

The Geopolitics of Critical Minerals

by Sophia Kalantzakos

Sustainable Energy Transition Series

ABSTRACT

The decarbonisation of the global economy – which is necessitated by the climate crisis – and the new wave of technological evolution featuring artificial intelligence (AI) and 5G networks, fuel the race to secure uninterrupted access to critical minerals. Traditional industrial actors (the US, the EU and Japan) are pitted against China and its global Belt and Road Initiative, that sets out to unite Eurasia and Africa and loop in South America into a seamless space of high connectivity (land, maritime, air, cyberspace) and trade. Understanding how the high geographic concentration of rare earths, lithium and cobalt often creates hotspots of contention especially in unstable parts of the world, offers instructive indications of how the race to decarbonise and digitalise the global economy will contribute to shaping geopolitics in the years to come.

China | Foreign trade | Mining | Rare earths | Energy

keywords

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Introduction

The decarbonisation of the global economy – which is necessitated by the climate crisis – and the new wave of technological evolution featuring artificial intelligence (AI) and 5G networks are fuelling the race to secure uninterrupted access to critical raw minerals (CRMs), namely those critical to the production of high-technology applications.¹ Given that critical minerals are found in substantial geographic concentration, often in fragile states,² the race to secure the minerals themselves and, even more so, the supply chains from mine to market is creating hotspots of contention, while aggravating geopolitical rivalries.

The United States, the European Union and Japan, traditional global economic powers, are no longer the exclusive drivers of the global economy and its future transformation. They face mounting competition from emerging powers and principally from the People's Republic of China (PRC), which has presented the developing world with an alternative vision for this planetary transformation. China's Belt and Road Initiative (BRI) sets out to unite Eurasia and Africa as well as to loop in South America into a seamless space of high connectivity (land, maritime, air, cyberspace) and trade. BRI is a building project, a digital project, a global project – and it claims to be a sustainable project.³ As a consequence, China's

¹ According to USGS, critical minerals are defined as having “a supply chain that is vulnerable to disruption, and that serve an essential function in the manufacture of a product, the absence of which would cause significant economic or security consequence”. Moreover, strategic minerals are “a subset of critical minerals and are those that are essential for national security applications”. Klaus J. Schulz et al. (eds), “Critical Mineral Resources of the United States—Economic and Environmental Geology and Prospects for Future Supply”, in *USGS Professional Papers*, No. 1802 (2017), p. A12, <https://doi.org/10.3133/pp1802>.

² The Fund for Peace, *Fragile States Index*, <https://fragilestatesindex.org>.

³ “Full Text of President Xi's Speech at Opening of Belt and Road Forum”, in *XinhuaNet*, 14 May 2017, http://www.xinhuanet.com/english/2017-05/14/c_136282982.htm. In 2019 more than 150 countries and international organisations have signed agreements on Belt and Road cooperation with China.

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· Paper prepared in the framework of the IAI-Eni Strategic Partnership, December 2019.

global vision is raising the stakes over access to critical minerals in its attempt to lead and dominate innovation, digitalisation and the green economy. The deployment of 5G, for instance, will expand mobile networks to support a diversity of both services and devices thus redefining a number of industries, such as retail, education, transportation and entertainment. AI, moreover, is being rapidly developed with a promise to accelerate innovation, efficiency and sustainability in businesses and organizations. Both these technology-driven undertakings form the backbone of the next “industrial” revolution and their complex systems are voracious consumers of critical materials. Finally, they will help create a world that is even faster paced and interlinked.

In this world, fragmentation is an obstacle, which is why the competition between the major industrial economies will only increase. The US attempts to counter the growing penetration of China’s leading global information and communications technology (ICT) solutions provider, Huawei, in global markets represents the tip of the iceberg. While there are those who believe that the free market and continued innovation will ensure the flow of minerals, such a view underestimates the geopolitical impact of developing global realignments.

1. Rare earths as a major geopolitical challenge

The first signs of what competition over access to critical minerals might entail for the 21st century involved seventeen elements of the periodic table called rare earths. Relatively unknown to non-specialists, geopolitics – and particularly the fact that 97 per cent of these materials came from China – spotlighted their enormous significance to the production of crucial industrial applications. Previously, most research had focused on their properties and applications. Few scholars, strategists and policy makers had considered including them in discourses of economic statecraft and resource competition.

Lighting, magnets, glass, electronics, defence systems, wind turbines, hybrid and electric vehicles all contain rare earths. Part of the family of lanthanides, rare earths exist in other countries outside the PRC, but in most places it is not economically feasible to extract and process them. Even when it does make economic sense to mine rare earths, both extraction and processing are toxic for the environment.⁴ In addition, not all these materials are equally valuable; light rare earths are more abundant while heavy are rarer, more expensive and more critical. Lead times to bring a mine into operation is a capital-intensive proposition and takes at least a decade.

⁴ Cindy Hurst, *China’s Rare Earth Elements Industry: What Can the West Learn?*, Washington, Institute for the Analysis of Global Security (IAGS), March 2010, <https://doi.org/10.21236/ADA525378>; Jost Wübbeke, “Rare Earth Elements in China: Policies and Narratives of Reinventing an Industry”, in *Resources Policy*, Vol. 38, No. 3 (September 2013), p. 384-394.

New technological applications have transformed rare earths into a coveted input, so much so that China gave them the status of a strategic asset in its industrial and economic development plans. China developed its own national policy on the subject, the key goal of which was to move away from being a raw commodity exporter of rare earths and to produce end products domestically. In accordance with this agenda and in response to other considerations (illegal mining and exports, environmental degradation etc.), during what would become known as the rare earth crisis of 2010, China first reduced export quotas of the elements by 40 per cent and then “unofficially” boycotted exports to Japan over an incident near the contested (by China) Senkaku/Diaoyu islands in the East China Sea.⁵ These events sent a shock wave throughout the international community, triggering fears of an unprecedented dependence on one supplier and anxieties about China’s use of economic statecraft in geopolitical disputes. The perceived crisis provoked a steep price hike of the elements and two years later, in 2012, resulted in the EU, Japan and the US filing simultaneous complaints with the World Trade Organisation (WTO) demanding consultations with China over its restrictions on the export of rare earths, tungsten and molybdenum.⁶

After the dust settled, it became clear that rare earths constituted a salient case study of how resource competition may become more pronounced in the future, particularly over critical minerals. In the years since, the situation has become more fraught. The current trade wars have undermined the centrality of the WTO as well as heightened political rivalries, reduced scientific collaboration and revealed a pronounced clash of economic and leadership ambitions between China and the Western powers (including Japan).⁷ These developments prompted scholars, researchers, policymakers and industry specialists to identify a number of other critical inputs. Cobalt and lithium, for instance, are also mined in few geographic locations and have become indispensable to high tech, the green economy and the defence industry. To be sure, neither of them resembles rare earths in geographic singularity. Nevertheless, demand is growing exponentially, straining production capacity, impacting the environment in the areas of extraction and pitting companies and nations against each other in a competition that some describe as a scramble for a new generation of vital resources.

In the case of rare earths, China continues to dominate production and supply because of its leading processing capabilities.⁸ Enthusiasm about new discoveries

⁵ Keith Bradsher, “Amid Tension, China Blocks Vital Exports to Japan”, in *The New York Times*, 22 September 2010, <https://nyti.ms/2HOinnx>.

⁶ Sophia Kalantzakos, *China and the Geopolitics of Rare Earths*, New York, Oxford University Press, 2018, p. 134.

⁷ Li Wei, “Towards Economic Decoupling? Mapping Chinese Discourse on the China–US Trade War”, in *The Chinese Journal of International Politics*, Vol. 12, No. 4 (Winter 2019), p. 519-556, <https://doi.org/10.1093/cjip/poz017>; Tony Feder, “Trade Wars and Other Geopolitical Tensions Strain US–China Scientific Collaborations”, in *Physics Today*, Vol 72, No 11 (November 2019), Art. 22, <https://doi.org/10.1063/PT.3.4338>.

⁸ Wang Jiamei, “Ensuring Rare Earth Dominance Crucial in Trade War”, in *Global Times*, 25

has been dampened by the cold realities of high-cost financing and long lead times. The only significant rare earth mine outside China and in which the PRC has not invested remains Lynas in Australia. Industry has made some strides with respect to substitution. While rare earths enhance productivity and efficiency in their applications and comparable replacements are not readily available, scientists have been examining ways to reduce the quantity of rare earths used in applications wherever possible without compromising efficiency. Thus, China's dominance continues while its own need for these materials is rapidly growing. In fact, China became a net importer of several rare earth elements in 2018 for the first time since 1985.⁹ In other words, the market will soon be tightening as China imports rare earths from abroad for downstream processing.

The case of rare earths, therefore, indicates among other things, that few governments have articulated, let alone implemented, a sound resource strategy. As a result, China is at least a decade ahead of its international competitors. Moreover, it explains why rare earths made headlines again in 2019 when China "indicated" that it might "weaponise" the elements to leverage its trade dispute with the US.¹⁰

2. Competition over lithium and cobalt

The climate crisis points to fossil fuels (coal, oil, natural gas) being eventually phased out as main sources of energy generation. Electrification is seen as the way forward for various sectors, through the development of a modern electric smart grid that uses renewable energy instead of fossil fuels to cover domestic and industrial energy needs. Moreover, transportation – responsible for over 20 per cent of global emissions during the last decade – is expected to transition to alternative energy vehicles with an expanding share of electric vehicles (EVs).¹¹ In this next phase of our industrial revolution, lithium and cobalt are set to become critical minerals – and indeed they already feature in CRM lists. In May 2018, the US Department of the Interior, in coordination with other executive branch agencies, published a list of 35 critical minerals (83 FR 23295) that included both lithium and cobalt as well as rare earths. The list was developed pursuant to the president's executive order 13817, "A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals" (82 FR 60835), which indicated that the US administration

November 2019, <http://www.globaltimes.cn/content/1171149.shtml>.

⁹ Liuxi Li and Denise Jia, "China Became Net Importer of Rare Earths in 2018", in *Caixin Global*, 16 March 2019, <https://www.caixinglobal.com/2019-03-16/china-became-net-importer-of-rare-earths-in-2018-101393333.html>; Tom Daly, "China Becomes World's Biggest Importer of Rare Earths: Analysts", in *Reuters*, 13 March 2019, <https://reut.rs/2Hw3l7e>.

¹⁰ Ben Blanchard, Michael Martina and Tom Daly, "China Ready to Hit Back at U.S. with Rare Earths: Newspapers", in *Reuters*, 29 May 2019, <https://reut.rs/2Wsa1FE>.

¹¹ Ralph Sims et al., "Transport", in Ottmar Edenhofer et al. (eds), *Climate Change 2014. Mitigation of Climate Change. Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, New York, Cambridge University Press, 2014, p. 599-670, <https://www.ipcc.ch/report/ar5/wg3>.

was sensitive to growing concerns over securing uninterrupted access to critical minerals.¹² For its part, the EU has published its own lists that include rare earths and cobalt (amongst others) and underscore lithium's criticality for battery technology.¹³ Japan, in turn, maintains a stockpile of minerals that it deems rare/critical and, through Japan Oil, Gas and Metals National Corporation (JOGMEC), a government institution, provides equity support or loans to Japanese companies for metal resource exploration projects.¹⁴

In the 21st century, the production of lithium began to grow rapidly in order to meet the demand for lithium ion batteries. Accelerated transformation of the transportation industry with the introduction of hybrid and electric vehicles, which began entering the market in the late 1990s,¹⁵ necessitated the development and production of a new rechargeable high energy density battery.¹⁶ Rechargeable lithium batteries are also used extensively in the growing market for portable electronic devices and increasingly in electric tools, electric vehicles and grid storage applications. Consequently, multiple demand drivers have caused lithium production to skyrocket. According to the United States Geological Survey (USGS), world production in 2015 was 31,500 tons, while in 2018 it reached 85,000.¹⁷

Lithium resources are highly concentrated in South America, especially in Argentina (14.8 million tons), Bolivia (9 million tons – of largely untapped resources) and Chile (8.5 million tons). Because of their dominant position, these three countries have become known as the “lithium triangle”. Just below them are Australia – which is estimated to have 7.7 million tons of identified lithium resources – and China with 4.5 million tons.¹⁸

The security of the lithium supply has become a top priority for technology companies in the US and Asia and companies have begun to form strategic alliances with lithium exploration companies worldwide.¹⁹ Industry has been more

¹² US Department of the Interior, “Final List of Critical Minerals 2018”, in *Federal Register*, Vol. 83, No. 97 (18 May 2018), p. 23295-23296, <https://www.federalregister.gov/documents/2018/05/18/2018-10667/final-list-of-critical-minerals-2018>; Brian W. Jaskula, “Lithium”, in USGS, *Mineral Commodity Summaries*, February 2019, p. 98, <https://www.usgs.gov/node/930898>.

¹³ European Commission, *2017 List of Critical Raw Materials for the EU* (COM/2017/490), 13 September 2017, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017DC0490>; European Commission, *Report on Raw Materials for Battery Applications* (SWD/2018/245/2), 22 November 2018, <https://ec.europa.eu/transport/sites/transport/files/3rd-mobility-pack/swd20180245.pdf>.

¹⁴ Japan Oil, Gas and Metals National Corporation (JOGMEC) website: *Metals: Financial Support for Japanese Companies*, http://www.jogmec.go.jp/english/stockpiling/metal_10_000003.html.

¹⁵ Tomer Fishman et al., “Implications of Emerging Vehicle Technologies on Rare Earth Supply and Demand in the United States”, in *Resources*, Vol. 7, No. 1 (March 2018), Art. 9, <https://doi.org/10.3390/resources7010009>.

¹⁶ Taylor Dimsdale, *Rules of the Road. The Geopolitics of Electric Vehicles in Eurasia*, Berlin, E3G, June 2019, https://www.e3g.org/docs/12_6_19_E3G_Geopolitics_of_EVs_PDF.pdf.

¹⁷ Brian W. Jaskula, “Lithium”, cit., p. 98.

¹⁸ Ibid., p. 99.

¹⁹ Richard Mills, “Lithium Supercycle”, in *Ahead Of The Herd*, 17 October 2017, <https://aheadoftheherd.com/Newsletter/2017/Lithium-Supercycle.htm>.

pro-active than in the case of rare earths. To illustrate, during the rare earth crisis of 2010 a number of companies moved to China to avoid disruption of supply and others supported mines outside China only temporarily, as they turned back to China when prices and availability for export normalised.

The industry's greater activism has not prevented China from taking steps towards increasing its strategic position in lithium production. The PRC has pursued mine investments in South America and Australia in order to secure a dominant position in downstream industries and an overall command of the supply chain. For instance, in 2018, China's Tianqi Lithium, became the second largest shareholder in Sociedad Química y Minera (SQM), a Chilean mining company. It also holds a 51 per cent stake in the world's biggest hard-rock lithium mine at Greenbushes in Western Australia.²⁰ Tianqi Lithium, moreover, which is listed on the Shenzhen Stock Exchange, is fully verticalised, that is, it engages with all the stages of the lithium industry – mining, downstream production, processing and sales of a wide range of high-quality lithium products. These products include lithium concentrate extraction and the production of advanced lithium specialty compounds.²¹ China's biggest lithium producer, Jiangxi Ganfeng Lithium, is also vertically integrated.²²

Politics, however, always finds a way to rear its head. For instance, the US–China trade war as well as the Chinese government's decision to cut subsidies to EV production by half in the summer of 2019 and to eliminate subsidies for vehicles with ranges under 250 km has brought down EVs sales. These twin policy decisions have affected the market significantly and driven down lithium prices, since China is a global leader in both the production and sale of EVs. In 2017, 770,000 EVs were manufactured and sold there and the expectation was that that number would reach 2 million in 2020. In 2018 global EV sales reached 2.1 million, an increase of 64 per cent compared to the total sold in 2017.²³ EV production remains expensive, but China's generous subsidies to both consumers and manufacturers had been designed to jumpstart the industry of electric bus production and passenger vehicles. Cities in China also provided incentives for deploying EVs, to reduce air pollution including assured issuance of a vehicle license as well as greater access to carpool lanes. The change in the subsidy scheme accelerated by fears of an economic slowdown because of the trade wars negatively impacted the demand for lithium and dampened investor expectations in the industry.

²⁰ Akshat Rathi, "One Chinese Company Now Controls Most of the Metal Needed to Make the World's Advanced Batteries", in *Quartz*, 30 May 2018, <https://qz.com/1292202>; Tim Treadgold, "China and the U.S. Heading for a Showdown in an Australian Lithium Mine", in *Forbes*, 24 June 2019, <https://www.forbes.com/sites/timtreadgold/2019/06/24/china-and-the-u-s-heading-for-a-showdown-in-an-australian-lithium-mine>.

²¹ Tianqi Lithium website: *Our Company*, <http://en.tianqilithium.com/ourcompany/synopsis.html>.

²² Ganfeng Lithium website: *Overview*, http://www.ganfenglithium.com/about_en.html.

²³ Edison Electric Institute (EEI), *Electric Vehicle Sales: Facts & Figures*, April 2019, p. 4, https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL_EV_Sales_Update_April2019.pdf; Jack Perkowski, "What China's Shifting Subsidies Could Mean for Its Electric Vehicle Industry", in *Forbes*, 13 July 2018, <https://www.forbes.com/sites/jackperkowski/2018/07/13/china-shifts-subsidies-for-electric-vehicles>.

Correspondingly, there are also concerns over political turmoil in South America. In Chile, protesters blocked mines in Atacama and in 2018, Corfo, the Chilean development agency, introduced extremely high royalties on lithium, which made production there less competitive, especially during a global price slump. In Argentina, the renewed financial crisis and the recent change of government is predicted to adversely impact investment in new projects and to affect supply levels.²⁴ Lithium development contracts in Bolivia have been highly coveted and contested, with China's industrial rivals fiercely competing against the PRC for control, a contest that has impacted local politics.

Australia is currently the world's largest producer and seems to have identified its niche in CRM production and export. According to a 2019 government report, it is also looking to invest in downstream processing.²⁵ Because many countries are now taking a strategic approach that include diversification of supply, Australia finds itself uniquely positioned to supply not only rare earths (as previously discussed), but also lithium and cobalt. Japan has already invested there, while the Trump administration has recently initiated talks with the Australian government for closer collaboration and sourcing of CRMs.

Nonetheless, the China factor remains of critical importance to Australia because the PRC is both a large investor in the Australian mining industry and an importer of its minerals. The PRC is also Australia's largest trading partner. Coal (at 16 per cent) and other minerals constitute major exports to China because of geographic proximity.²⁶ While Australia may think of itself a controlling player in the competition over CRM, it runs the risk of becoming a hotspot and battlefield in which greater powers face off. Furthermore, Australia lacks the kind of verticalisation needed for supply chain control and acquiring that capacity can be prohibitive as labour costs are many times that of China. While prices skyrocketed, Australia's mining companies had focused on ramping up production. Now the price slump is having the opposite effect. A number of companies are unable to restructure their debt and efforts to consolidate producers are underway in an attempt to weather the storm created largely by the trade war between the US and China.²⁷

The story of cobalt, a key ingredient in batteries for smartphones, laptops and electric cars²⁸ more closely resembles that of rare earths with respect to its high

²⁴ Morgan Stanley Research, *Lithium | Global LME Week Feedback: Industry in Capitulation Mode*, 6 November 2019.

²⁵ Australian Department of Industry, Innovation and Science, *Australia's Critical Minerals Strategy 2019*, March 2019, <https://www.industry.gov.au/node/52573>.

²⁶ Australian Department of Industry, Innovation and Science, *Resources and Energy Quarterly*, December 2019, <https://publications.industry.gov.au/publications/resourcesandenergyquarterlydecember2019/index.html>.

²⁷ Melanie Burton, "Australian Lithium Miners Submerged by Low Prices", in *Reuters*, 2 September 2019, <https://reut.rs/2jS8soX>.

²⁸ Elsa A. Olivetti et al., "Lithium-Ion Battery Supply Chain Considerations: Analysis of Potential Bottlenecks in Critical Metals", in *Joule*, Vol. 1, No. 2 (11 October 2017), p. 229-243, <https://doi.org/10.1016/j.joule.2017.10.001>.

concentration in one country. This time, however, the dominant producer is the Democratic Republic of Congo, one of the poorest countries of Africa, which currently accounts for more than 60 per cent of world cobalt mine production and boasts by far the largest reserves in the world.²⁹ As a matter of fact, copper and cobalt combined represent 80 per cent of the DRC's export revenue.³⁰ Media attention was drawn to the miserable labour practices employed by the mining industry following a 2016 Amnesty International report that raised questions about ethical mining practices. Under pressure to demonstrate greater social responsibility, many major tech companies have expressed a commitment to better monitor their supply chains for human rights abuses, although in practice that is difficult to achieve. Partly in response to this outcry, a new mining code in 2018 raised royalties for cobalt in the DRC from 2 to 10 per cent causing an uproar among foreign investors.³¹

Yet again, China stands out for its attempts at securing a position of influence over the industry. By all accounts, China is the dominant actor in cobalt mining in the DRC. In 2018 it formed a 35-member Union of Mining Companies with Chinese capital with the blessings of both the PRC and the DRC governments.³² China is the leading supplier of cobalt imports to the US and the world's leading consumer of cobalt, with more than 80 per cent of its consumption being used by the rechargeable battery industry. While Australia is able to provide some level of diversification of supply, cobalt production there was 4,700 tons in 2018 whereas cobalt output in the DRC went up from 63,000 tons in 2015 to 90,000 tons in 2018.³³ This makes the DRC the most critical player in the sourcing of the mineral and a hotspot of contention.

3. The BRI and the race for critical minerals

In the scholarly, policy and technical world there are those who take a cornucopian approach to the issue of critical metals. Physical depletion, they claim, is not imminent, while the market and innovation will help address any short-term crises in their availability. Similarly, they are also strong proponents of technical solutions such as recycling and substitution. They champion intellectual property rights (IPRs) and patents and foresee the merger of major technology actors into

org/10.1016/j.joule.2017.08.019.

²⁹ Kim B. Shedd, "Cobalt", in USGS, *Mineral Commodity Summaries*, February 2019, p. 51, <https://www.usgs.gov/node/930898>. According to USGS, the DRC's global reserves currently stand at 3,400,000 metric tons, three times that of Australia.

³⁰ FP Analytics, "Mining the Future", in *Foreign Policy*, 1 May 2019, <http://bit.ly/2GN72nj>.

³¹ "Overhauling the DRC's Mining Code", in *Mining Technology*, 28 March 2018, <https://www.mining-technology.com/?p=46618>.

³² William Clowes, "China Marks Cobalt, Copper Ascendancy in Congo With New Group", in *Bloomberg*, 18 June 2018, <https://www.bloomberg.com/news/articles/2018-06-18/china-marks-cobalt-copper-ascendancy-in-congo-with-new-group>.

³³ Kim B. Shedd, "Cobalt", cit., p. 51.

a handful of dominant corporations. In their view, geopolitics does not enter the equation as all disruptions in the sector will be short-lived and trigger more innovation.

There is merit to these claims. Recycling may technically be possible, but may not be economically feasible. Substitution or a reduction in the quantity of the critical minerals has occurred in some applications. In the case of lithium, for example, labs have been exploring magnesium as a replacement based on its affordability and abundance. While IPR protects innovation, it has been part of the ongoing frictions between Europe, the US, Japan and China, with the latter regularly accused of lax enforcement of IPR protection rules or even industrial espionage. In this context, the rise of populism and resource nationalism are also impacting free trade agreements, as demonstrated by the ongoing trade wars initiated by the US and spreading globally.

Most of all, however, mounting geopolitical tensions are linked to China's growing global power manifested through the Belt and Road Initiative, which aims to bring land, maritime, air and cyberspace connectivity to the developing world. This is a vast and continually evolving project and estimates of its scale range anywhere from 1 trillion to 8 trillion US dollars. The BRI has thus far principally underpinned energy and transport projects, which account for 38 per cent and 27 per cent of BRI investments and construction contracts, respectively.³⁴ It features highways, railways, ports, airports, dams, pipelines, a modern power grid and open trade and investment networks that will complete the planet's transformation. It is a resource-intensive, capital-intensive and labour-intensive global plan.

As principal investor, therefore, China is seen by its competitors as consolidating a web of global partnerships. Concerns abound over how a "win-win" narrative among "equal" partners has resulted in soaring debt for many, which has actually engendered a counter-narrative of neo-colonialist aspirations of the PRC. In fairness, China went out in search of resources, markets and political friends in a world that had already been divided among the most powerful economies. The external conditions in which the PRC found itself largely dictated where to look for raw materials and how to go about securing access to them. Today, criticism notwithstanding, the network of relationships that China has created offers agency and alternatives to other developing nations that had felt constrained for options. It also allows China to consolidate its existing investments and present an alternative vision of development to its partners in Asia, Africa and South America.

China's offer to become the one-stop-shop for the developing world poses a threat to the US, the EU and Japan, which in the post-war world dominated industry, trade, technology, defence and international institutions and drafted development strategies, norms, systems of governance while dictating financial realities to

³⁴ Veasna Kong et al., *The Belt and Road Initiative—Six Years On*, Moody's Analytics, June 2019, p. 2-3, <https://www.moodyanalytics.com/-/media/article/2019/belt-and-road-initiative.pdf>.

many nations. What is most alarming to them is perhaps not that the centre of world power is shifting toward China, but that China is encompassing the world, moving west, north and south, reversing the direction of the silk road and building up its maritime connections to directly bridge (and streamline) geographically, economically, territorially, digitally and perhaps even politically Eurasia and Africa, as well as linking them further to South America. In the ensuing competition for markets and technological leadership in a decarbonised world economy, threatened by the growing climate crisis, those nations rich in CRMs may find themselves in the eye of a raging storm. The DRC, Chile, Argentina, Bolivia and others that are resource-rich are willing and eager partners of China's projects, their CRMs coveted by China's rivals. China has promised sustainable development and has signed off on the Paris Agreement on climate change. It is also pursuing the creation of a digital umbrella that will allow numerous countries without their own tech giants to participate in an internet economy led by China's tech industry. Already Chinese telecommunication companies have made significant inroads into Africa and elsewhere along the BRI in markets that rely on mobile banking and the internet to keep their economies growing and connected to larger markets. All these projects require CRMs and demand will only accelerate as the belt and road gains momentum.

Conclusion

Geopolitical realignments, the urgency to decarbonise and the race to lead 5G and AI in a digitalised world have placed critical minerals centre-stage in the competition amongst leading industrial actors. Previously unimaginable obstacles to free trade flows are now a reality and a geopolitical showdown of sorts is already taking place as the US challenges its competitors and above all its strategic rival, China. The sheer size and scope of the Belt and Road Initiative, with China in the lead, threatens to tilt the balance in the PRC's favour. China has invested heavily in AI and 5G technology. It brings to the table the financing, the relationships and access to critical minerals and other vital resources which it will need to transform the developing world. These are the facts and they cannot be ignored even by cornucopian views about resource scarcity. Governments, industry and scholars searching for practical solutions (state investment in exploration, recycling, substitution, diversification of supply chains, legislative responses, the drafting of critical materials lists, innovation) need to first and foremost acknowledge that geopolitics may end up being the greatest disrupter in their most carefully laid out plans.

Updated 31 December 2019

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