



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

net zero as well as for its economic resilience and national security.

Box 1: Critical Minerals Strategy

In July 2022, the Government [published](#) designed to enhance the resilience of critical minerals supply chains. The strategy sought to:

by maximising the critical minerals that the UK can produce domestically from primary (e.g. the extraction of

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 assessment scored 26 minerals against two key criteria - supply risk¹⁰ and economic vulnerability¹¹ to assess their criticality to the UK economy.

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 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



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

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 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 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,

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](#)

[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 33ca

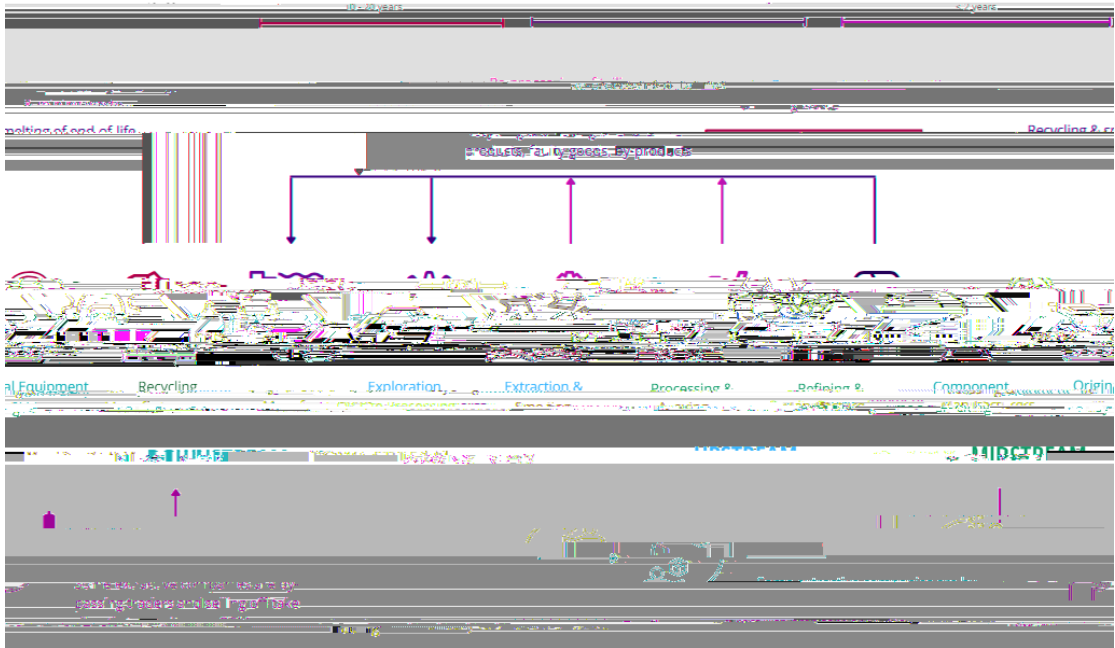


Figure 2: Overview of typical stages in critical minerals supply chains, Critical Minerals Association

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

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 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 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

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

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.

critical minerals.

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

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](#) [t4y8\(\)m0 g0 G\[\]TJET@MC /Span A](#)