into the role of oil in the Iraq war. Further, Hinnebusch (2007)⁴ provides explanations of the Iraq war in detail, where oil emerges as the devil.

Oil is a strategic commodity that every country needs, and it is crucial to military power.⁵ Therefore, even non-state elements or militant groups are trying to destroy or forcefully acquire oil assets in various parts of the world, especially in the Middle-East and Africa.

The Organization of the Petroleum Exporting Countries (OPEC) is a permanent, intergovernmental Organization, created at the Baghdad Conference on September 10–14, 1960, by founding members Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. OPEC formed to increase the market power of petroleum exporting nations; in a sense, it created a cartel to drive prices down or up as and when needed. Unequal distribution of valuable natural resources like oil, certainly makes a case for geopolitical tension. Petroleum resource-rich countries have been the prime objects of these tensions. In the modern world, trade assumes a critical role in the economic development of nations. Most importantly though is that the economies of oil producers are very dependent on oil revenues from export.

Geopolitical Developments— Impacts on Oil Production and Trade

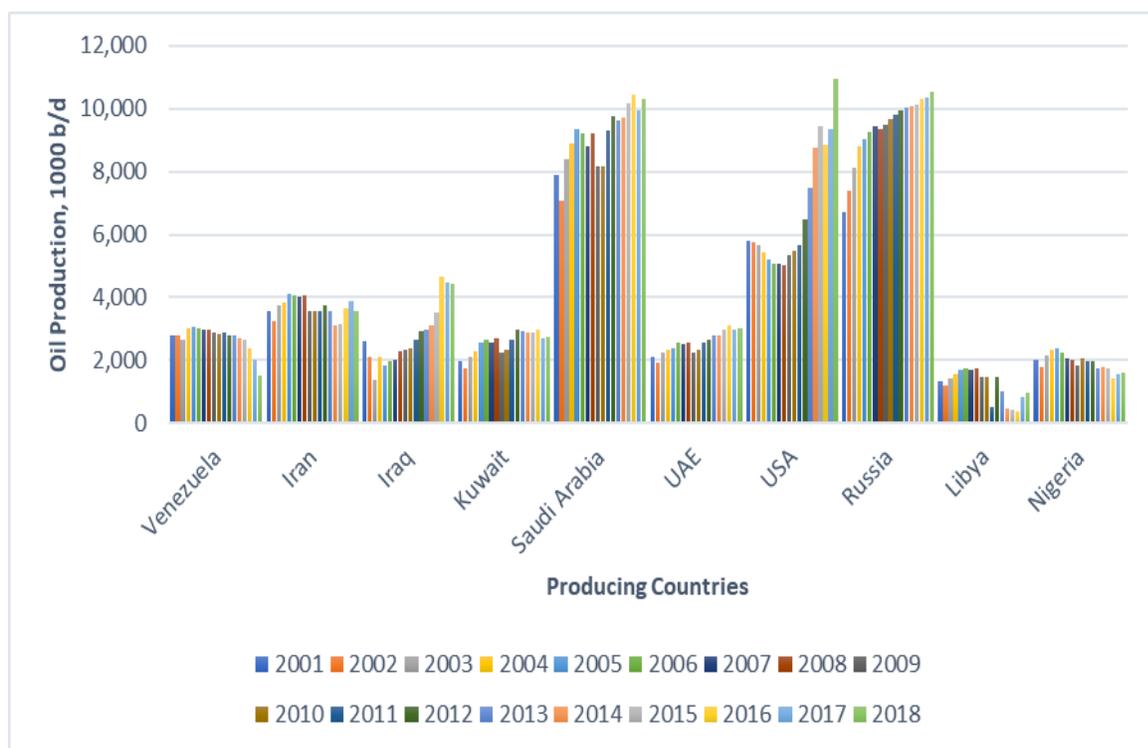
Today, we have multi-lateral trade agreements allowing for the free flow of commodities, which is crucial to the economic and social prosperity of nations. The World Trade Organization (WTO) was created to establish a conducive environment for open trade that is beneficial for all. Oil is one of the largest globally traded commodities. It's volatile and subject to demand-supply constraints impacted by many factors, including political instability, inter-state conflicts, OPEC production policies, and actions by other major producers and consumers.

In the past, the United States (US)-Iraq relationship adversely impacted global oil trade. In recent times, the US's tough stance on Venezuela and Iran started to impact oil trade dynamics. Venezuela's petroleum export value dropped to \$34.6 billion in 2018 from \$93.5 billion in 2012. The grave domestic situation in Venezuela resulted in oil production falling to 1.5 million barrels per day (Mb/d) in 2018 from 2.88 Mb/d⁶ in 2012. The US's recent most sanctions against Iran intend to stop the flow of Iranian crude to the global market, thereby weakening the economic power of Iran.

Now, the US is the largest producer of crude oil, surpassing Saudi Arabia (**Figure 1**). Traditionally, the US is one of the most significant influencers of oil trade in the world. Saudi Arabia is the largest producer in OPEC and significantly influences OPEC policies. Russia, a non-OPEC country extends supports to production adjustment decisions by the OPEC, thereby impacting global

crude production, supply, and pricing. In the 7th OPEC and non-OPEC Ministerial Meeting on 6th December 2019, it was decided for an additional production adjustment of 500 thousand b/d, taking total adjustment to 1.7 million b/d,⁷ excluding voluntary adjustment of 400 thousand b/d, mainly by Saudi Arabia.

Figure 1: Crude Product in Select Countries



Increased oil production in the US means, OPEC needs to look at promising markets like China and India more liberally. China has become the world's largest importer of crude oil, acquiring the majority of its oil from OPEC Member Countries.⁸ Therefore, it is understandable that both sides are trying to deepen the relationship through collaborations. A stronger OPEC-China relation is bound to impact global oil trade.

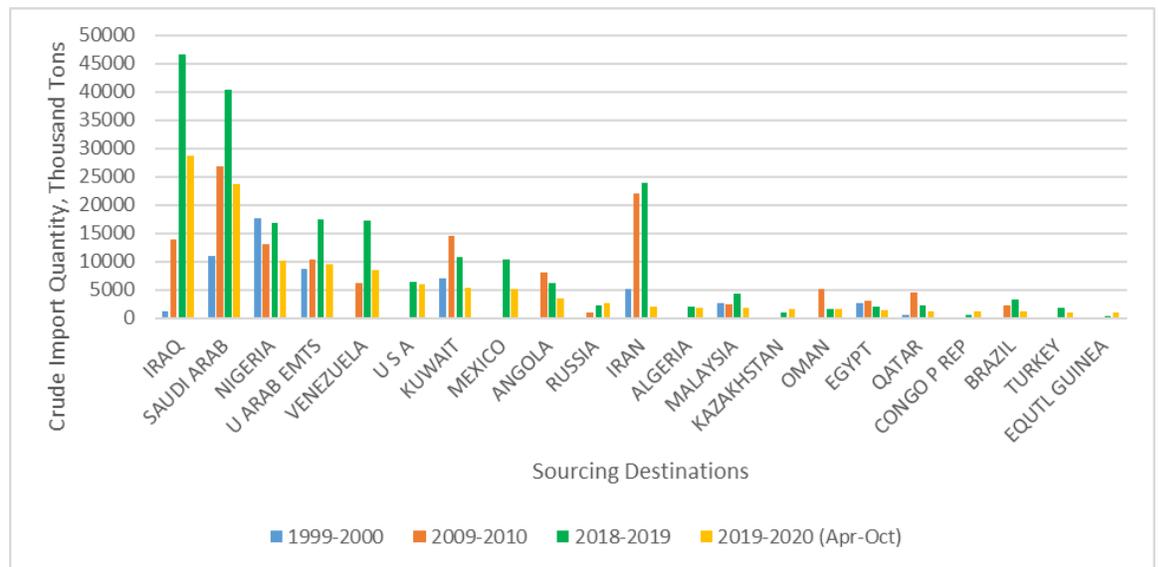
India has been trying to enhance bonding with OPEC. During the 3rd India-OPEC Energy Dialogue, India pressed upon responsible pricing, an approach that would attempt to minimize price volatility, which could benefit both producers and consumers.⁹ A healthy India-OPEC trading relationship would augur well for global oil trade.

India's Crude Oil Sourcing—Dynamics

India's crude sourcing has been heavily dependent on the Middle-East primarily due to multiple advantages, which include the availability of crude, geographic proximity, shipping time and cost. In addition, New Delhi considers Middle-East countries as friends and extended neighbours. With most of the oil resource-rich nations in the Middle-East, India shares a very cordial relationship, which of course, goes beyond trade relations. India is well placed to garner the benefits of the surge in oil production post Iraq war. Already, Iraq displaced Saudi Arabia as the largest crude supplier to India (Figure 2). India's investment in the rebuilding process of post-war Iraq is bound to benefit both nations.

The strained relationship between the US and Iran adversely impacted India's crude sourcing from Iran. Purely from a trade point of view, India may have lost a significant advantage of sourcing Iranian crude. As usual, difficult situations create multiple opportunities to explore, so Indian refiners were prepared to think beyond Iran as their primary source of crude. Newer crude oil sources like the US and Russia are being tried by Indian refiners.

Figure 2: India's Select Crude Sourcing Destinations



Source: Prepared by authors based on data available on the website of Department of Commerce, India

Impact of US-Iran Relations on India's Crude Sourcing

The strained relationship between the US and Iran adversely impacted India's crude sourcing from Iran. Purely from a trade point of view, India may have lost a significant advantage of sourcing Iranian crude. As usual, difficult situations create multiple opportunities to explore, so Indian refiners were prepared to think beyond Iran as their primary source of crude. Newer crude oil sources like the US and Russia are being tried by Indian refiners.

Indo-Iran Relation: Beyond Crude Trade

The US sanctions against Iran forcing India to reduce and finally stop crude import from Iran. The sanctions also adversely affected the Indian strategic investment in the Chabahar port development. The Chabahar port development is considered a "lifeline"¹⁰ to Afghanistan because this opens up ample opportunities for exporting humanitarian supplies to the war-hit country and expand trade opportunities, which could revive that nation.

During a recent visit to Iran, Subrahmanyam Jaishankar -- External Affairs Minister, India met with Iranian Foreign Minister Javad Zarif and reiterated that Indo-Iran ties are "ancient, historic and unbreakable". During the discussion, both parties emphasized the strengthening of bilateral relations and tackling regional and global issues affecting both nations. Both nations are willing to think and work beyond crude trade.

India-Iraq: Carbon Bonding

Carbon bonding between India-Iraq seems to be getting stronger day by day. New Delhi's strategic investment in rebuilding Iraq, improving ease of living, and public life has undoubtedly been paying a dividend. Iraq became the largest crude oil sourcing destination for Indian refiners in 2017-18. Toppling Saudi Arabia and remaining at the top of the table speaks volumes about the India-Iraq diplomatic and trade relationships.

New Delhi had been making enormous efforts to grow Indo-Iraq trade. India's import from Iraq reached \$22.37 billion in 2018-19 compared to a modest \$2 million in 2005-06. Import of crude oil constitutes 99.5 percent of the total import from Iraq and 92 percent of Indo-Iraq bilateral trade.

India-Saudi Arabia: Strengthening Partnership

Prime Minister Modi has been making concerted efforts to strengthen bilateral relationships with Saudi Arabia as well. India considers Saudi Arabia, a critical strategic partner to address its oil security concerns. India's rising trade deficit with Saudi Arabia reaching US\$ 22.9 billion is a concern, but it provides reliable crude oil supply.¹¹ India imported crude valued at \$21.38 billion from Saudi Arabia—the 2nd biggest crude supplier to India (**Table 1**). Further, India's dependence on Saudi Arabia for crude oil is bound to rise in the future, therefore increasing opportunities for building a stronger bilateral trade relationship.

Table 1: India's Trade with Select Countries in 2018-19

Value (million USD)	Export	Import	Total Trade	Trade Balance	Crude Import	Crude Import Share
Iraq	\$1,789	\$22,372	\$24,161	-\$20,584	\$22,265	99.52%
Iran	\$702	\$13,526	\$14,228	-\$12,823	\$12,111	89.54%
Saudi Arabia	\$5,562	\$28,479	\$34,041	-\$22,917	\$21,381	75.08%
UAE	\$30,127	\$29,785	\$59,912	\$341	\$9,512	31.94%
Russia	\$2,389	\$5,840	\$8,229	-\$3,451	\$1,181	20.22%
US	\$52,406	\$35,549	\$87,956	\$16,857	\$3,589	10.10%
Venezuela	\$165	\$7,259	\$7,424	-\$7,094	\$7,248	99.84%
Angola	\$282	\$4,027	\$4,309	-\$3,745	\$3,282	81.51%
Brazil	\$3,800	\$4,406	\$8,206	-\$606	\$1,596	36.23%
Algeria	\$940	\$1,697	\$2,637	-\$757	\$1,206	71.08%
Total	\$98,162	\$152,941	\$251,103	-\$54,780	\$83,372	54.51%

Source: Compiled from Department of Commerce, Govt. of India

Prime Minister Modi, during his recent visit, highlighted opportunities for Saudi Arabia to explore investment of about \$100 billion in the build-up of oil and gas infrastructure by 2024. PM Modi's second visit since 2016 placed the India-Saudi relationship on an "upward trajectory pointing towards greater collaboration in future".¹² His Royal Highness Crown Prince Mohammed bin Salman bin Abdu's visit to India in February 2019 reinforced the commitment toward a 'Strategic Partnership'¹³ envisaged as a part of the 'Riyadh Declaration' of February 2010.

All possible efforts are being made to metamorphose the existing crude 'buyer-seller' relationship to a comprehensive bilateral trade and strategic partnership. Over 2.6 million Indians are working in Saudi Arabia,¹⁴ which provides opportunities for enriching economic and socio-cultural ties. Saudi Arabia is now looking at India as a land of opportunities for investment—essentially partnering with India's growth story.

Saudi Arabia has shown inclinations to heavily invest in oil and gas infrastructure, including strategic reservoirs, refineries, and retailing businesses. Such actions would ensure access to the full crude oil value chain and increase the relationship between the two countries.

India-Russia: Renewed Friendship

Relations between India and Russia are deep-rooted in history.¹⁵ This relationship has grown more reliable over time, engendering a high level of mutual trust and cooperation. Traditionally, India-Russia ties were actively nurtured through collaboration in the fields of science, technology, and defense. Of course, diplomatic relations remain at the centre of this sustainable friendship. In recent times, energy has assumed a critical position in Indo-Russia ties. Russia is the third-largest producer of crude; it makes sense for India to leverage this old friendship. Often logistics and other factors create hindrance for Russian crude reaching India.

Russia is well placed to serve as a strategic partner to help India ensuring crude supply security. Already, Indian exploration & production (E&P) companies such as Indian Oil Corporation Ltd, Oil India Ltd, Bharat PetroResources Ltd, and ONGC Videsh Ltd have established their presence through buying stakes in Russian fields. Further, the Indian consortium is eyeing stakes in the Suzunskoye, Tagulskoye and Lodochnoye fields - collectively known as the Vankor Cluster.¹⁶ Energy driven diplomacy with Russia renewed and revitalized this old friendship. Higher and sustainable investments by Indian companies in Russia's E&P industry means they will have the opportunity to bring back equity oil to India. On the other hand, Russian investors sense a plethora of business opportunities in India.

Russia's energy giant Rosneft and its partners have completed the \$12.9-billion acquisition of Essar Oil. Rosneft's investment in the downstream sector, especially in the refining and retail business, ensures a stable flow of Russian crude to India. Further, Rosneft gets access to the 'high-potential and fast-growing'¹⁷ market.

Time will come when these two countries reap the full potential benefits offered by the Indo-Russia natural and strategic ties. Currently, Indo-Russia's total trade of \$8.2 billion, which is abysmally low, considering the resources available in both countries. Both nations have scope for achieving newer heights in terms of bilateral trade. Higher bilateral trade should augur well for both nations, which could put them on the global bilateral trade map.

India-United States: Strategic Arena

India's friendship with the United States has been growing stronger. The United States and India have "shared interests in promoting global security, stability, and economic prosperity through trade, investment, and connectivity".¹⁸ Diplomatic ties between both democratic nations are prospering under the Modi-Trump relationship. However, trade relations, in general, are undergoing severe scrutiny from the United States, and there is some uncertainty as to how this relationship will evolve.

In 2018 India purchased 48.2 million barrels of US crude oil, a significant increase from 9.6 million in 2017, which is an excellent sign for India-US trade relations. India finds the US as an able crude supplier to meet emerging demand in India. In addition, losses of Iranian crude could be compensated by the US supply.

Crude Sourcing— Impact on Refinery Business

Refining is generally affected by multiple factors, including crude types, crude assays, crude availability, and the ability of the refinery to process crude oil with different characteristics. Historically, Indian refiners have been heavily dependent on sourcing crude oil from the Middle-East. It is well documented that the Middle-East is always prone to political and diplo-

matic turbulence. Over the last two decades, at least one or more of the major crude producers from the Middle-East have faced sanctions. This has resulted in the unreliability of crude supply from the Middle-East.

Indian refiners dependent on such suppliers should reorient their strategy and balance their sourcing mix to maintain a desirable refinery margin and profitability. Of course, refiners should sense such undesirable changes in the business environment and remain ready to revisit their sourcing strategy and product optimization. Geopolitical issues quite often impact crude production, supply, and pricing at a local or global level.

During the Iraq war, Indian refiners had to look for alternatives to Iraq crude. Currently, the United States sanctions on Iran places a similar level of challenge for refiners in India. However, now the Indian refiners have more options. State-owned refiners, especially, have higher flexibility in terms of purchasing crude from spot markets. Availability of crude from the US and Russia coupled with greater supply from Iraq and Saudi Arabia could balance out a lack of supply from Iran and Venezuela.

Conclusion

Geopolitical issues certainly impact production, supply, sourcing and pricing of crude in the short-run. In the long-run, market forces realign to counter the imbalances. As a nation, if your diplomatic ties with oil resource-rich countries or with economic superpowers are strong and sustainable, you can easily face the short-term turbulence without much disturbance. Today, Indian refiners are exceptionally well placed to chart out their sourcing strategies against difficulties arising out of geopolitical interventions. Further, Indian upstream companies are actively investing in the acquisition of foreign oil and gas assets to ensure a stable supply of oil & gas to Indian operations.

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The Geopolitics of Renewable Energy: the Rare Earth Elements Case

Fernanda Delgado¹, João Victor Marques² and Victor Gaspar³

Etymologically derived from the inaccurate notion about the resources in the 19th century, rare-earth elements (REEs) are a compound of 17 critical minerals with low substitutability rates. Their availability is concentrated in few known reserves where large quantities of the minerals are found, and they become even more significant when considering the few amounts necessary to their primary applications (Voncken, 2016)⁴.

The relevance of REEs to the global economy is related to their applications both in civilian and military technologies. Found in magnets, catalysts, lasers, missiles and roughly every electronic device, these minerals have become strategic and clearly a National Security issue. Their application in defence is commonly stressed by states; however, the current energy transition also requires REEs use in renewable energy technologies (solar panels, wind turbines and electric vehicles' batteries).

Historically, from the First Industrial Revolution on, the demand for raw materials (coal, copper, iron, tin and wood) has increased. According to International Relations Realist scholars, those resources might be measured in terms of power, insofar as the state aspires to survive and to expand underneath the ongoing anarchical system. Then, access and control over natural resources would guarantee its political and military survival. Considering the shortage of natural resources, the rise of industrialized countries throughout the twentieth century have put more pressure not solely on the possibility of new countries to industrialize themselves, but also on the reserves of natural resources, especially hydrocarbons (coal, oil and natural gas), uranium, titanium and rare metals (Klare, 2012)⁵.

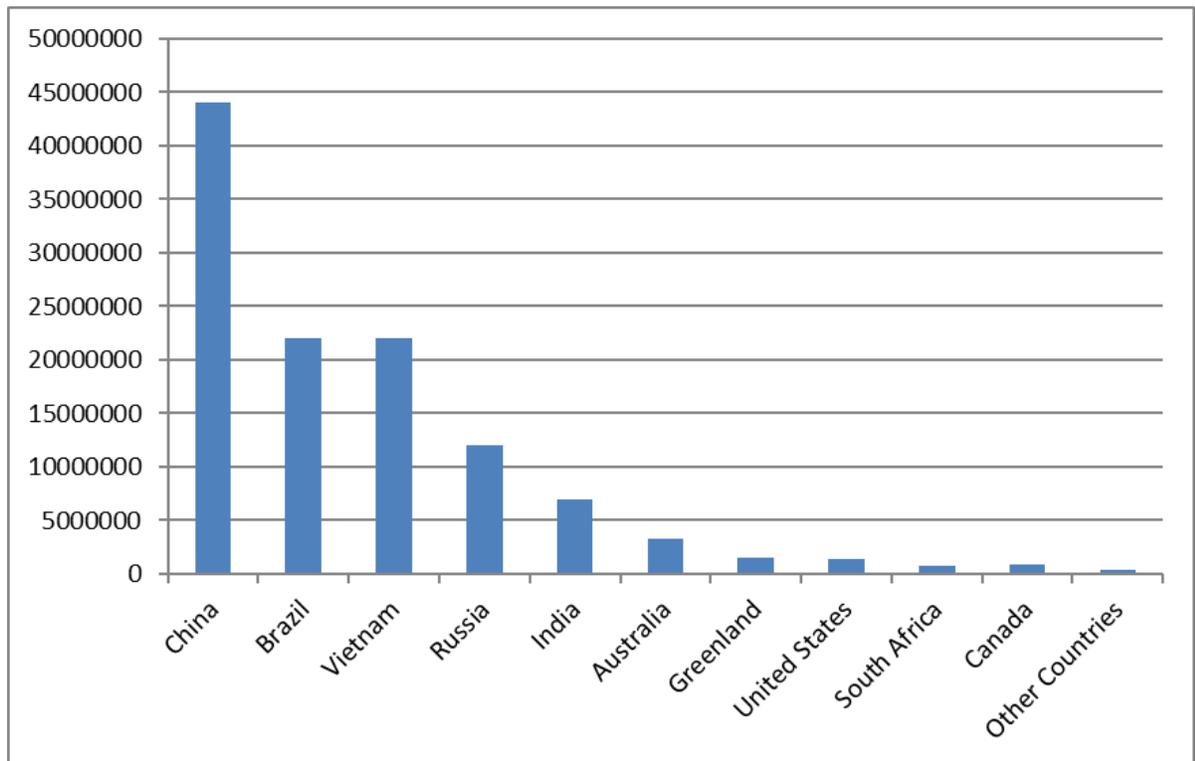
The shortage and survival issues have revealed a geopolitical dilemma of competition or cooperation among international actors like states and transnational corporations. Regarding the REEs, those two approaches have occurred likewise. The current process labelled by Michael Klare (2012) as "the race for what is left", also known as a global scramble for the remaining fields of limited resources, exemplifies the pendulum between competition and cooperation. At the same time, states and corporations have challenged their equals over the rule of reserves as well as have sealed bilateral and multilateral agreements about energy sharing, resource exploration and environmental protection. Despite the global competition for power, mainly between the United States and China, the resources supply being intensely concentrated in few countries requires cooperation and trade treaties. Thus, the scramble for resources does not mean an isolated initiative. It is instead an organized and unprecedented process to reach critical elements (Klare, 2012) using a competitive and cooperative approach.

Lusty & Gunn (2015)⁶ explain that the criteria used to define specific natural resources as critical may differ. The definition adopted by the United States’ Secretary of the Interior, for example, is:

(a) A “critical mineral” is a mineral identified by the Secretary of the Interior pursuant to subsection (b) of this section to be (i) a non-fuel mineral or mineral material essential to the economic and national security of the United States, (ii) the supply chain of which is vulnerable to disruption, and (iii) that serves an essential function in the manufacturing of a product, the absence of which would have significant consequences for our economy or our national security [Executive Order 13817].

Notwithstanding, it is generally perceived in any methodology that the higher geographical concentrations of materials in fewer countries, the higher its supply risk (Lusty & Gunn, 2015). Reserves of REEs are mostly concentrated in China, Brazil and Vietnam (Figure 1).

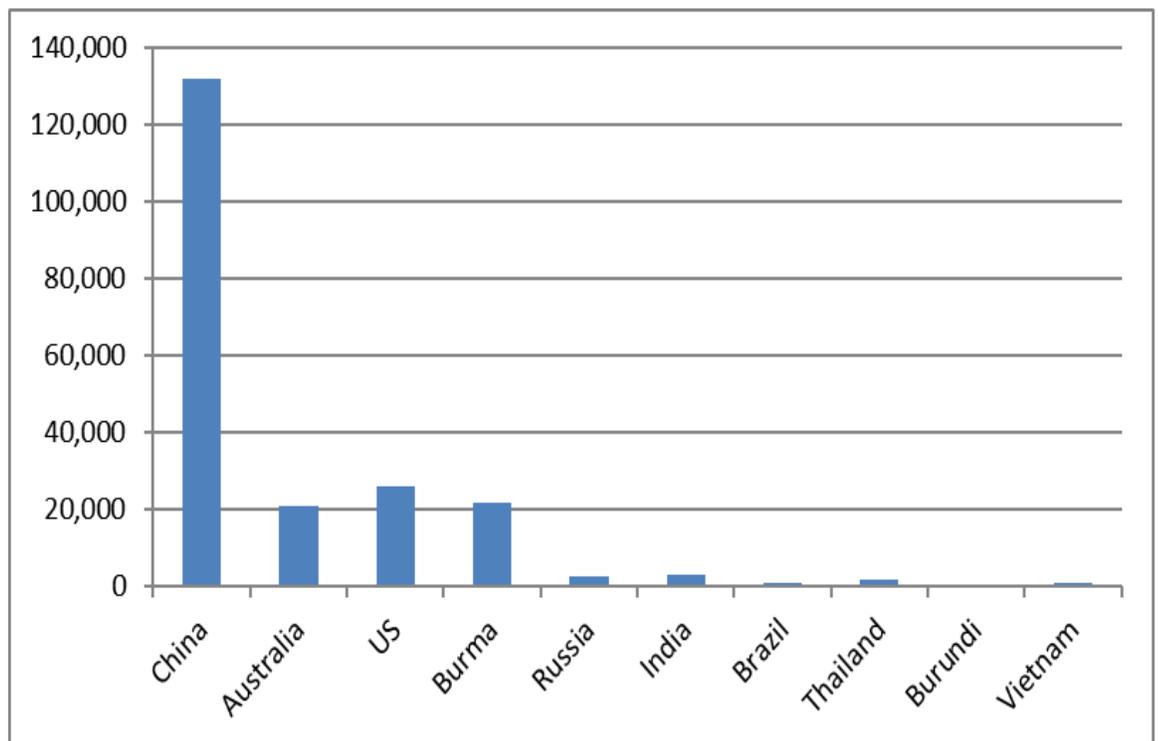
Figure 1: World Reserves of Rare-Earth Minerals in 2019 (tonnes)



Source: Elaborated using data from the USGS (2020)

In terms of production, REE mining has globally increased by 11% compared to 2018. Imports by the United States increased from \$160 million in 2018 to \$170 million in 2019. For the fiscal year (FY) 2020, the potential acquisitions requested by the US Government Stockpile were 908.2% superior to FY 2019. According to the United States Geological Survey (USGS)⁷, domestic production has increased by 44% compared to 2018. That improvement in 2019 turned the country into the second-largest producer of REEs concentrates, after China (Figure 2), though the processing stage has been done overseas.

Figure 2: World Production of REEs in Tonnes in 2019



Source: Elaborated using data from the USGS (2020)

Lusty & Gunn (2015) assert that the expectations of the proper functioning of market mechanisms of supply-demand for the mineral market may be frustrated because of the structural scarcity of some critical minerals, arising from the fact that deposits are only explored when certain technological conditions and economic viability are met.

The US has taken a step towards the mitigation of risks imposed by the critical minerals supply chain. The publishing of the Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals (2019) aims to reduce the national dependence on foreign suppliers. It lists several goals to conquer market independence, such as investment in R&D, treaties with traditional partners and streamline permitting. Moreover, it emphasizes that growth in production will not be enough to reduce vulnerability since the processing facilities are located in China. Then, it is required an effort to focus on all stages of production to achieve the desired independence.

Most of the effort being made towards articulating international mining partnerships involves actors like Canada and Australia. The effort is also concerned about sustainable development, regarding that processing facilities involve several environmental risks such as ground and surface water pollution and public health hazards. Many of the restrictions faced by the mining companies while operating plants in the US are mainly environmental regulations.

In November 2019, a memorandum of understanding (MOU)⁸ was signed between the US Bureau of Energy Resources (ENR) and the Australian Embassy in the US as a by-product of the Energy Resources Governance Initiative (ERGI)⁹ – also supported by Canada.¹⁰ The MOU intends to:

- 1) Promote responsible and sustainable mining practices in the energy mineral sector;
- 2) support resilient supply chains of energy minerals by facilitating trade and industry connectivity; and
- 3) establish measures to meet expected demand for clean energy technologies, including involvement of financial institutions in mining and processing projects.¹¹

In Australia, a project called Nolans Bore, owned by Arafura Resources is expected to begin construction in late 2020. The mentioned deposit has roughly 56 million tonnes of REEs. In Canada, Geomega Resources Inc has received an investment of C\$1.72 million from Investissement Quebec to start producing four high-demand REEs (Neodymium, Praseodymium, Terbium and Dysprosium) in 2020. The company has also been working on a technology capable of recycling REEs permanent-magnets.

Despite the Sino-American competitive approach, such as the Chinese President Xi Jinping's suggestion to weaponize the REEs to gain leverage during the trade-war against the United States,¹² Washington has decided not to impose tariffs on critical minerals imported from China – given their degree of importance. In turn, China has agreed to buy scandium and yttrium from the US, following the bilateral agreement's phase-one signed in January 2020. Although they are currently not mined on American soil, the agreement has secured a customer for junior miners.

In this sense, global actors have also cooperatively interacted. They have designed, for instance, strategies to increase the life-cycle of oil and natural gas fields, to improve the energy efficiency and to develop renewable energies. The decrease of solar and wind energy production costs has aided to change the energy mix, crossing international barriers and overcoming, in some cases, fossil fuels. Even companies outside the electric sector have sought to invest in renewable energies, including in the poorest countries, as a new field of capital application. The construction of wind farms in Kenya illustrates such a context.

Conclusions

The development of scientific content in this subject is particularly incipient. It may be related to the geopolitics of renewable energy, which differs hugely from the geopolitics of oil and gas. Perhaps, the sector does not impact the global economy enough yet, so more elaborated studies may be needed to understand their role in the evolving energy mix. There are a lot of projections made by international agencies about the renewable energies' insertion in the global energy mix. These projections differ as the underlying knowledge has a great deal of uncertainty.

Within different scenarios of international geopolitics, global competition over strategic minerals will be a core issue to coordinate the movement of producers, consumers, providers and investors. The hard dilemma looks to be, however, to act in the face of the events and to foresee problems, so in the future, the poorest countries are not turned into mere raw material suppliers. Interventions should occur with enough flexibility in order not to harm unconsolidated processes, which requires making adaptations in the face of unforeseen events. That level of uncertainty may mean an increased role for governments and national energy companies in comparison to relying on the competitive market and private sector investments. History shows that a lack of planning and preparedness would once again result in the exploitation of the disadvantaged.

Endnotes:

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⁸*Vide* <https://www.state.gov/united-states-and-australia-sign-mou-on-critical-energy-minerals/>

⁹The ERGI is coordinated by the ENR under the assumption that by 2050 the global consumption of critical energy minerals could increase almost 1000%. *Vide* <https://www.state.gov/energy-resource-governance-initiative/>

¹⁰*Vide* https://www.canada.ca/en/natural-resources-canada/news/2019/12/canada-joins-the-energy-resource-governance-initiative.html?utm_source=miragenews&utm_medium=miragenews&utm_campaign=news

¹¹*Vide* <https://www.state.gov/united-states-and-australia-sign-mou-on-critical-energy-minerals/>

¹²GASPAR FILHO, V. *Chineses miram em vulnerabilidade estadunidense no mercado de terras-raras*. Boletim Geocorrente, Rio de Janeiro, v. 95, p 5-5, jun. 2019.

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