UCL Institute for Sustainable Resources

Critical minerals: potential next steps

Lewis Pickett, Parliamentary Fellow, University College London

July 2024

1. Background

1.1. What are critical minerals?

The term 'critical mineral' doesn't mean that a mineral is rare. Whether a mineral is considered, or classified, as 'critical' is less of a geological matter and more of an economic and political one.[1] A country or a business, for example, may define a mineral as 'critical' depending on the economic importance of that mineral to them and the risks to the supply of that commodity.[2] Risks to the supply of critical minerals are usually not caused by the physical scarcity of the mineral in question (e.g. the amount of the mineral that exists on earth, either on land or at sea), but an array of other factors (see Section 2) that can affect supply.[3]

1.2. Why are critical minerals important now?

Today's concerns about the supply of critical minerals are not unprecedented. The British Geological Survey (BGS) pointed out that the during the Cold War, the Soviet Union was criticised for engaging in a 'resource war' to cut off minerals to the West.[4] There are, however, a few reasons why governments are taking steps to enhance the resilience of critical mineral supply chains.

a) **Demand is rising rapidly for the minerals needed to produce new technologies**. New technologies are not only increasing demand for common minerals, such as copper, but a series of other minerals. Rising demand for many minerals is expected to significantly exceed the speed at which new sources of supply can be delivered (see Section 2). Low-carbon technologies needed to deliver Net Zero targets often require more minerals than the technologies they replace.[5]

b) **Advanced economies have been hit by a series of shocks that have exposed the vulnerabilities of complex global supply chains**. These shocks, from a shortage of computer chips (also called semiconductors) through to soaring energy prices and attacks on shipping vessels in the Red Sea, have prompted governments and businesses to take steps to enhance the resilience of their supply chains.

c) **Rising geopolitical competition.** The last Government's Integrated Review Refresh in 2023 noted an "intensification of systemic competition" over the nature of the international order, which is playing out in "overlapping

---

[1] P.A.J. Lusty, R.A. Shaw, A.G. Gunn, N.E. Idione, "UK criticality assessment of technology critical minerals and metals", Decarbonisation & Resource Management Commissioned Report, British Geological Survey, 6 June 2022, CR/21/120; Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023

[2] P.A.J. Lusty, R.A. Shaw, A.G. Gunn, N.E. Idione, "UK criticality assessment of technology critical minerals and metals", Decarbonisation & Resource Management Commissioned Report, British Geological Survey, 6 June 2022, CR/21/120

[3] Ibid

[4] Ibid

[5] For example, copper and manganese are used to produce electric cars and those with an internal combustion engine. However, electric cars also require a host of other minerals, such as lithium, cobalt, graphite and nickel.

strategic arenas."[6] One of these is the global economic and trade order.[7] International trade has shown signs of fragmenting, with a rise in protectionism and the onshoring of industrial capabilities and supply chains.[8]

For these reasons, critical minerals are important for the UK's ability to reach net zero as well as for its economic resilience and national security.

Box 1: Critical Minerals Strategy

In July 2022, the Government published the UK's first Critical Minerals Strategy, designed to enhance the resilience of critical minerals supply chains. The strategy sought to:

- **Accelerate the UK's domestic capabilities** by maximising the critical minerals that the UK can produce domestically from primary (e.g. the extraction of domestic reserves) and secondary (e.g. reuse and recycling) sources, while also building the UK's skills in mining and using research to find alternative solutions (e.g. ways to substitute minerals and materials). The strategy also focused creating an 'enabling environment' for investment across critical minerals value chains from extraction through to midstream processing and also recycling.
- **Collaborate internationally,** with a view to diversifying global supply. This included developing the UK's diplomatic, trading and development relationships by engaging bilaterally with key countries to promote joint working and also continuing to build plurilateral and multilateral partnerships.
- **Enhancing international markets** by taking steps to improve environmental, social and governance (ESG) performance.

In March 2023, the Government published a Critical Minerals Refresh. The Foreign Affairs Committee noted that this document acted as a delivery plan and also a report on the progress the Government had made. As part of the Critical Minerals Refresh, the Government commissioned a Task and Finish Group, made up of industry experts, to assess the dependencies and vulnerabilities of UK industry sectors and develop a framework to monitor risks to the supply of critical minerals. The Task and Finish Group published its final report in December 2023**.**

[6] HM Government, Integrated Review Refresh 2023: Responding to a more contested and volatile world, March 2023
[7] HM Government, Integrated Review Refresh 2023: Responding to a more contested and volatile world, March 2023
[8] House of Commons Library, The Integrated Review Refresh 2023: What has changed since 2021?, March 2023

1.3. Which minerals are critical to the UK?

The UK Government, in 2022, identified 18 minerals as critical, based on an assessment conducted by the British Geological Survey (BGS).[9] These minerals are listed in the table below.

Table 1: UK Critical Minerals List		
Antimony	Lithium	Silicon
Bismuth	Magnesium	Tantalum
Cobalt	Niobium	Tellurium
Gallium	Palladium	Tin
Graphite	Platinum	Tungsten
Indium	Rare earth elements	Vanadium
Source: Critical Minerals Strategy		

The BGS's assessment scored 26 minerals against two key criteria - supply risk[10] and economic vulnerability[11] – to assess their criticality to the UK economy. The vertical axis on the BGS's graph below shows the supply risk score of each mineral, while the horizontal axis covers the economic vulnerability score. Minerals in the top right-hand quadrant represent those with the highest criticality (e.g. minerals that had high scores for both indicators). The 18 minerals the UK has classified as 'critical' represent those considered to be of greatest importance to the UK because of the potential not only for their supply to be disrupted, but also the potential impact of this disruption on the UK economy.

A further five minerals were included in a watchlist of minerals deemed to be of increasing importance (or increasing criticality). These lists are kept under review by the Critical Minerals Intelligence Centre (CMIC) and are due to be updated periodically.[12] While the BGS's assessment focused on the UK economy as a whole, a more recent report from the Task and Finish Group on Industry Resilience for Critical Minerals provides an analysis of minerals that are critical to key UK industries.[13]

[9] Ibid

[10] Supply risk refers to the likelihood of disruption to the supply of a mineral. This can be due to a range of factors. The British Geological Survey used three indicators of global supply risk: production concentration (e.g. the extent to which production is concentrated in a small number of countries), companion metal fraction (e.g. the extent to which minerals are extracted as a by-product of other minerals) and recycling rates.

[11] While supply risk is used to assess the likelihood that supply could be disrupted, economic vulnerability indicators look to assess how vulnerable consumers are to this disruption. The BGS used six indicators to assess economic vulnerability: product evolution or demand growth of a product, price volatility (e.g. fluctuations in the price of the commodity), substitutability (e.g. whether alternative materials can used at the same or lower cost to replace the mineral), global concentration of trade, UK import reliance and UK Gross Value Added contribution (e.g. the importance of minerals to the UK economy).

[12] Business, Energy & Industrial Strategy, Resilience for the future: the United Kingdom's Critical Minerals Strategy, July 2022

[13] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023

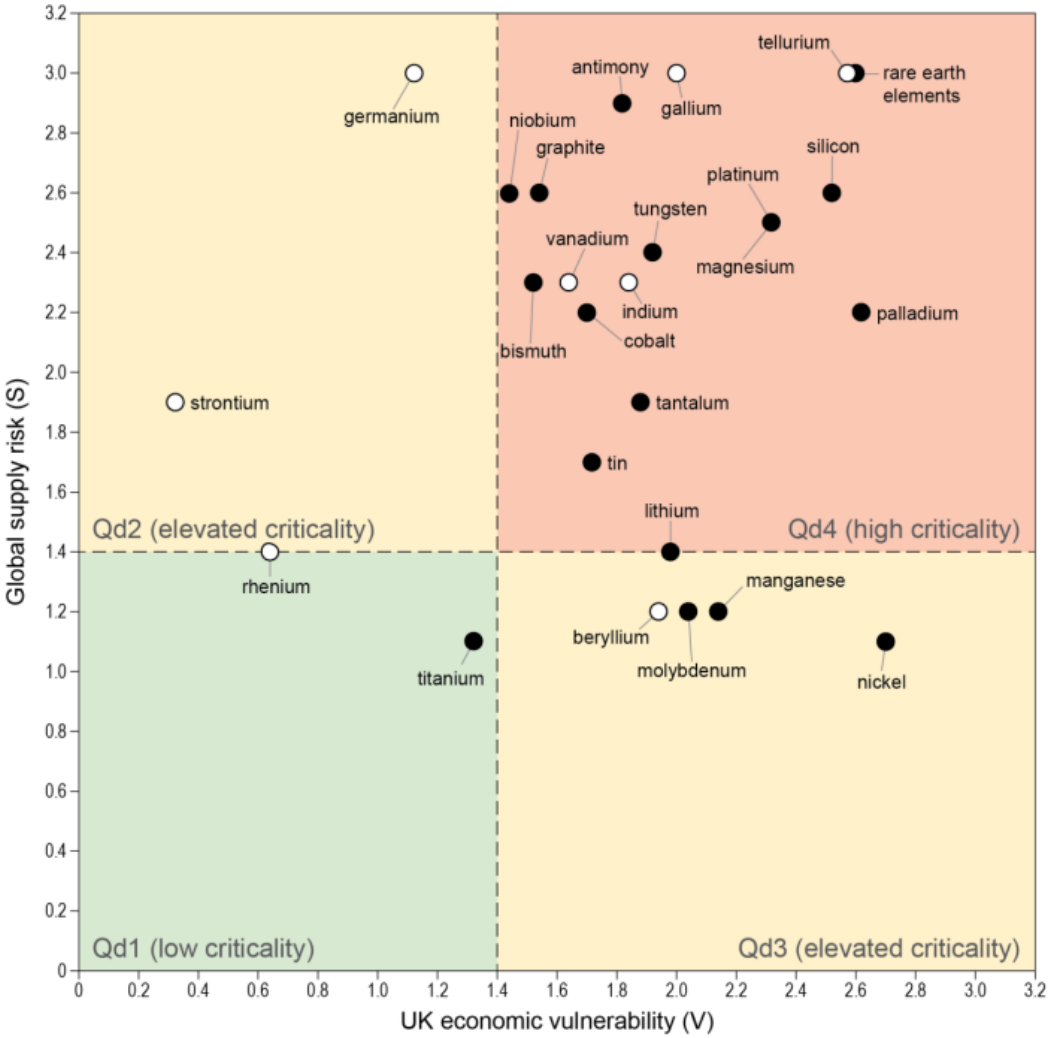

Figure 1: UK criticality assessment of technology critical minerals and metals, British Geological Survey 2021

2. Key challenges for the new Government

The global competitive environment is very challenging. China gained first mover advantage decades ago and now has a large market share in the global production of many critical minerals. China has been exploiting its own natural resources for decades.[14] China, consequently, has a large market share in the extraction of minerals rare earths elements (REE) and graphite. Around 70% of the global extraction of graphite takes place in China.[15] China accounts for around 60% of global extraction of REE.[16] Chinese-owned businesses have been supported to set-up mining operations overseas.[17] China has progressively moved up the value chain to capture a large market share in the midstream processing of many critical mineral supply chains, including minerals that are predominately extracted outside of China.[18] Almost all the refining of REEs and graphite takes place in China (90% to 100% respectively). However, between 50-70% of the global refining of lithium and cobalt occurs in China too. This means that minerals extracted around the world often flow into China to be refined and processed. China, in 2022, was by far the largest importer of critical minerals, accounting for 33% of global imports – much higher than the EU (16%), US (11%) and Japan (11%).[19] China's imports of critical minerals rose substantially between 2002 and 2022, but especially from 2017 onwards.[20]

The UK, along with other countries, is responding the dominant position China has built up over this time. The Foreign Affairs Committee, in December 2023, pointed out that:

> In the post-Cold War years, when western governments actively sought to outsource the mining and processing of minerals, China welcomed these extractive industries. This gave China a significant first mover advantage in the mining and processing of critical minerals.[21]

The Foreign Affairs Committee suggested that the UK has been slower to recognise and respond to the importance of critical minerals to the UK economy.[22] The US, Japan and other major industrial economies took steps to reduce their dependence on China, after China restricted the export of rare earth elements to Japan in 2010.[23]

---

[14] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023
[15] World Trade Organisation, High demand for energy-related critical minerals creates supply chain pressures, January 2024
[16] IEA, The Role of Critical Minerals in Clean Energy Transitions, May 2021
[17] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023
[18] Ibid
[19] World Trade Organisation, High demand for energy-related critical minerals creates supply chain pressures, January 2024
[20] Ibid
[21] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023
[22] Ibid
[23] Ibid

There is now intense competition from other advanced economies looking to secure supplies of critical minerals. Other advanced economies (e.g. US, EU, Canada, Australia and Japan) are taking steps to onshore supply chains. Such efforts by other economies can help diversify global supply. However, the UK is also competing against these economies to attract private investment. Canada and Australia, for example, are not only looking to increase domestic mining of critical minerals, but also attract investment in activities further up the value chain. The same is true in other countries too.[24]

The UK economy is heavily reliant on imports of critical minerals from complex global supply chains that serve UK industries. Often critical minerals enter the UK not as raw materials, but as other materials, components and products that have been manufactured elsewhere.[25] The Foreign Affairs Committee noted that the UK is likely to remain reliant on these global supply chains, at a time when they are coming under increasing pressure from other countries seeking to access the same resources.[26]

Self-sufficiency is not a viable option for the UK. The last Government aimed to accelerate the UK's domestic capabilities, with a view to maximizing what the UK can produce domestically (see Box 1). This included steps to reduce barriers to the exploration and extraction of minerals that exist in the UK, through to taking steps to promote a more circular economy.[27] Domestic primary and secondary sources can contribute to reducing the UK's import dependence**,** but these supplies are likely to be limited and developing them is not a quick fix.

- The UK has pockets of mineral deposits which could be exploited to reduce its import dependence. However, these are not yet mined commercially. There are projects looking at bringing these minerals into production, but the Foreign Affairs Committee noted that it will be a long time before any new mines produce a yield.[28]
- On secondary sources of supply, a lot of low-carbon technologies, such as electric vehicles and wind turbines, will not reach the end of life for quite a while. This limits the supply that recycling facilities will need to expand. However, the Critical Minerals Association, in March 2023, noted that there is due to be a "sudden and significant increase" in these technologies from 2030.[29] Another issue is that without midstream

[24] Government of Canada, Canadian Critical Minerals Strategy: From Exploration to Recycling: Powering the Green and Digital Economy for Canada and the World, December 2022; Australian Government, Critical Minerals Strategy 2023–2030, June 2023
[25] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023
[26] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023
[27] Business, Energy & Industrial Strategy, Resilience for the future: the United Kingdom's Critical Minerals Strategy, July 2022
[28] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023
[29] Critical Minerals Association, Midstream Processing and Refining: Unlocking Security of Supply, March 2023

capabilities (e.g. refining and processing) minerals recycled in the UK need to be exported, before they are processed and then imported again.[30]

The global supply chains that UK industries rely on are very opaque. Businesses often have very little visibility of their supply chains beyond their tier 1 suppliers. This creates a problem because potential disruptions to supply are hard to detect. Businesses and governments are also exposed to a plethora of environmental, social and governance (ESG) risks, especially in the upstream stages of their supply chains. The Task and Finish Group on Industry Resilience on Critical Minerals pointed out that industries often have very little visibility of the commodity stage of their supply chains.[31] There are emerging trends in the steps different sectors are taking to enhance their resilience. Automotive companies, for example, are vertically integrating with suppliers further upstream in the electric vehicle value chain to secure supplies, whereas aerospace and defence companies have been building up stockpiles of key minerals.[32] Supply risks and ESG risks are prevalent across key UK industries, although different industries are exposed to different types of risks depending on the critical minerals they depend on. The Government's Task & Finish Group on Industry Resilience on Critical Minerals forecast moderate to high risks to supply for a variety of critical minerals that the UK industries require.[33]

[30] Critical Minerals Association, Midstream Processing and Refining: Unlocking Security of Supply, March 2023
[31] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023
[32] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023
[33] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023

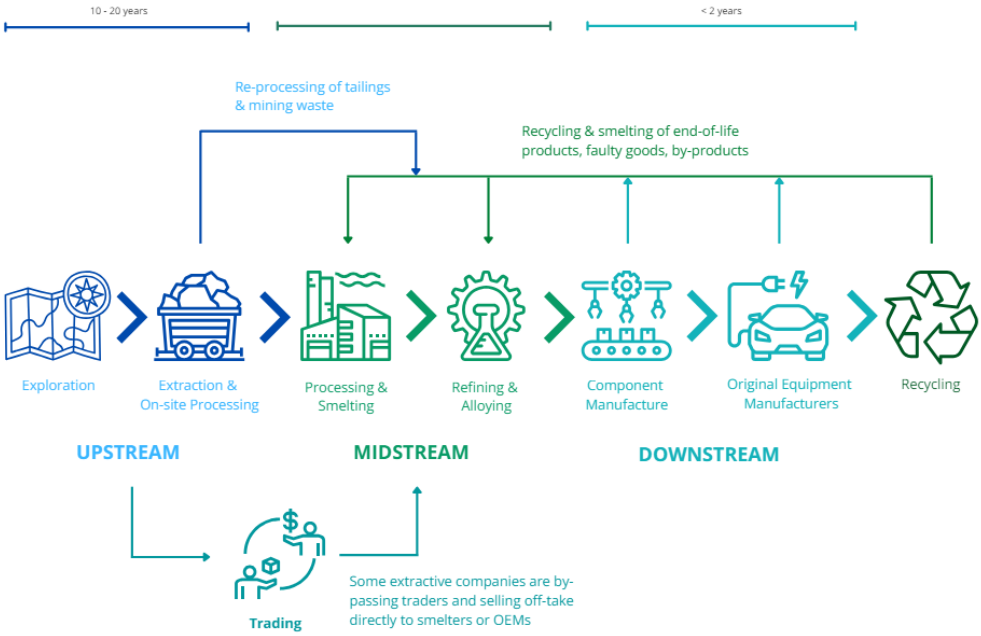

Figure 2: Overview of typical stages in critical minerals supply chains, Critical Minerals Association

There are significant challenges to scaling-up and diversifying supplies of critical minerals fast enough and in a manner that is commercially viable. New mines have long lead times of over 16 years, on average. Most of this time is spent on discovery, exploration and feasibility studies (over 12 years), before necessary planning and construction takes place.[34] Critical minerals are often extracted as by-products or co-products of mining of other minerals. This creates a situation where the extraction of some 'daughter elements' is tied not to demand for that commodity, but to that of the 'parent metal' they are part of. The aerospace and defence manufacturers, for example, rely on a handful of minerals that are mined as by-products of other metals, such as gallium and rhenium.[35]

Sources of critical minerals are geographically concentrated. The Foreign Affairs Committee, for example, pointed out that the "vast majority of critical minerals are concentrated in countries that are autocratic, non-aligned, or actively hostile."[36] However, the problem is not just an issue of the countries that these resources are located within, but also the location of mineral reserves within countries. Mining operations are often located in ecologically sensitive areas.[37] Such operations can have a variety of negative effects on the

[34] International Energy Agency, Global average lead times from discovery to production, 2010-2019, May 2021
[35] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023
[36] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023
[37] Littleboy A, Keenan J, Ordens CM, Shaw A, Tang RH, Verrier B., Vivoda V, Yahyaei M, Hodge RA, A sustainable future for mining by 2030? Insights from an expert focus group, The Extractive Industries and Society, Volume 6, Issue 4, 2019, Pages 1086-1090

environment. Critical minerals are often located on indigenous land or land that local people may depend on for food and water. Of over 5,000 projects of energy transition metals, consisting of current and possible future mines, over half (54%) were located on, or nearby, indigenous peoples' land.[38] These projects were also often in places with high levels of food insecurity and water risk.[39] Rising demand in advanced economies may put governments in source countries under pressure to exploit natural resources, at the expense of those people who have rights to the land or depend on it.[40] The pressure on governments in source countries is exacerbated by uncertainties surrounding how long high demand for their domestic natural resources could last, as technology is always progressing and governments in advanced countries have incentives to find ways reduce their dependence on imports.[41] This can give rise to conflicts between governments, companies and local communities. For example, research into lithium mining in Chile and Argentina found that "economic opportunities, uncertainties and the 'green discourse' fueled by the transition demand led the State and private actors to neglect indigenous concerns, rights and lifestyles."[42]

Critical minerals supply chains have a variety of environmental, social and governance risks. Enhancing ESG performance is not straightforward. Mines often operate on boom-and-bust cycles, involving periods of expansion but also periods when production stops. The dynamic nature of these interactions between mines and the social and environmental context in which they operate can be difficult to capture in approaches to sustainability and corporate social responsibility.[43] Experts have recommended that companies adopt a systems thinking approach in the way they plan their operations to take greater account of these dynamics.[44] Raising environmental, social and governance standards can help ensure a playing level field. However, the Foreign Affairs Committee observed that there is a risk that companies avoid doing business with developing countries who not able to meet high standards of transparency, causing standards in these countries to drop further.[45] The

[38] Owen, J.R., Kemp, D., Lechner, A.M. *et al.* Energy transition minerals and their intersection with land-connected peoples. *Nat Sustain* **6**, 203–211 (2023). https://doi.org/10.1038/s41893-022-00994-6

[39] Ibid

[40] Ciftci, Mehmet Metehan; Lemaire, Xavier; (2023) Deciphering the impacts of 'green' energy transition on socio-environmental lithium conflicts: Evidence from Argentina and Chile. The Extractive Industries and Society **,** 16 , Article 101373. 10.1016/j.exis.2023.101373.

[41] Ibid

[42] Ibid

[43] Verrier B., Smith C., Yahyaei M., Ziemski M., Forbes G., Witt K., Azadi M., Beyond the social license to operate: Whole system approaches for a socially responsible mining industry, Energy Research & Social Science, Volume 83, 2022, 102343, ISSN 2214-6296, https://doi.org/10.1016/j.erss.2021.102343.

[44] Littleboy A, Keenan J, Ordens CM, Shaw A, Tang RH, Verrier B., Vivoda V, Yahyaei M, Hodge RA, A sustainable future for mining by 2030? Insights from an expert focus group, The Extractive Industries and Society, Volume 6, Issue 4, 2019, Pages 1086-1090
; Verrier B., Smith C., Yahyaei M., Ziemski M., Forbes G., Witt K., Azadi M., Beyond the social license to operate: Whole system approaches for a socially responsible mining industry, Energy Research & Social Science, Volume 83, 2022, 102343, ISSN 2214-6296, https://doi.org/10.1016/j.erss.2021.102343.

[45] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023

World Economic Forum pointed out that to avoid a "public backlash, some companies have stopped sourcing minerals entirely from countries with known human rights abuses, seriously threatening local livelihoods in the process."[46]

Mining provides an opportunity to help poorer countries develop, but can be deleterious to them if not conducted responsibly. Insights from an expert focus group on sustainable mining explained that:

> The mining industry has an unprecedented opportunity to mobilise human, physical, technological and financial resources to advance sustainable growth. When managed effectively, mining can create jobs, support local socio-economic development, protect ecosystems, and support good governance. At the other end of the spectrum, mining can cause ecosystem destruction, social inequality and conflict, undermine the fair distribution of benefits, costs and risks, and promote corruption. [47]

Governments and institutions play a pivotal role in the extent to which the countries, and their populations, benefit from their natural resources. Experts on sustainable mining noted that avoiding some of the negative effects of mining is a "particular issue for resource-rich, low-to-middle-income countries, frequently with reduced institutional and governance capacities to manage mine-related impact."[48]

Fundamentally, scaling-up and diversifying the supply of critical minerals – globally and domestically – is a long-term, international challenge. It is also a profoundly ethical one. The costs (e.g. environmental and social costs) of mining critical minerals needed to meet advanced economies' demand for new technologies, including low-carbon technologies needed to hit Net Zero targets, will be largely borne by poorer countries in the Global South.[49] Public support for green policies in advanced economies relies on public acceptance of the costs imposed on them. Confronting these challenges requires governments to grapple with what constitutes a just transition and their role in delivering it.

[46] World Economic Forum, Critical minerals can pave the road to more robust international development, January 2024

[47] Littleboy A, Keenan J, Ordens CM, Shaw A, Tang RH, Verrier B., Vivoda V, Yahyaei M, Hodge RA, A sustainable future for mining by 2030? Insights from an expert focus group, The Extractive Industries and Society, Volume 6, Issue 4, 2019, Pages 1086-1090

[48] Ibid

[49] Ciftci, Mehmet Metehan; Lemaire, Xavier; (2023) Deciphering the impacts of 'green' energy transition on socio-environmental lithium conflicts: Evidence from Argentina and Chile. The Extractive Industries and Society **,** 16 , Article 101373. 10.1016/j.exis.2023.101373.

3. Potential next steps for the new Government

The Critical Minerals Strategy has initiated a lot of work that a new Government could continue to pursue, domestically and globally. However, there are few additional steps that a new Government may wish to consider building on the progress that has been made. The new Government could:

1. **Clarify the UK's industrial priorities.** The Task and Finish Group on Industry Resilience for Critical Minerals recommended that the Government "should set priority industries and materials based on national priorities and competitive advantage." [50] The Australian Government's Critical Minerals Strategy identified priority technologies for critical minerals ranging from batteries and battery components to semiconductors and rare earth magnets. The Australian Government selected these technologies based on their contribution to national priorities.[51] The Australian Government planned to prioritise government support for critical minerals projects that support these key technologies.
2. **Outline where the UK should position itself in the critical minerals value chain.** The last Government aimed to provide an 'enabling environment' for investments along the value chain. [52] The Foreign Affairs Committee observed that there was a "disconnect between strategy and delivery" because the Critical Minerals Strategy did not clarify the UK's role and where to position itself in the value chain. The Task and Finish Group recommended that the UK should focus on developing midstream processing capabilities.[53] Some of this capacity already exists and other projects are under development. Midstream activities help facilitate a circular economy for critical minerals in the UK.
3. **Articulate the UK's offer to international partners.** The Foreign Affairs Committee also recommended that the Government should define a "coherent 'Team UK' proposition to other countries".[54] The UK has strengths in research, development and innovation, along with a mining and engineering expertise, that could be used to help other countries build supply chains. The FAC suggested that "agreements with middle-income countries to develop local value chains is another way in which the Government could utilise the UK's diplomatic skills to support

[50] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023
[51] The technologies were chosen based on their overall contribution to emissions reduction, the country's security, energy and industrial priorities, the country's long-term comparative advantage and national interest, technological readiness and the capacity of these technologies to support the country's strategic partnerships.
[52] Business, Energy & Industrial Strategy, Resilience for the future: the United Kingdom's Critical Minerals Strategy, July 2022
[53] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023
[54] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023

diversification."[55] This also includes the UK's capacity to help countries develop, including to put governance in place to help maximise the potential benefits of mining and minimizing the downsides. The World Economic Forum, for example, recommended that:

> Revamping the approach to foreign assistance in tandem with mineral investments could be a way to reinstitute an important instrument of soft power. Otherwise, developed nations in the Global North and others are vulnerable to criticism that suggests they are exploiting developing countries with the green energy transition as a cover.[56]

4. **Outline the UK's approach to developing a circular economy for critical minerals.** The Task and Finish Group's report recommended that the Government work with industry to develop a robust circular economy for critical raw minerals.[57] There are numerous definitions about what constitutes a circular economy. When thinking about applying circular economy strategies, governments and businesses often focus on what happens when a product reaches the end of its life. However, technological developments in recycling, while essential, are unlikely to fully replace the need for new mines to open. Taking copper as an example, even an optimistic scenario – with significant advances in recycling technological and successful efforts to collect scrap metal – secondary sources will, at best, only fulfil less than half of the expected demand by 2050. This brings into doubt the ability of secondary sources to fulfil future demand for other critical minerals. Circular economy strategies can also be deployed successfully further up the value chain (e.g. in reducing waste from mining activities).[58] Australia and the EU are promoting activities to look at recovering critical minerals from mining waste, including sites where waste from the mining industry has already been disposed. The UK should consider policies that help ensure the stock of critical minerals available in everyday products can be easily extracted. Finally, policies to reduce demand (e.g. energy efficiency measures or policies encourage modal shift) can help alleviate supply chain pressures.
5. **Leverage the UK's strengths to enhance international governance, coordination and standards.** The UK has considerable soft power and influence, along with a strong finance sector, that can be used to help enhance international standards to help address the environmental,

[55] Foreign Affairs Committee, First Report of Session 2023–24, A rock and a hard place: building critical mineral resilience, HC 371, 15 December 2023
[56] World Economic Forum, Critical minerals can pave the road to more robust international development, January 2024
[57] Department for Business and Trade, The Task & Finish Group Report on Industry Resilience for Critical Minerals: An analysis of sector risks and recommendations for the UK's supply chain resilience, December 2023
[58] Born K., Ciftci MM, The limitations of end-of-life copper recycling and its implications for the circular economy of metals, Resources, Conservation and Recycling, Volume 200, 2024, 107318, ISSN 0921-3449, https://doi.org/10.1016/j.resconrec.2023.107318.

social and governance risks that are prevalent across critical minerals supply chains. To improve the visibility of critical minerals supply chains, the UK could introduce of product passports, such as the ones being implemented in the EU (e.g. EU Battery Passport). More broadly, the UK could look at ways to foster better, more joined collaboration with international partners. The International Energy Agency, for example, was set-up after the oil crisis in the 1970s to help coordinate efforts to address potential disruptions to supply.[59] There is no equivalent international agency that could help coordinate efforts to respond to possible shortages of critical minerals.

.

[59] International Energy Agency, From oil security to steering the world toward secure and sustainable energy transitions, updated 8th April 2024