

The social and environmental dimensions of critical minerals in the UK: A policy discussion and evidence review

Synthesising evidence and identifying key knowledge gaps

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Aerial view of clay mining site in Cornwall with machinery, winding roads, and rural landscape under cloudy skies. © Alexey Fedorenkoe on Adobe Stock

Executive summary

Critical minerals sit at the centre of the UK's ambitions for net zero, economic resilience, national security, and technological innovation. In response to global supply risks, the UK has committed to meeting 10% of annual demand through domestic production by 2035, diversifying international sourcing and increased recycling.

To date, policy and industry discussions have focused primarily on geology, finance, and regulatory feasibility. However, as projects move from exploration to implementation, their social and environmental impacts will become decisive factors in their success or failure.

This brief summarises a rapid review of the state of knowledge regarding the social and environmental dimensions of critical minerals in the UK. The evidence suggests that the UK is currently underprepared for navigating the social and environmental impacts of critical minerals projects, not because risks are unknown, but because they are insufficiently understood in the UK context. Without stronger engagement with these issues there is a risk that: 1) projects face delays, opposition, or cancellation; 2) opportunities for a just transition and nature recovery are missed; 3) environmental harms compound existing degradation and inequalities.

The success of the critical minerals sector in the UK will depend not only on whether projects are technically and economically viable, but on whether their social and environmental dimensions are understood, anticipated, and governed effectively. Crucially, this is not only a question of how much we know, but how knowledge is produced, shared, and used in decision-making. These dynamics are shaped by the UK's long and distinct history of mining. The legacies of deindustrialisation continue to influence how environmental risks, social outcomes, and public perceptions of mining are shaped and experienced today.

- This report synthesises current knowledge, examining what is known and where key gaps remain across four interconnected domains:
- Environmental impacts
- Just transition and local development
- Governance and decision-making
- Geopolitics and global interdependencies

Across all four, a consistent pattern emerges: the UK has a reasonable understanding of risks in principle, but a weak evidence base for how risks and opportunities will manifest and be navigated in practice. This creates a gap between ambition and implementation.

Our review of the evidence, summarised below, outlines important knowledge gaps that are essential for addressing a number of key challenges facing the critical minerals sector in the UK. These challenges include: the ability of policymakers, legislators, regulatory bodies, and stakeholders to engage, design, and implement effective regulation; the impacts of delays facing industry and investors; and risks of growing mistrust and declining social licence to operate among mining communities. Overall, addressing the issues outlined here is essential for the pursuit of a successful, responsible, and sustainable critical minerals sector.

The tables below summarise current evidence across these domains, highlighting where knowledge is robust, where gaps remain, and why these matter for decision-making.



1. Environmental baselines, impacts, and trade-offs

While global evidence on mining impacts is extensive, the UK-specific picture is limited. Onshoring has multiple environmental risks which could build on the historic impacts of mining in the UK. However, there are also opportunities for large-scale landscape restoration and building a circular economy.

What we know	Key gaps	Why it matters
Mining can drive pollution, habitat loss, and biodiversity decline; UK landscapes already show legacy impacts	The extent and spatial distribution of historic pollution and recovery in the UK	Limits to the ability to assess cumulative impacts and design mitigation
Prospective mining areas overlap with agricultural land, protected areas, and culturally significant landscapes	Which species, habitats, and ecosystem services are most at risk from future projects	Weakening planning, conservation decisions, and environmental safeguards
Restoration and biodiversity gains are possible, particularly in degraded UK landscapes	Conditions under which mining can deliver net positive outcomes for nature	Risks missing opportunities or overstating benefits for nature recovery
Environmental impacts vary significantly by extraction method and site context	Scientific assessments of the environmental costs involved in extracting a range of minerals in the UK, versus overseas sourcing	Difficulty in assessing the extent to which onshoring reduces or displaces harm

2. Just transition beyond job creation

Deindustrialised regions are complex and require more than jobs to achieve a just transition. The critical minerals industry provides a unique and crucial opportunity to achieve this.

What we know	Key gaps	Why it matters
Critical minerals are framed as a source of jobs and regional regeneration in deindustrialised areas	Accessibility of jobs to local populations given skills gaps, automation, and labour mobility	Risks misalignment between expectations and outcomes, undermining trust
Deindustrialised regions face complex, multi-dimensional inequalities beyond employment	Feasibility and design of effective reskilling and workforce development pathways	Limits the ability to deliver meaningful and inclusive economic benefits
Mining has historically shaped both physical and social infrastructure in local areas	The role of critical minerals projects in rebuilding infrastructure and local services	Missed opportunities to support broader regional development
Community perceptions of mining are diverse, shaped by history, identity, and external narratives	Conditions under which communities grant or withhold social licence to operate	Poor engagement risks delays, opposition, and project failure

3. Governance, scale, and legitimacy

A lack of clarity over the scales of decision-making involved in the permitting, financing, and monitoring of critical minerals projects risks undermining meaningful deliberation of critical minerals policy and jeopardising social and environmental opportunities.

What we know	Key gaps	Why it matters
Governance of critical minerals is fragmented across local, regional, and national levels	Effectiveness and consistency of ESG standards and regulatory approaches	Creates uncertainty for industry and uneven social and environmental outcomes
Planning and permitting processes are widely seen as slow and complex	Impacts of governance models (e.g. NSIP vs devolved approaches) on legitimacy and outcomes	Shapes both project viability and public acceptance
Local authorities play key roles but often face resource and capacity constraints	The roles, relationships, and capacities of institutions involved in oversight and enforcement	Risks gaps in monitoring, accountability, and delivery
Mineral rights ownership and geological data are often opaque and fragmented	Consequences of limited transparency in data and ownership structures	Increasing transaction costs, delays, and barriers to informed decision-making

4. Global dynamics and local outcomes

Domestic mining is entangled with international actors, affecting the social and environmental challenges and opportunities of critical minerals in the UK.

What we know	Key gaps	Why it matters
Critical mineral supply chains are globally concentrated and geopolitically contested	Social and environmental implications of foreign investment and ownership in UK projects	Shapes distribution of benefits, risks, and accountability
The UK is pursuing diversification through international partnerships and agreements	Effectiveness of Memorandums of Understanding and other partnerships in embedding ESG standards	Influences the extent to which global engagement supports or undermines local outcomes
Environmental and social harms are well documented in global mining contexts	Methods for tracing and comparing impacts across supply chains	Limits ability to evaluate trade-offs between domestic and imported supply
The UK has influence through finance and institutions (e.g. London Metal Exchange and financial markets)	Capacity to shape international norms and standards for responsible mining	Potential to miss a significant opportunity to lead on global ESG standards

Conclusion

Across all themes, a common challenge emerges: the governance of knowledge. Gaps and inconsistencies in geological data, environmental baselines, mineral rights, and project-level monitoring do more than limit technical understanding. They shape who can participate in decision-making, whose knowledge counts, and how trade-offs are negotiated. In this sense, knowledge is not neutral; it is central to how critical minerals are governed in practice.

This report does not intend to prescribe specific policy interventions. Instead, it argues that the future of critical minerals in the UK will be determined as much by how knowledge is produced, shared, and governed as by geology or finance. At present, ambition is moving ahead of understanding, with important uncertainties around environmental impacts, social outcomes, and institutional capacity.

The UK is still at a relatively early stage of developing its domestic critical minerals sector. This creates a window to anticipate impacts, embed social and environmental considerations from the outset, and shape governance frameworks before they become entrenched. Realising this opportunity will depend on strengthening the relationships between evidence, institutions, and communities.

The challenge, then, is not simply whether to onshore critical minerals, but how to do so in ways that are just, legitimate, and informed. Addressing the knowledge gaps and governance dynamics outlined in this report is therefore a vital next step.

Contents

1. Purpose of the report	6
2. Understanding critical minerals	7
3. Critical minerals in the UK	9
4. Why the social and environmental matter	12
5. Synthesis table	13
6. Mining and the environment	15
7. Ensuring a just transition	21
8. Clarifying governance	26
9. Grounding geopolitics	30
10. Conclusion	32
11. Endnotes	35

I. Purpose of the report

Across the world, critical minerals are among the most salient issues in domestic and international policy. The demand for increased, secure access to these minerals has many sources. Whether for the energy transition, national security, critical infrastructure, or technological innovation; **it seems that no matter the objective, critical minerals are an integral part of the solution.**

Over the past decade, the recognition of the vulnerability and forecast demand for certain minerals has not only led to designations of criticality, but also a change in the global geographies of their extraction. Explorative mining, processing, and recycling operations are emerging in the Global North. This is part of a wider trend of re-industrialisation driven by claims to security and sustainability, called ‘onshoring’ or ‘reshoring’¹.

The UK is no exception. With an ambition of 10% of annual UK industrial demand for critical minerals being met through domestic production by 2035, **onshoring is key to the UK’s 2025 Critical Minerals Strategy (CMS)**.²

At the time of writing this report in early 2026, much attention has focussed on the UK’s geological,³ financial,⁴ and legislative⁵ potentials and hurdles for critical minerals onshoring. Less attention has been placed on what domestic extraction and processing of critical minerals means from a social and environmental perspective.

This report emerges in response to this lack of attention. **The following pages provide a synthesis of what is currently known and unknown about the social and environmental challenges and opportunities presented by the UK’s onshoring of critical minerals.**

The social and environmental dimensions of critical minerals onshoring matter. If critical mineral projects are to move from ideational and exploratory to active and commercial, they will have impacts on the ground. These impacts are a major determinant of the success of critical minerals projects.

This report was born from the authors’ concern that the lack of attention to the social and environmental dimensions of critical minerals onshoring risks neglecting these opportunities and pitfalls. **The CMS offers a nostalgic vision of revitalising Britain’s industrial communities.** Yet, concrete details for how this will be achieved is yet to emerge. With this in mind, our report provides a careful consideration of how the social and environmental dimensions of critical minerals onshoring can be pre-empted and navigated, making the achievement of the aspirations contained in the CMS more likely.

This report is a policy, industry, and public facing working discussion document, funded by the Agile Initiative as a Science to Policy project. As a working document, there may be periodic updates; see front matter for date of latest revision.

Rather than a long-term study, this project provides an overview of existing literature and examples relating to the social and environmental dimensions of critical minerals in the UK. Our assessment of what is known and unknown is not intended to be systematic. Instead, our confidence in this work comes from an approach which foregrounds interdisciplinarity and stakeholder engagement. The core of our team consists of environmental social scientists and ecologists- all of whom have expertise in resource extraction. Strategic oversight and input were provided by earth scientists and those with geotechnical expertise. We also discussed a draft of this report with experts working in policy, industry, and academia- editing accordingly.

The themes which structure this report are:

- Mining and the environment;
- Ensuring a just transition;
- Clarifying governance;
- Grounding geopolitics.

These scalar themes were chosen to help grapple with the tension at the heart of this work: that **whilst critical minerals are essential in the pursuit of clean energy futures and hold enormous social and economic potential, there also exist considerable risks.**

Before unpacking what is known and unknown in these themes and their resulting challenges and opportunities, we offer an expanded introduction to critical minerals; their presence in the UK's physical, innovation, and cultural landscapes; and the necessity for understanding their social and environmental dimensions.

2. Understanding critical minerals

i. What are critical minerals?

Critical minerals are a dynamic grouping of materials. Lists of minerals categorised as critical vary depending on which part of the world you are in and at what time. **There is nothing static or inherent about critical minerals;** they are more of a verb than they are a noun.

Over the past 15 years, states and regional bodies across the world have been undertaking assessments to ascertain which minerals are critical to them.⁶ These assessments have become far more wide-spread and frequent since 2020. Whilst each country uses different analytical processes, data, and contextual considerations to settle on their criticality lists, this categorisation concerns two factors. Critical minerals are imbued with great economic importance and a high risk of supply disruption.

Lithium, for example, is widely classed as a critical mineral. Its economic importance is attributed to its necessity for lithium-ion batteries. These batteries are vital for the electrification of transport and energy storage systems, as well as portable technologies. Because of this, demand for lithium has tripled since 2020 and will triple again by 2035.⁷ However, lithium supply chains are vulnerable. More mining projects are needed to meet its demand; the price of lithium has fluctuated enormously since 2020,⁸ de-incentivising investment; and the top three lithium mining producers represented 77% of global supply in 2024.⁹

Critical minerals are not all concerned with the energy transition. Antimony is used in alloys, weaponry, and predominantly in the production of flame retardants as it can bolster the fire-resistance of textiles and plastics. Like lithium, antimony supply is dominated by few countries. China, Russia, and Tajikistan account for over 90% of global production.¹⁰

Lithium and antimony are examples of 14 minerals which are consistent across the UK, EU, United States, Canada, Australia, China, and Japan's lists of critical minerals. These countries each identify over 30 minerals as critical, meaning there are more divergences in these lists than overlaps. Tin and phosphorous, for example, are deemed as critical in the UK but not in Australia, Canada, or the United States.

Critical minerals are also temporally contingent. The UK added 18 new minerals in its 2024 criticality assessment compared to its 2021 assessment. Palladium was removed. Meanwhile, the 2025 CMS included a new section on growth minerals, determined by their expected strong demand growth and because they cannot be substituted within Industrial Strategy growth-driving sectors.

Recent assessments of critical minerals are the latest in a long history. The 'US Strategic and Critical Materials Stock Piling Act' introduced the idea of criticality in 1939, facilitating these materials' acquisition for national defence purposes. 'Criticality discourse' was revived in the 1970's and 80's in the United States, before re-emerging and staying on the Euro-American scene since 2008.¹¹

ii. The global context for critical minerals

As the examples of lithium and antimony highlight, critical mineral supply chains are often dominated by a handful of countries (most frequently China¹²). Beyond undertaking criticality assessments, states have had multiple responses to the current state of global critical mineral supply chains.

Some Global South countries have begun to impose bans on the exportation of raw materials.¹³ As refined minerals hold more economic value than when raw, countries have imposed these bans to ensure that the refining and production of minerals happens domestically. Zimbabwe, for example, has recently and notably done this with lithium.¹⁴

Meanwhile, countries in the Global North are also imposing strategic changes which go beyond onshoring. These are further unpacked in the later section on geopolitics (section 9 of this report). Changes include a shift from multilateral to bilateral agreements between countries regarding critical mineral extraction and production. The UK, for example, has signed numerous Memorandums of Understanding with countries over the past five years, including the United States, Kyrgyzstan, and Japan.

Other Global North countries have pursued a more aggressive form of resource nationalism. The United States exemplifies this, with mineral stockpiling high on its discursive and policy agenda.¹⁵

As this report outlines, the global rush for critical minerals presents social and environmental concerns. Think tanks,¹⁶ Non-Governmental Organisations¹⁷ and academics¹⁸ have noted this, highlighting the relationships between lithium and environmental degradation in the Latin American salares¹⁹; cobalt and child slavery in the Democratic Republic of Congo²⁰; and numerous other environmental injustices across the world.²¹

Crucially, however, this rush also presents significant opportunities for local communities and environments. **Where local people and environments are approached by critical minerals projects early, earnestly, and context-specifically²², there are opportunities.**²³ Historically polluted landscapes have been remediated²⁴; skills in environmental monitoring have been learned by local communities²⁵; physical and social infrastructure has been developed²⁶; and slowly, more democratic governance regimes have started to be built.²⁷

The UK could serve as a model for how onshoring critical minerals can be responsible and sustainable. Amidst the shifting global critical minerals landscape, the UK is beginning to articulate its own agenda. It is imperative that the grounded impacts of critical minerals onshoring are foregrounded.

Key points

- Critical minerals are a relative and dynamic category of materials which have both great economic importance and a high risk of supply disruption.
- Critical minerals supply chains are often dominated by a few countries.
- States are responding to this domination through increasing domestic extraction and production, raw material export bans, resource nationalism, and bilateralism.

3. Critical minerals in the UK

i. Mining history

Mining has a long history in the UK. Coal is perhaps the best-known actor in this history. Coal mining took off in the early 1700's with the invention of the steam engine and reached its peak in the 1920's when almost 1.2 million people were employed in the coal industry.²⁸

Coal mining's British history goes back further than the past 300 years, however, with its origins attributed to the Romans. Metal mining in Cornwall – the other major contributor to Britain's modern extractive history – has a similarly deep history. Gold in the 3600-year-old Nebra Sky Disc, the first solar map of the world, is likely to have come from Cornwall's Carnon Valley.²⁹

As with coal, Cornish tin and copper mining boomed in the 17th to early 20th centuries. New extractive technologies were pioneered which led to Cornwall becoming the world's metal mining epicentre³⁰.

Since the 1980's mining in the UK has had a sharp decline. Coal followed the earlier trajectory of tin and copper in Cornwall, becoming limited to a few super-mines. The last tin mine to close was South Crofty in 1998 and the last deep coal mine to close was Kellingley Colliery in 2015. In the intervening years, mining in the UK has primarily been for aggregates.³¹ A notable exception to this is Boulby Mine in North Yorkshire- a former potash mine which became the world's first and only polyhalite mine in 2011.³²

The history of mining in the UK is characterised by triumphant pioneering and painful decline. The influence of this history on the UK's ambitions for re-industrialisation and onshoring cannot be under-emphasised. Mining is deeply engrained in the UK's cultural and physical landscape. But mining is also a dirty word for many people³³; a reference to the decline of working-class communities, or standing for a polluting, old-fashioned industry.

This history underscores and complicates the social and environmental themes discussed in this report. Whilst romanticised in a layer of nostalgia and the promise of jobs, re-industrialisation and onshoring must be attentive to the specific, grounded histories of extraction found across the UK.

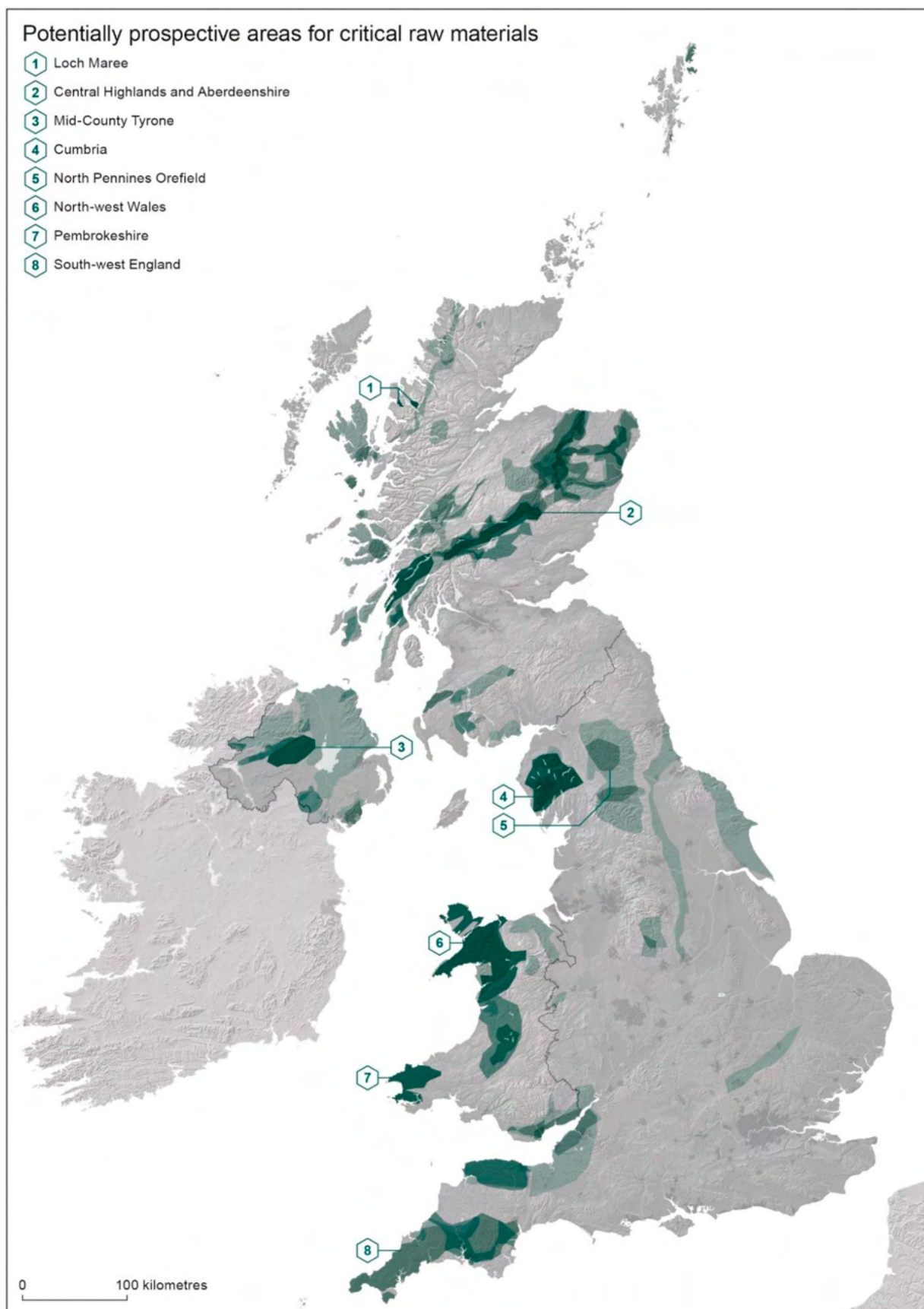
ii. Projects and prospects

In the UK, criticality is determined by plotting global supply risk with UK economic vulnerability. Global supply risk is assessed and quantified using the 'country-level concentration of mining or refining activities, global trade flows through net imports, the scale of recycling, and how much is produced as a co-/by-product of another raw material'.³⁴ UK economic vulnerability is assessed and quantified through 'apparent consumption value, net import reliance and gross (or economic) value added by a specific raw material'.³⁵ Where these both meet a certain threshold, a mineral is critical.

By 2035, the UK is targeting 10% of annual industrial demand for critical minerals being met through domestic production, and 20% through the recycling of products. An enormous amount of work needs to happen for these figures to be met- which will necessitate more investment than the £50 million which has been made available for nascent operations.

The map below illustrates the prospective areas for critical minerals extraction in the UK. There are nascent operations occurring both across these regions and across the critical minerals supply chain. The Critical Minerals Association provides a detailed guide which showcases these projects: www.criticalmineral.org/investinuk

Figure 1: Areas of the UK considered potentially prospective for critical raw materials. The darker areas are those that are prospective for several CRMs. Contains Ordnance Survey data © Crown copyright and database right 2023. Contains NEXTMap Britain elevation data from Intermap Technologies. Reproduced with permission from the British Geological Survey © UKRI 2026 All Rights Reserved . Permit Number [CP 26/010]



iii. Mining is not just mining

As the map and guide above make clear, there are a host of operations which are possible within the UK. Depending on the operation in question, different technologies, labour, land access, financing, and management are necessary.

The variance involved in mining extends beyond the upstream, midstream, and downstreams of critical mineral supply chains. In the upstream, extraction of minerals from the ground can be done in numerous ways. These in turn have different environmental impacts. Open pit, surface-level mining tends to exhibit higher land degradation and air pollution, while underground mining can lead to greater water contamination and higher safety risks.³⁶

Exploratory lithium extraction operations in Cornwall, for example, use both surface and sub-surface mining techniques. In mid-Cornwall, hard-rock mining from existing China clay pits is incomparable with the geothermal brine mining of lithium being tested further south-west. In the former, lithium-rich mica is extracted, crushed, concentrated, purified and crystallised.³⁷ In the latter process, boreholes are drilled to extract lithium-rich brine from thousands of metres deep. The lithium is removed from the brine using a technology called Direct Lithium Extraction and the water returned into the original fissures.³⁸ The social and environmental dimensions of brine mining are subsequently very different to hard-rock mining.

The UK also has the potential to extract critical minerals using novel, experimental technologies. Lithium has been identified as present in large quantities in old oil wells³⁹; coal fly ash has been touted as a potential source of rare earth elements⁴⁰; UK overseas territories are the site of research between volcanic activity and critical mineral extraction.⁴¹

Onshored critical mineral extraction and production is therefore irreducible to a simplistic understanding of the term ‘mining’. This is more than just digging a hole. Subsequently, **there is an array of factors which mean that there is no ‘one size fits all’ answer to navigating the impacts on the ground for local communities and environments.**

iv. Choices

The UK has plenty of opportunities across all streams of the critical minerals supply chain. Some of these opportunities are significant and can tap into the pre-existing competitive advantages possessed by the UK.

With its world-leading universities, the UK has an advantage in regard to research and development (R&D).⁴² In particular, **the recycling technologies being developed in the UK⁴³ are among the leading operations in the world.**⁴⁴ These have obvious social and environmental advantages in their potential to reduce the amount of raw material extracted. With the emerging trend of recycling and other spin out companies leaving the UK,⁴⁵ however, the success of these businesses in contributing to a just transition is not guaranteed. If the goal of Critical Mineral Strategy is for 20% of annual UK demand for critical minerals to be met through recycling by 2035⁴⁶, then further support for this industry will be needed. This includes financially as well as support for their energy, chemical, and material demands.

The UK has other strengths too. Some of the pockets of mineral deposits across the country are globally significant- particularly tungsten in Devon⁴⁷ and lithium in Cornwall.⁴⁸

Meanwhile, London is one of the world centres of mining finance. Numerous mining companies and investment banks are headquartered in England’s capital.⁴⁹ This offers an opportunity to set high ESG standards. In particular, the London Metal Exchange – discussed further in section 9 of this report – has a huge role to play in setting the standards for ethical extraction.

With so many opportunities and permutations for critical minerals onshoring, there comes a lot of unpredictability. Adding to this, the gap between exploration and production is often a step too far for junior mining companies; the technologies being touted are novel; and past examples rarely provide best practise cases to compare with contemporary operations.

Through accepting and embracing this unpredictability, this report suggests the groundwork which needs to be laid for ensuring nascent critical minerals operations are socially and environmentally responsible.

Key points

- The UK has a long and distinct history of mining which influences the social and environmental challenges and opportunities faced by domestic projects.
- Through leaning into its existing strengths, the UK has potential for successful operations across all streams of critical mineral supply chains.
- Different critical mineral operations necessitate different considerations over their social and environmental dimensions; there is no ‘one size fits all’ answer to ensuring success on the ground.
- The past does not provide many best practise case studies which can be used as foundations for contemporary operations.

4. Why the social and environmental matter

We understand the social and environmental dimensions of mining to refer to the impacts that critical mineral extraction and production activities have on both ecosystems and people.

Environmental aspects include issues such as pollution, biodiversity loss, and landscape change, while social aspects encompass effects on local communities, livelihoods, health, and cultural heritage.

These two dimensions are deeply interconnected: environmental degradation often directly affects social wellbeing, and social dynamics shape how environmental impacts are experienced and managed.

These considerations matter for two reasons. Firstly, **critical minerals projects have a fundamental ethical duty of care to the environments and communities in which they operate.** The severity of the potential negative consequences of mining make responsible management of these impacts a moral obligation rather than a purely optional extra. Beyond simply avoiding harm, the critical minerals industry should be expected to contribute positively to local development, respect community rights, and ensure that the benefits of resource extraction are shared fairly. This has been extensively laid out in best practise standards, such as that by the Initiative for Responsible Mining Assurance (IRMA).⁵⁰

Crucially, **social and environmental considerations are not only ethical but also essential to the success of mining projects.** Research⁵¹ consistently shows that projects which fail to address these issues face delays, opposition, and even cancellation, largely due to the loss of ‘social licence to operate’ (SLO)- meaning acceptance from communities and stakeholders. A European example of a project cancelled due to community resistance includes Rio Tinto’s Jadar Project for lithium extraction in Serbia.⁵²

Social and environmental performance shapes whether projects attract investment, secure regulatory approval, and remain operational over time. As examples throughout this report demonstrate, integrating ESG into operations can enable more stable, legitimate, and ultimately successful mining operations.

5. Synthesis table

The following table synthesises what's known and less known about critical minerals in the UK. This allowed us to establish our key starting points and key remaining questions for the different layers of analysis considered in this report. This forms the outline for the sections which follow.

Theme	Starting points – what's known	Key questions – what's less known
Understanding mining and the environment	<ol style="list-style-type: none"> 1. Whilst the UK has a legacy of long-term environmental damage from mining, there have also been restoration projects on mine/quarry sites as well as the natural formation of some ecologically novel and valuable habitats. 2. Prospective mining areas overlap with agricultural land, protected and designated areas, and unprotected but still culturally significant landscapes. 3. The UK can emerge as a leader in mineral recycling. This provides an opportunity to create an exemplary circular economy. 4. The UK has a legislative and planning framework that incorporates environmental issues - though effectiveness and impact on mining varies. 	<ol style="list-style-type: none"> 1. What is the extent of historic pollution and subsequent recovery of mining landscapes? How would that change under future mining scenarios? 2. What standards of mitigation and remediation are current/exploratory operations being held to? How can these be made clearer and more consistent? 3. What do clear examples of best practice mining operations look like? How applicable are these for creating opportunities to enhance conservation actions in the UK? 4. Which types of species/habitats would be most affected by future (and cumulative) mining projects in the UK? And to what extent? 5. What are the comparative environmental costs/benefits of UK mining versus overseas?
Ensuring a just transition	<ol style="list-style-type: none"> 1. Prospective UK mining areas map on to de-industrialised regions that are politically, socially, and economically disadvantaged and disenfranchised in complex ways which are often hard to quantify. 2. Jobs in mining are not the same as what they were previously. Generally, the profile of employment is trending towards a higher skills base and lower labour intensity. 3. Social Licence to Operate cannot be assumed. Community perspectives on mining re-commencing are incredibly diverse and shaped by memory, lived experiences, and international narratives. If these are ignored, community resistance to mining projects can emerge and jeopardise projects' success. 	<ol style="list-style-type: none"> 1. How can the complexity, multi-dimensionality, and contextual specificities of disadvantaged and disenfranchised de-industrialised regions be addressed by incoming industry? 2. To what extent are the jobs being proposed by the CM industry accessible to 'local' people? How feasible is re-skilling and what would this require? 3. What does effective community involvement in mining projects look like?

Theme	Starting points – what’s known	Key questions – what’s less known
Clarifying governance	<ol style="list-style-type: none"> 1. CM projects are beginning to be recognised as Nationally Significant Infrastructure Projects (NSIP). NSIP is perceived as centralising governance with resulting struggles over how local voices and perspectives are included. 2. CM projects in the south-west are furthering calls by some for Cornish devolution. 3. There is a lack of transparency relating to mineral rights ownership and geological surveying data which is hampering the commercialisation of CM resources. 	<ol style="list-style-type: none"> 1. How clear, consistent, and effective are the ESG standards and requirements of the government when investing in CM projects? How does this shape deliberation at local and national levels regarding the development of CM projects? 2. What are the roles, relations, resources, and capacities of central and local government/ councils/ bodies/ agencies involved in regulating CM projects to their agreed ESG standards? How would devolution impact this? 3. How might the lack of accessibility, clarity, and transparency over data relating to minerals’ material presence (including their ownership) shape the prospects for CM projects?
Grounding geopolitics	<ol style="list-style-type: none"> 1. Due to CM extraction and production being highly concentrated, the UK and other Global North states are responding with a combination of resource nationalism and diversification of CM supply chains. 2. The UK is building alliances with other nations to assist in the diversification of CM supply chains, with MoUs emerging as a central medium for navigating this. 3. The significance of The London Metal Exchange provides an opportunity to ensure higher ESG standards of CM projects both domestically and internationally. 4. International narratives shape UK perceptions and interests - e.g. Lithium mining is generally perceived negatively. 	<ol style="list-style-type: none"> 1. How might foreign investment and ownership of UK projects have different social, economic, and environmental impacts to domestically owned ones? 2. CM supply chain analyses of environmental impacts are difficult, let alone analyses of social issues. How can these CM analyses and proposed frameworks for traceability be strengthened and operationalised (including becoming further contextualised and digitised)? 3. How are environmental and social issues considered and kept accountable by MoUs related to CM projects? 4. How can the UK effectively influence beyond its borders in such a volatile world and with a shifting aid landscape?

6. Mining and the environment

Onshoring has multiple environmental risks which could build on the historic impacts of mining in the UK. However, there are also opportunities for large-scale landscape restoration and building a circular economy.

Context

Research into the environmental impacts of mining is well-established and growing, with increasing interest in recent years due to rising critical mineral demand and concerns about the impacts of future supply.⁵³ Impacts on the environment can be either direct or indirect, occurring at the mine site or further afield and can be caused through a multitude of different impact pathways.⁵⁴ **Most research has so far been focused on direct impacts of mineral extraction⁵⁵**; however, there is growing momentum to research indirect impacts beyond the immediate mine site.⁵⁶ Key impacts include those associated with land cover change, water resources and biodiversity.⁵⁷ Here we provide a broad overview of these impacts, drawing from literature across the globe, before exploring the potential environmental implications and opportunities in the UK context.

Land cover change

Mining frequently involves major physical disruptions to the landscape, resulting in land cover changes, deforestation and habitat loss. Direct land cover change can occur at the mine site and for associated infrastructure, including the construction of roads, railways, water pipelines, tailings and powerlines.⁵⁸ The extent of this land cover change varies with the type of critical mineral being mined and type of extraction method,⁵⁹ but estimates suggest that aboveground mining activities have a global footprint of at least 66,000-100,000 km².⁶⁰ These estimates, however, do not usually include the associated infrastructure beyond the immediate mine site such as roads, railways and powerlines. Additionally, increased human populations in and around mine sites can lead to the development of settlements, housing, informal roads and agriculture, often resulting in extensive deforestation⁶¹.



Impacts on water resources

Extraction and processing of critical minerals can have significant impacts on water resources, including through water abstraction and use. A review of environmental impacts of critical mineral mining found that approximately three quarters of existing research papers identify water depletion as an issue for lithium mining, particularly in already arid regions.⁶² Similarly, mining can result in water pollution and heavy metal contamination, with an estimated 1-1.8 million km of river networks worldwide thought to be exposed to mining-related contamination.⁶³ Pollution and contamination of waterways can result from wastewater discharge, atmospheric emissions, dust and debris, acid mine drainage and ineffective waste storage.⁶⁴ Poor water and waste management at mine sites can result in negative impacts on both ecosystems and local communities,⁶⁵ including through polluting vital groundwater resources and damaging nearby agriculture and aquaculture.⁶⁶

Biodiversity

Amongst other drivers, land cover change and pollution can have knock-on impacts on biodiversity at or near mine sites. Land cover change results in habitat loss and fragmentation, which can lead to changes to species distributions and to wildlife movement.⁶⁷ Pollution from heavy metals and metalloids in water and soil can lead to toxic build-up in organisms and can affect nutrient flows, leading to reduced insect diversity and density and to increased mortality and reduced species richness.⁶⁸ Accumulation of toxic metals through the food chain can affect vertebrate survival and health.⁶⁹ Additionally, pollution can cause changes in environmental conditions such as water and soil pH and sediment loads, affecting ecosystem function and reducing habitat quality.⁷⁰

Indirect impacts of mining on biodiversity include invasive species introduction and increased pressure on wildlife from illegal wildlife trade and bushmeat hunting, often due to the influx of people to previously inaccessible areas and the establishment of new transport networks.⁷¹ Additionally, wildlife behaviour can be impacted by noise and light pollution from mine-site processes and along transport infrastructure routes.⁷² Avoidance behaviours can lead to further fragmentation of wildlife populations and changes to habitat use.⁷³

Global analyses have identified the coincidence of critical mineral mining with biodiversity hotspots and protected areas,⁷⁴ and mineral extraction has been highlighted as a threat to IUCN Red List species,⁷⁵ including great apes.⁷⁶ The production of nickel, a metal vital for low-carbon technologies and steel, is currently projected to threaten the top 10% of global land areas most critical for conserving biodiversity and storing carbon.⁷⁷

Carbon and energy intensity

Refining and processing of critical minerals can be both carbon and energy intensive. Global metal production is one of the largest consumers of fossil fuels,⁷⁸ primarily for fuelling heavy machinery, electricity generation and for refining and smelting.⁷⁹ Additionally, smelting processes for certain metals like copper can produce hazardous emissions such sulphur trioxide, which can lead to, for instance, acid rain.⁸⁰ The impacts of critical mineral extraction on climate change are currently underexplored but are important to consider in the transition towards greater development of renewable energy sources.⁸¹

What is the state of knowledge in the UK?

The UK has a rich history of coal and aggregate (e.g. crushed rock, sand and gravel) mining and between the 18th and 20th centuries was a major source of metal mining.⁸² Despite this, two major global reviews of impacts of mining on biodiversity only included two UK studies,⁸³ both of which focus specifically on the post-mining landscape rather than impacts during active mining.⁸⁴ Additionally, Great Britain does not explicitly reference mining in its national targets for the 2011-2020 biodiversity framework of the UN Convention on Biological Diversity (CBD) nor in its national biodiversity strategies and action plans (NBSAPs).⁸⁵ Until the year 2000, mine operators in the UK were allowed to abandon mines without any liability for ongoing pollution.⁸⁶

The potential impacts of future critical mineral mining in the UK are currently underexplored; however, some evidence of environmental impacts of existing or closed UK metal mines does exist. The majority of environmental impacts recorded so far focus on pollution and contamination of rivers, including from abandoned mines.⁸⁷ **For example, abandoned metal mines are believed to be the largest source of metal pollution to English rivers and into marine environments.**⁸⁸ Between 1,491 km of rivers and estuaries are believed to be affected across England⁸⁹. Additionally, impacts on mammal species such as bats have been recorded up to at least 900 metres from a tungsten and tin mine, with bat species richness and activity levels decreasing closer to the mine.⁹⁰ **Additionally, some research has focused on mine remediation and post-mining ecosystem services or habitats.**⁹¹ Despite these estimates, the overall extent of historic pollution and wider impacts on the environment is not well known, nor is how effective recovery operations have been at a national scale. Additionally, given the uncertainty in where critical mineral mining might take place in the UK,⁹² it is difficult to predict exactly which habitats, ecosystem services and species might be affected, and therefore actions that can be taken to mitigate this. Here, we provide an overview of key environmental considerations for critical mineral mining in the UK, including potential risks, mitigation and opportunities.

i. Key considerations in the UK context: Risks

Pollution and waste management

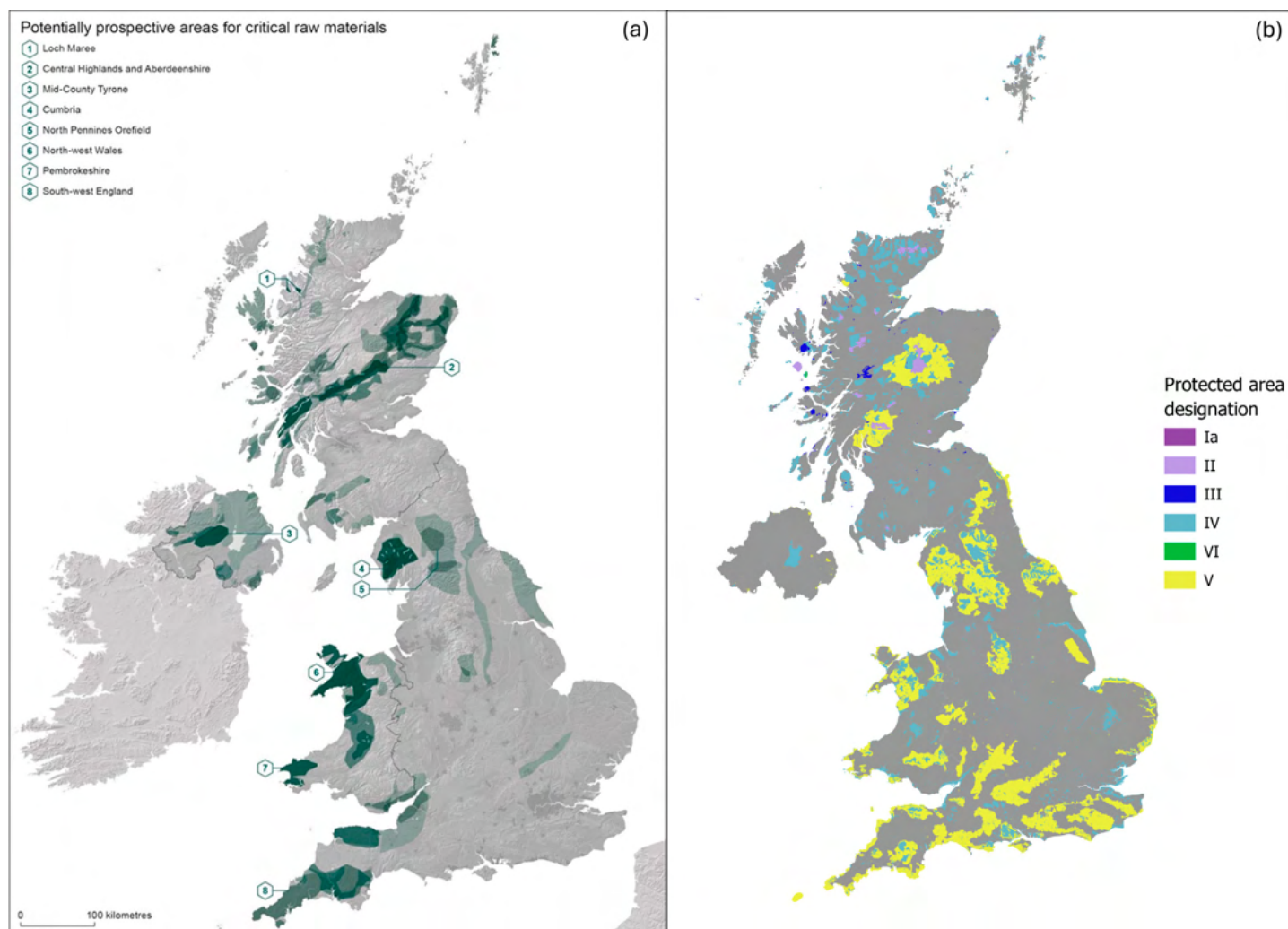
As discussed, the UK already has ongoing water pollution and contamination issues from legacy mines.⁹³ Additionally, UK waterways are heavily polluted through other processes, such as from water treatment works overflows and from agricultural runoff.⁹⁴ The State of Our Rivers Report 2024 revealed that none of England's rivers are in good or high overall health, and 83% also fall below good ecological status.⁹⁵ Tailings storage facilities (TSF), such as the Wheal Maid tailings in Gwennap Mining District, Cornwall,⁹⁶ can also pose high risks to the health of humans, fauna and flora as well as presenting wider ecosystem impacts.⁹⁷ Considerations should be made about how onshoring critical mineral mining might further impact already heavily polluted water systems and what mitigations can be put in place to reduce any potential further impacts. **In particular, because although the spatial extent of mines can be relatively small,⁹⁸ impacts such as water pollution can reach much further into the environment,⁹⁹ depending on the management of the mine.** Effective and environmentally-sound management of mining wastes in the form of both waste rock and mine tailings should therefore be a priority.

Additionally, mining and processing of critical minerals have high energy requirements and produce airborne emissions.¹⁰⁰ In 2018, extraction and processing of critical minerals accounted for 10% of greenhouse gas emissions globally and is expected to rise with demand for critical minerals.¹⁰¹ Mining activities and transportation of goods can also produce atmospheric dust pollution in the form of fine particulate matter.¹⁰² **Particulate emissions have been declining in the UK since 1990,¹⁰³ but new critical mineral projects could alter that trajectory, if not carefully managed.** Understanding how prospective mines might affect air quality and ground pollution at a local and national level will be important for both wildlife and human health. This is also important in the context of national and global emissions reduction targets, such as the aim to reach net zero by 2050.¹⁰⁴

Cumulative impacts on biodiversity and fragmentation:

Onshoring of critical mineral mining in the UK could have adverse effects on biodiversity and increase habitat fragmentation, if not effectively managed. Habitats in the UK are already heavily fragmented by, for instance, roads (Figure 2¹⁰⁵), and the latest State of Nature Report (in 2023) highlighted continuing significant loss of biodiversity.¹⁰⁶ **The UK is believed to be one the most nature-depleted countries globally.**¹⁰⁷ Land-use change because of new mine sites and additional transportation infrastructure could exacerbate both habitat loss and fragmentation effects¹⁰⁸, and associated impacts on wildlife species and populations. Additionally, provisional mapping of the 'potentially prospective areas for critical raw minerals'¹⁰⁹ in comparison to IUCN classified protected areas (World Database of Protected Areas 2026) and roadless areas (areas beyond the effects of roads¹¹⁰) shows high overlap in some regions (Figure 2). In-depth analyses of these data and additional environmental variables, such as species distributions, ecological status and ecosystem services, are needed to fully explore potential impacts. **Additionally, more detailed surveys of prospective areas for critical minerals are needed to identify realistic areas for mineral exploration.**

Figure 2: Side-by-side comparison of locations of potentially prospective areas for critical raw materials versus existing protected area designations in Great Britain. (a) Areas of the UK considered potentially prospective for critical raw materials. The darker areas are those that are prospective for several CRMs. Contains Ordnance Survey data © Crown copyright and database right 2023. Contains NEXTMap Britain elevation data from Intermap Technologies. Reproduced with permission from the British Geological Survey © UKRI 2026 All Rights Reserved. Permit Number [CP 26/010]. Source: <https://ukcmic.org/downloads/reports/ukcmic-potential-for-critical-raw-material-prospectivity-in-the-uk-cr23024.pdf>. (b) Protected areas across Great Britain as per IUCN classifications with decreasing protected from Ia to V: Ia = Strict Nature Reserve, II = National Park, III = Natural monument or feature, IV = Habitat/species management area, VI = Protected area with sustainable use of natural resources, V = Protected landscape/seascape. Source of protected areas: World Database of Protected Areas.



ii. Key considerations in the UK context: Mitigation

To facilitate onshoring of critical mineral mining, effective environmental planning, timely permitting and successful mitigation is vital. Establishment of best practices and clear guidelines around mitigation and offsetting would ensure that the potential environmental implications of critical mineral mining in the UK are managed to high standards, regardless of which company is involved and where a mine is located.

Best practices of mining operations and mitigation:

The mitigation hierarchy is a best practice framework for managing impacts on biodiversity and ecosystem services, with the priority being to *avoid* impacts.¹¹¹ If avoidance is not possible, impacts should be *minimised* (i.e. reduced or limited as far as is feasible) and then *rehabilitated* or *restored*. *Offsetting* should occur where residual impacts remain to ensure goals such as no net loss or net positive impact are achieved.¹¹² The mitigation hierarchy is, however, not a standard or goal but can be used to implement conservation goals. Similarly, the International Council on Mining and Metals (ICMM) has developed a Good Practice Guide to assist mining companies with achieving no net loss or net gain of biodiversity,¹¹³ providing guidance for each stage of the mining lifecycle on how to establish baselines, apply the mitigation hierarchy and disclose progress.

Importantly, aiming for best practice does not necessarily involve legal compliance and is often viewed as a ‘beyond compliance’ approach where companies are taking actions above and beyond what is legally required. This means that to some extent it is optional for companies to strive for best practices; however, there is a growing body of certification and reporting schemes used by investors that subsequently incentivises mining companies to work beyond compliance.¹¹⁴ High variability in governance between and within countries can mean that mines operate at very different levels in terms of environmental impact and mitigation;¹¹⁵ however, monitoring by stakeholders and investors can encourage companies to strive for best practices, and therefore competitive advantage, regardless of whether policy-level interventions exist.



Standardisation of planning and monitoring:

There is currently little standardisation of planning and monitoring for different types of mining and associated processes across the UK. The approval of planning applications is not centralised in the UK, with the devolved governments having their own national planning policies and frameworks.¹¹⁶ Mineral planning and decisions are usually carried out by local Mineral Planning Authorities, such as local councils, national parks or unitary authorities. Mineral Planning Authorities have the responsibility to guide future developments, safeguard mineral resources, make decisions on planning applications, and monitor and enforce existing planning permissions.¹¹⁷ In addition, depending on the location and scale of the mining project, the types of regulatory bodies involved in approving and providing environmental permits will differ.¹¹⁸

The current lack of UK-wide standardised processes for planning, monitoring and mitigation leads to inconsistent approaches across different regions and projects, and a lack of transparency for both mining companies and broader society.¹¹⁹ The Mineral Products Association (MPA) calls for a more streamlined mineral planning and permitting system, citing the ‘uncertainty, delay, and cost’ in current processes.¹²⁰ This would also enable easier comparison and greater transparency of the environmental impacts of different mines across different regions. As discussed in section 8, Nationally Significant Infrastructure Project Status is one way that centralisation of planning, monitoring, and mitigation standards are likely to be centralised.

Offsetting of biodiversity impacts:

When impacts of mining on biodiversity cannot be avoided or mitigated, biodiversity offsetting may be used. **In England, the biodiversity net gain (BNG) approach calls for developers to deliver a 10% increase in biodiversity compared to pre-development conditions**¹²¹. BNG prioritises on-site biodiversity gains, but if not possible, then off-site biodiversity offsetting can be explored or biodiversity credits purchased.¹²² Given mine sites tend to operate over decades, biodiversity gains may not be realised until many years after the initial disturbance. For example, the proposed Cornish Lithium Trelavour Pit project is expected to operate for at least 20 years.¹²³ Additionally, ensuring the long-term monitoring and management of mitigation and offset actions beyond the closure of a mine is key. There are examples elsewhere of mine sites being on track to achieve no net loss of biodiversity as a result of offsetting programmes, such as the Ambatovy mine in Madagascar.¹²⁴ **Despite this, research suggests that biodiversity offsets through the BNG framework face integrity risks**, particularly through governance challenges such as local authorities having insufficient resources to conduct basic monitoring or enforcement.¹²⁵ This could limit the success of future offsetting of critical mineral mining projects, unless improvements are made to the performance of biodiversity offsetting¹²⁶.

Further clarity to the timelines involved in BNG as well as domestic examples of best practise for mining projects will be crucial to the success of BNG as a mitigation measure.

iii. Key considerations in the UK context: Opportunities

Biodiversity impacts in the UK may be lower than overseas, and restoration offers potential improvements for nature.

The UK is relatively unique compared to current major source countries for critical minerals because **restoration in the UK has real potential to improve on pre-mining conditions for biodiversity**. High levels of degradation, overgrazing and low levels of biodiversity exist across large areas of the UK.¹²⁷ Critical mineral mining in already degraded environments may impact fewer species than mining in higher biodiversity areas and therefore be easier to mitigate or offset.

Diverting demand from higher impact areas in the tropics to already relatively degraded landscapes could reduce overall global biodiversity impacts of the UK critical mineral supply chain. The effect would likely only be marginal, however, given that the UK is expected to continue to rely on international supply for 90% of its critical mineral needs.¹²⁸

Carefully planned and ambitious restoration of critical mineral mines in the future could provide valuable habitats for wildlife. Many historic mines in the UK are now protected and considered important areas for the environment and as cultural heritage sites.¹²⁹ For example, restored limestone quarries in England and Wales have been found to provide critical breeding habitats for amphibians and to enhance green infrastructure and connectivity between fragmented landscapes.¹³⁰ To ensure biodiversity net gain and that restoration efforts are successful, effective long-term management will be needed and not just short-term investment. The Nature After Minerals (NAM; afterminerals.com) partnership programme led by the Royal Society for the Protection of Birds (RSPB) and supported by Natural England, MPA and the British Aggregates Association aims to provide advice on effective habitat restoration to minerals restoration stakeholders. The International Principles and Standards for the Ecological Restoration and Recovery of Mine Sites (Mine Site Restoration Standards, MSRS) was published in 2022 and provides a framework for delivering effective mine restoration projects¹³¹. Future critical mineral mining projects should seek to work with partnerships such as NAM and follow the MSRS in order to maximise the potential of restoration for nature. Additionally, there are calls for practical restoration guidelines for European habitats to enable better standardisation across mines and countries, and to improve biodiversity outcomes.¹³² Given the biodiversity baseline in the UK is so low¹³³, the potential for nature positive mining is high. Potential positive restoration outcomes for nature should, however, be weighed up against any immediate and short-term losses associated with mineral extraction and associated habitat loss.

Mining could produce novel and interesting ecologies:

Research has shown that mine sites can produce novel and interesting habitats and ecologies, particularly after closure.¹³⁴ For example, the disturbance and alteration of landscapes during mineral extraction can produce novel ecosystems consisting of new plant species compositions, subsequently affecting ecosystem structure and function.¹³⁵ Additionally, informal and often unrecorded interactions between wildlife and human use of post-mining landscapes can occur, resulting in habitats for plant species specific to open waste ground and uncommon invertebrate species.¹³⁶ The process of restoration and the different successional habitats that occur can offer refuges for specialist and endangered species, and restored areas can provide landscape heterogeneity and ecosystem services that otherwise would not exist¹³⁷.

The creation of a circular economy:

The UK's Critical Minerals Strategy sets out the goal of meeting 20% of total annual UK demand through recycling of products to recover critical minerals by 2035.¹³⁸ Creating a circular economy through reuse and recycling would reduce demand for mining of new minerals and the associated environmental implications of mining¹³⁹. The UK already has strong capabilities in recycling iron and steel, and there are two recycling plants that also process lithium-ion batteries, but currently up to 80% of metal products classified as waste are exported from the UK rather than recycled in-country.¹⁴⁰ At a global scale, secondary supply (including direct use scrap) of copper and nickel currently makes up 33% and 31% of demand for these metals, but this is lower than previous years suggesting that recycling is struggling to keep up with increasing demand.¹⁴¹ In the UK, there are currently low levels of recycling of rare earth elements such as dysprosium, thulium and samarium,¹⁴² yet these elements are important for magnets used in technology. Recycling processes can also involve high energy consumption to reach high temperatures for separating and purifying metals (up to 500°C) in a process called pyrometallurgy, and for smelting (over 1400°C).

Additionally, strong acids used in recycling processes must be carefully managed in order to avoid damage¹⁴³

to the environment.¹⁴⁴ **The ambitious 20% goal in the Critical Minerals Strategy will require significant investment in upscaling of existing projects and development of new recycling plants alongside funding research into new, efficient ways of recycling and extracting critical minerals from products.**¹⁴⁵

Key points:

- Onshoring critical mineral mining could lead to increasing pressure on the environment, including through pollution, habitat loss and fragmentation effects. This could build on historic mining pollution in the UK. However, more in-depth research is needed to understand potential impacts and how best to mitigate them.
- Effective mitigation and adherence to environmental planning regulations will be key to sustainable and successful mining but to facilitate this, more streamlined planning and permitting systems are needed.
- The UK is heavily nature-depleted and eventual restoration of critical mineral mines does offer a unique opportunity. This adds to other environmental opportunities of critical minerals such as the creation of a more circular economy.
- Narratives and framing around mining are generally negative amongst the environmental community, potentially masking the vast heterogeneity of impacts, and potential opportunities, associated with mining.

7. Ensuring a just transition

De-industrialised regions are complex and require more than jobs to achieve a just transition. The critical minerals industry provides a unique and crucial opportunity to achieve this.

Context:

A just transition seeks to utilise the move towards a zero-carbon economy as a means to combat inequality.¹⁴⁶ Founded on principles born from North American unions in the 1970s,¹⁴⁷ a just transition recognises that climate action must be for the benefit of everyone. Industrial workers and communities, in particular, should not be abandoned in the pursuit of greener infrastructure and technologies.

There has been extensive recognition and suggestions for the role for critical minerals in a just transition. Heffron, for example, proposes the 'JUST framework' as a reference for how this can be achieved¹⁴⁸.

In the UK, various organisations have highlighted how the Critical Minerals Strategy could go further in promoting a just transition.¹⁴⁹ They add to an existing, broader body of work which has grappled with how the UK's energy transition can be more equitable.¹⁵⁰

The need for a just transition in the UK is imperative, with industrial industries having significantly declined over the past century¹⁵¹. Mining, iron and steel manufacturing, ship building, and many more have either ceased entirely or slowed to a crawl. Many of the regions home to these industries have been left with minimal employment alternatives and decimated social and physical infrastructure.¹⁵² **Regional inequality in the UK is among the highest in all OECD countries.**¹⁵³

Some of these same deindustrialised regions now hold the promise of critical minerals. Cornwall and the Northeast of England are key sites for critical mineral exploration and processing. The industrial heritage and demise of these regions are highlighted by critical mineral projects.¹⁵⁴ The return of jobs is framed as one of

the key incentives for garnering local support.

De-industrial regions are complex, however. Communities in these regions often feel ‘left-behind’ because of multiple factors which pit their strong sense of peripheral locality against metropolitan centres, building a sense of disenfranchisement.¹⁵⁵ **Financial impoverishment is just one aspect of a bigger picture of post-industrial inequality.**¹⁵⁶

In Cornwall, for example, the 2025 Pretty Poverty Report¹⁵⁷ highlighted how conventional poverty metrics such as the Index for Multiple Deprivation (IMD) miss out many characteristics of rural poverty. Undertaken in post-industrial areas of Cornwall – some of which are now subject to critical mineral exploration (St Dennis) – the report highlights the themes of: Transport Dependency; Housing Displacement; Employment Precarity; Healthcare Withdrawal; Educational Isolation; and Community Resilience as challenging current deprivation measurement approaches. As many upstream critical mineral extraction projects are situated in rural areas, these complexifying themes of rural poverty are highly relevant.

Rather than relying solely on economic indicators to judge how critical minerals in the UK can contribute to a just transition, we foreground work which centres local lived experiences. Research by Sovacool et al. has shown the importance of place-based perceptions and local identities, potent lived experiences of injustice, technology-specific concerns, issues of trust and awareness, and issues concerning policy and governance for achieving just transitions in the UK.¹⁵⁸ As has been evidenced elsewhere,¹⁵⁹ **the promise of jobs alone is clearly not enough for a just transition.**

Drawing out what is known and unknown about critical minerals in relation to a just transition in de-industrial communities led us to four points which can lead to local opportunities or local failure.

i. Employment:

Critical minerals projects can be a source of good and sustainable employment. However, uncertainties exist as to the exact nature of these jobs.

Modern mining has different employment profiles to historical operations. These profiles tend towards a



Coal mining village landscape image. © Mark on Adobe Stock

higher technical base and lower labour intensity¹⁶⁰. Beyond the skill level required for entering the industry, modern mining jobs vary drastically in terms of duration, when they will become available, their accessibility and their interest to people living locally, regionally, and nationally.

Local communities with familiarity of past industrial employment should not be misled as to these caveats- up-to-date information on the opportunities available is essential.¹⁶¹ In particular, there are five sub-points which need further research and clarity to ensure that employment in the critical minerals industry can contribute to a just transition.

- **Automation:** Modern mining practises are increasingly seeing human labour substituted for automation and robotics. Examples of ‘Smart Mine’ technologies include autonomous hauling systems, trucks, drilling systems, hazard monitors, and geological data analysis.¹⁶² As technologies advance and reduce in price, it is likely that lower-skilled jobs will become in increasing jeopardy.¹⁶³
- **The Local:** Whilst nascent mining operations highlight local job creation, this claim can be deceptive. ‘Local’ is often defined as living within a commutable distance. However, those living within the immediate vicinity of prospective operations have been noted to understand local as meaning a far smaller scale. This can lead to feelings of being misled when operations claim to be hiring local people.¹⁶⁴
- **Skills:** A report by the Institute of Materials, Minerals and Mining (IoM3) makes clear the growing gap between the skills needed for building a domestic critical minerals supply chain and what the UK currently possesses.¹⁶⁵ With skilled professionals retiring, institutional knowledge is declining in both industry and regulatory sectors. Currently, not enough young people are being trained in mining engineering, mineral processing, and metallurgy. Industry, academia and regulators all require access to these skills. This will necessitate bringing in workers from further afield, potentially adding further pressures to local services and risking alienating local communities from critical minerals projects. Whilst it is clear investing in skills is necessary, this requires further research. Inspiration could be taken from the renewable energy industry: Celtic Sea Power’s ‘Cornwall FLOW (Floating Offshore Wind) Accelerator’ project involved a comprehensive regional assessment of the capacity, skills and workforce which would be needed across the supply FLOW supply chain.¹⁶⁶
- **Re-skilling:** Whilst re-skilling has been noted as highly important for a just transition, there has been limited research into what this entails. This is a challenge noted briefly by the IoM3 report. The report cites evidence by EY’s 2023 risks for the mining industry, stating that industry has ‘typically favoured a ‘buy it’ instead of ‘build it’ approach to talent acquisition’, meaning, ‘There has been limited focus or investment in reskilling and upskilling, despite 56% [of mining industry participants in EY’s research] stating it as a priority last year and 60% highlighting it again for the year ahead’.¹⁶⁷ Similarly, a report by the University of Cambridge Institute for Sustainability Leadership on ‘Investing in quality jobs for a just transition’ listed reskilling as one of its answers to ‘What can investors do to improve portfolio impact on decent work?’¹⁶⁸ Reskilling, whilst expensive¹⁶⁹, is imperative- yet, there is limited understanding of how possible it is.
- **Access:** Access to mining jobs involves more than possessing the relevant technical skills. Research by the University of Exeter’s Critical Minerals Challenge Centre has shown that having access to industry networks is vital. This work highlights the importance of critical minerals projects to be engaging directly with local communities.¹⁷⁰

ii. Local services

Embracing the sense of community and place-based attachments of de-industrial areas, critical minerals projects can contribute to a just transition through an attention to local infrastructures.

Physical infrastructure:

Mining operations frequently require the creation of roads, railways, housing, and other associated infrastructure concerning water, waste, and energy. These are services for which there is often pre-existing demand and contention, especially in rural areas which are being prospected for critical minerals¹⁷¹.

Making mining infrastructure open-access has long been noted as holding social and economic opportunities.¹⁷²

Mining provides a great impetus to improve physical infrastructure with resulting benefits for communities as well as industry. There is a need to improve transport links (a significant contributor to rural deprivation¹⁷³); the capacity of the energy grid (currently seen as a major constraint for critical mineral projects¹⁷⁴ and over 600 renewable energy projects¹⁷⁵); and build more affordable housing for workers and to combat regional housing crises.¹⁷⁶

Furthermore, research has found that some of the most popular actions which mining companies can make concern the development of local amenities. The maintenance and creation of footpaths, for example, to ensure continued access to nature is a popular and low-cost service.¹⁷⁷

Social Infrastructure:

Mining companies were often the historic heart of communities and highly paternalistic. These communities were formerly richly endowed with industry-supported social infrastructure, including schools, playgrounds, parks, libraries, sports and social clubs, bands and carnivals. These sustain the identity of a place and provide environments for community support.¹⁷⁸

Tomaney et al. found that left-behind, former mining communities had both a gradual then sudden drop in social infrastructure.¹⁷⁹ Consequently, the work required to rebuild social infrastructure should not be underestimated.

Critical minerals projects have a role to play in rebuilding this social infrastructure. Whilst work is necessary to identify a framework for this rebuild, a starting point should be the combination of funding for local groups and initiatives with community engagement to build a 'productive nostalgia'.¹⁸⁰

iii. Heritage, memory, and perceptions

Despite often being universalised,¹⁸¹ local perceptions around local mining legacies are incredibly diverse.

As studies from both the UK¹⁸² and Europe¹⁸³ demonstrate, these perceptions are highly ambivalent and irreducible to generational divides. Whilst lamenting the decline of employment, local business, and social and physical infrastructures, those with first-hand experiences of mining are sometimes the most dismissive about its potential return. **Nostalgia for mining should therefore not necessarily be interpreted as a desire for more mining.**

These complicated relationships with the past can be reproduced through mining heritage.¹⁸⁴ The persistence of legacies in the landscape from past extraction are often iconographic for regions, such as Cornish beam engines.¹⁸⁵

Figure 3: Clay waste piles ‘Flatty and Pointy’ in St Dennis. Photo © Jamie Hinch.



However, this heritage is complicated. Pits and tips from past extraction might be dismissed as abandoned waste, but communities develop strong attachments to these unorthodox landscape features. **These attachments are lively and dynamic, as these sites are often important sites of leisure and recreation for local communities.** The prospect of removing China clay waste piles (Figure 3) at an exploratory lithium mining operation in Cornwall, for example, is highly controversial and a major reason for local distrust of the mining operation.¹⁸⁶

Alongside ambivalent memories of mining and dynamic engagements with the heritage of post-extractive landscapes, **media stories can complicate how communities receive the prospect of critical minerals operations.** Whilst there has been no recent research in the UK to confirm this, it is widely believed that mining has a generally negative perception in the UK.¹⁸⁷ This is often fuelled by stories of environmental and social injustices abroad. These media stories can negatively predispose communities towards the idea of mining, even where there is extensive local history of resource extraction.

iv. Transparency

Perhaps the most important consideration for making domestic critical minerals projects a success in their contributions to a just transition is transparency with local communities.¹⁸⁸ **Initial mistrust of mining projects can develop into conditional acceptance when met with transparent and accountable operations.** This has been exemplified by Eagle Mine in Northern Michigan, where Rio Tinto and subsequently Lundin Mining met intense opposition with careful environmental monitoring, economic development, and educational engagement with local communities.¹⁸⁹

Communities in former mining areas are often interested and well-versed in knowledge of local land (including its natural environments, ownership, permissions, and geology). Subsequently, any **activity in these areas should be clearly, earnestly, and directly communicated at the earliest possible opportunity to stop the spread of misinformation**. This has been recently demonstrated in Scotland, with an exploration company subject to negative headlines having not communicated the nature of their operations clearly enough to local communities.¹⁹⁰

The same is true of critical mineral projects financing. Opacity concerning how projects are being funded and their viability to become commercial impact local community perceptions. If a project seems to be underfunded or lacking clarity over funding, communities are more likely to be suspicious of the operation and dubious over its potential for commercialisation. This reduces local engagement and increases fears that speculative operations will make a mess of the landscape in the exploration phase and never bring in any of their proposed benefits.¹⁹¹ As stressed in section 4, projects fail where they fail to maintain social license to operate.

Key points

- Domestic critical minerals operations have a major role to play in the UK's just transition.
- There is an opportunity to provide local employment in critical minerals operations, but these promises must not ignore the questions which remain over access, skills, re-skilling, and automation.
- Ensuring a just transition goes beyond providing jobs; mining provides an opportunity to re-build and re-invigorate physical and social infrastructures.
- Local perspectives of mining are often highly ambivalent, influenced by memory, heritage, and media.
- Operations must be transparent to avoid the spread of misinformation, and the subsequent loss of Social Licence to Operate.

8. Clarifying governance

A lack of clarity over the scales of decision-making involved in the permitting, financing, and monitoring of critical minerals projects risks jeopardising social and environmental opportunities.

Context

The previous sections have identified numerous social and environmental opportunities and risks for critical minerals projects. Governance has a huge role to play in these projects achieving their potential.

Clear, transparent, and inclusive decision making is imperative and yet currently, the governance mechanisms in place for critical minerals onshoring are often opaque and discretionary.

These governance mechanisms are not only a social and environmental concern. The slow and bureaucratic nature of planning and permitting processes has been a major concern of the critical minerals industry.¹⁹² These delays pose the risk that UK projects will increasingly lag behind those based in other countries and make projects economically unviable.¹⁹³

Due to their national importance and multi-dimensionality, there is a need to streamline the decision-making involved in critical minerals projects.

One of the responses to this need for streamlining has been the manipulation of different scales of governance and decision making. Nationally Significant Infrastructure Project status and Devolution are two proposed examples of streamlining which have been raised in relation to critical minerals. Whilst very different, **these responses place attention to the relations, roles, resources, and capacities of different local, regional, and national authorities.**

Another response to the need for streamlining concerns the accessibility and transparency of knowledge. There is an economic case for greater transparency over data, evidence, and ownership rights. Greater transparency over this data also builds a better foundation for ensuring the social and environmental opportunities of critical minerals projects become a reality.

i. Planning, permitting, and NSIP

Critical minerals projects require planning permission. Because of the scale and resource intensity of these projects, they necessitate multiple permissions to be granted concerning energy, transport, water, environmental impacts, and waste management.

Obtaining multiple permissions for each of these domains is time and resource intensive. So much so, planning is one of the major concerns of the UK's nascent critical minerals industry. One study found that in Europe, 74 percent of projects analysed had experienced delays- the most in the world.¹⁹⁴

The slow nature of permissions and permitting presents social challenges. If projects take too long to get off the ground, **preliminary community buy-in may lose momentum and allow doubts over the project to emerge.** False promises will create short- and long-term issues for the critical minerals industry and local authorities alike.



The application for Nationally Significant Infrastructure Project (NSIP) status has been a response to the slow planning and permitting phase of critical minerals projects. Approved by the Secretary of State, NSIP allows for the granting of a Development Consent Order (DCO). The DCO grants a single, centralised permission for infrastructure construction as opposed to the multiple local ones which would ordinarily be required.¹⁹⁵

Introduced in the Planning Act 2008,¹⁹⁶ NSIP has most frequently been associated with power plants, renewable energy projects, transport, and public service infrastructure. In 2024, Cornish Lithium's Trelavour Lithium Project became the first critical minerals project to be given this status.¹⁹⁷ **The application for NSIP here has been proposed as a model for other critical minerals projects.**

The opportunity for community engagement and input into projects granted NSIP status comes primarily at the pre-application stage,¹⁹⁸ and subsequently through dialogue between the developer and community liaison group.

Whilst obtaining the DCO ensures engagement with local people, it has been repeatedly criticised for inadequate integration of community perspectives. **Many local publics involved with NSIP projects have been left dissatisfied and frustrated throughout the pre-application stage and regulatory examinations.**¹⁹⁹

NSIP status, in the minds of local communities, moves the discussion of projects away from 'whether' they happen and becomes about 'how' they happen.²⁰⁰ At the pre-application phase, research on renewable energy NSIP's found communities struggle to access channels of engagement, experience information deficits, and have difficulties asking questions on matters they deem important. The research also found communities encounter insufficient openness to comments, disrespect, and misrepresentation- with the probable long-term impact of the public questioning the legitimacy of these projects.²⁰¹

Other research on how NSIP projects include local communities has found challenges over who gets involved. The local people who most frequently engage tend to be 'the usual suspects' (local people consistently involved in community discussions and meetings), older people, and those with expertise on a subject.²⁰² As a result, many local people are reported to find NSIP's community engagement process intimidating and stressful; quickly dismissed as too technical. As a result, emotions and storytelling are often perceived as being unwelcome in these spaces.²⁰³ The negative legacy of past NSIP projects can influence their perceptions when the status is applied to critical minerals projects.²⁰⁴

The success of NSIP projects' community engagement is in the hands of the developers. Work is therefore needed to understand how the critical minerals industry can be encouraged to take on this responsibility, and how the NSIP process can better implement community voices.

Centralised decision-making leaves a lot of discretion with the developers and examining authority, which can obfuscate the role of local authorities. Despite their responsibilities and contact with the public being reduced, local authorities still have the formalised role to monitor and enforce compliance with the DCO. They also have the informal task of informing the pre-application stages through their understanding of local knowledge and community relationships.²⁰⁵ This reduced but significant role risks 'scalar dumping'²⁰⁶ at a time when local authorities are already under-resourced and constrained.

Whilst streamlining planning and making projects more likely to deliver social and environmental promises, NSIP poses challenges. These concern the discretion and responsibility for local voice inclusion; the capacities of local people and local authorities to engage in the NSIP process; and transparency over the examination processes.

ii. Devolved power

Whilst the critical minerals industry has been pursuing NSIP status as a response to the complexity of establishing extraction projects, politicians have been centring the multi-dimensionality of critical minerals in the case for regional power devolvement.

The desire for devolution in Cornwall has been a mainstream sentiment among Cornish publics and politics for over 20 years. Critical minerals have been a growing part of the case put forward for the region's need for devolution.²⁰⁷ As the heart of the UK's critical minerals extraction strategy, MP's have been calling for devolution as a means to 'unleash the Cornish Celtic Tiger' and facilitate critical minerals projects.²⁰⁸

Devolution has been argued to enhance democratic accountability and responsiveness, foster economic growth,²⁰⁹ and better recognise regional identity.²¹⁰

In regard to critical minerals, devolution could prove the best way to accommodate the multi-dimensionality of mining. Through having one channel of communication to central government, the linkages between mining and energy, housing, waste, and more can be clearly and concisely communicated. These linkages can be lost when multiple lines of communication are relied upon.

Devolution presents social and environmental opportunities. **Through bringing decision-making closer to the regions in question, a better understanding of local issues can be integrated into plans for developing critical minerals infrastructure.** Affordable housing, for example, is an example of an issue facing Cornwall which will also be necessary to develop for critical minerals project construction and development.

Pursuit of devolution also presents challenges. The type of devolution pursued by Cornwall is unique and will require time to negotiate, draft, and implement. In particular, there exists a tension over how devolution should best be achieved in Cornwall. The Devolution and Community Empowerment bill of 2025 mandates that only Mayoral Combined Authorities can achieve the highest levels of devolution. Cornwall is a single authority with no interest in combining with Devon- presenting a significant sticking point.²¹¹

The difficulties of achieving this deal risk slowing down and confusing critical minerals projects, minimising their opportunities for local communities and environments.

Other devolution questions include how it would interact with other planning and permitting mechanisms, such as NSIP, as well as how it would work with other regional networks such as the clusters proposed in the UK's industrial strategy.

iii. Knowledge governance – data, evidence, and rights

A key challenge to the development of critical minerals projects in the UK concerns the governance of knowledge. Data and evidence relating to the surface and sub-surface are incredibly opaque.

Mineral rights in the UK epitomise this issue. They have been repeatedly identified as a structural challenge to the development of domestic critical mineral projects.²¹² Surface ownership does not always correlate with sub-surface mineral rights ownership. The Coal Authority owns coal, and the Crown owns gold, silver, platinum (excluding Scotland), petroleum, and natural gas. Other minerals are most often privately owned.²¹³

There is no exploration or mining licensing system in the UK (exc. Northern Ireland). The Land Registry holds limited information on these rights but is far from comprehensive or reliable, as information is provided voluntarily. Sometimes, the information does not even exist. Many deeds have been lost, owners unaware of their ownership, and small areas of land divided among many people.²¹⁴

With such incoherent and fragmented ownership, this creates high transaction costs, delays, and early-stage uncertainty- particularly where surface and subsurface rights are not aligned. Developers are often required to negotiate access through multiple channels, with no standard practise to refer to and minimal support available outside of a few specialist law firms.²¹⁵

The unique messiness of mineral rights in the UK compared to other countries – where minerals are often state owned and licenced – can significantly extend project timelines. This weakens the UK's competitiveness in attracting investment for time-sensitive critical minerals supply.

Many alternatives to the current system of mineral rights have been suggested.²¹⁶ But, as with other attempts to streamline mineral governance, changes will likely happen at the necessary pace and will have resulting challenges for the promises and prospects of providing social and environmental benefits.

Another area of knowledge governance which is a significant issue for prospective critical minerals projects in the UK concerns pre-competitive data sets. Currently, much of the geological data of mineral deposits in the UK is undigitised. Much of the data is old and more modern data was created from geological surveys which were less focussed on mineral exploration.

Updated airborne surveys of Britain's mineral deposits would offer social and environmental benefits, as much as economic ones. By offering an updated data set on the presence of different critical minerals in the UK, it would incentivise investment in exploration projects. This would ultimately increase the chances of projects happening and delivering local benefits. **Beyond this, the gross value added of conducting these surveys is estimated at 8 to 15 times the initial investment.**²¹⁷ Whilst operating on a far larger scale than would occur in the UK, precompetitive geoscience data and analysis has supported \$76 billion of value added in the Australian economy, equivalent to 3.5 per cent of GDP. Excluding the resulting resource exploration and extraction, production of this data alone resulted in \$71 million in value added. 80,000 jobs were supported by this work in 2021-22.²¹⁸ At a more comparable scale, in Ireland, the Tellus geoscience data project cost approximately £5.8 million in 2007; resulting in a £32 million return from exploration licences alone.²¹⁹

If done in tandem with geochemical surveying, **pre-competitive data of mineral deposits could be combined with baseline data on existing pollution and waste.** This would ensure that any mineral extraction which does occur can be measured against existing levels of pollution to ensure great accountability and transparency.

Key points

- Clear, accessible, and transparent governance is needed to ensure the social and environmental opportunities of critical minerals in the UK.
- Attaining NSIP status to acquire a DCO has been one response to the need to streamline the planning and permitting of critical minerals projects. Whilst increasing the likelihood of projects happening and delivering proposed opportunities, NSIP has been criticised for failing to incorporate the perspectives of local communities.
- Critical minerals have been built into the case for Cornish devolution. Whilst this presents bureaucratic questions, devolved power could provide greater benefits for local communities and environments in critical minerals projects.
- Updated and accessible data and evidence regarding mineral rights and geology would improve the likelihood of social and environmental opportunities being achieved.

9. Grounding geopolitics

Domestic mining is entangled with international actors, affecting the social and environmental challenges and opportunities of critical minerals in the UK.

Context

Whilst onshoring portrays a scenario of increasingly ‘de-globalised’ operations across mineral supply chains, this is far from a reality. As with most other countries in the Global North, the technologies, infrastructure, legislation, resources, and investment into critical minerals makes the idea of a truly domestic supply chain in the UK a fallacy.²²⁰

Instead, the UK has been working closely with international actors to develop bilateral agreements which facilitate supply, research and development, and investment into critical minerals projects both domestically and abroad.²²¹

The bilateral agreements signed by the UK (including the state, specific departments, and government bodies) take the form of ‘Memorandums of Understanding’ (MoU), ‘Memorandums of Cooperation’, and ‘Strategic Partnership and Cooperation Agreements’. **These agreements vary, but broadly signal alignments of ambitions and intentions to cooperate.** This covers areas such as research and innovation, data and traceability, industry partnerships and public-private cooperation, infrastructure projects, technical standards, and environmental, social and governance standards. MoU’s have been signed between the UK and the United States,²²² Kazakhstan,²²³ Kyrgyzstan,²²⁴ France,²²⁵ Japan,²²⁶ Ukraine,²²⁷ Mongolia,²²⁸ and Indonesia.²²⁹

Domestically, international actors have been investing in operations within the UK. Unless there is an extensive increase to the limited amount of money made available by the UK for critical minerals projects, foreign investment will be crucial in developing UK critical minerals projects.²³⁰

Meanwhile, overseas, the UK has been leveraging its technical and commercial mining skills as a scientific superpower. Multiple value chain elements from separate production networks such as battery science, chemical and industrial manufacturing capacity, automotive manufacturing, and green finance have been integrated to achieve this.²³¹

The entanglement between the domestic and the international has ramifications for social and environmental challenges and opportunities.

i. Domestic mining and international actors

Domestic critical minerals operations have a mixture of investors. Some of these investors are UK-based (including the state itself), and others are listed abroad. Foreign investment in domestic projects will be needed to supplement the £50 million made available by the UK Government in the 2025 Critical Minerals Strategy.

Cornish Metals, for example, received a non-binding letter of interest from the United States Export-Import Bank in 2025. Sent at a similar time to the UK-US MoU, this letter proposed a \$225m investment in the company’s tin mining operations at South Crofty.²³²

This level of investment could be pivotal for moving Cornish Metals’ operations from exploratory to commercial, providing the foundation for local job creation and improved social and physical infrastructure. As outlined in section 7, these are essential to contribute to a local just transition.

Questions remain, however, about the extent to which deals with foreign actors will truly maximise benefits for the UK. As the UK does not have a smelter, the tin and tungsten extracted in Britain's Southwest will need to be exported. Currently, only a high level preliminary assessment into the feasibility of building a smelter in the UK has been conducted.²³³ This will most likely be to the countries which are most heavily investing in these extraction projects, such as the United States. These raw products hold far less value than when minerals are processed. Exporting raw products also raises the environmental footprint of extracting and processing these minerals.

Another question concerns the risk involved in relying on foreign actors as major investors in critical minerals projects. This has recently been demonstrated through the case of British Lithium- whom French mining company Imerys hold an 80% stake. One of the two most advanced lithium extraction operations in the UK, British Lithium had hopes for providing 350 jobs once operational²³⁴ and contributing to 10% biodiversity net gain.²³⁵ However, in early 2026 the project was suddenly frozen and placed in a care and maintenance phase.²³⁶ Many employees lost their jobs overnight.

The example of Imerys British Lithium illustrates the vulnerability of projects essential to the UK's domestic mining ambitions, yet which do not have explicitly domestic interests at their core.

ii. International mining and the UK

Whilst MoU's could pave the way for different social and environmental impacts on domestic shores, they will also result in challenges and opportunities overseas.

In the MoU signed between the UK and Mongolia, for example, there is an intent to partner on surveying critical mineral resources, promoting trade partnerships, and 'upholding Environmental, Social and Governance standards and promoting transparency initiatives'.²³⁷ This aligns with the ambitions of the 2025 UK's Critical Minerals Strategy which target 'responsible and transparent supply chains', including, in international contexts, the 'greater adoption of responsible business practices that protect the local environment and surrounding communities'.²³⁸

However, there is a lack of clear regulations or implementation of internationally recognised mechanisms for social safeguarding practices in Mongolia. Research has found the Mongolian government has a poor record of ESG in relation to mining.²³⁹



The intentions and aspirations of MoU's are strong, but work is needed to establish how these partnerships will result in significant shifts to existing poor business practises.

The challenge of ensuring high ESG standards of mining overseas is significant. The traceability of minerals is notoriously difficult, with supply chain analyses struggling to quantify environmental impacts of extraction- let alone social impacts.²⁴⁰ Whilst technological improvements are touted as improving mineral traceability – such as blockchain – they are still surrounded by questions over transparency and accountability.²⁴¹

At the same time, the current challenges to traceability and supply chain analyses present a major opportunity for the UK. **As the global hub of mining finance, the UK can advance high ESG standards.**²⁴²

The London Metal Exchange (LME), for example, has introduced a digital ESG data platform, LMEpassport. In 2023, over 50% of LME-listed brands were sharing sustainability credentials on LMEpassport.²⁴³ Questions over the reliability and transparency of this data remain,²⁴⁴ but this is an important move to harness emerging technologies as a means of improving ESG standards. Much work is needed to understand the effectiveness of these standards and regulations, however.

Further questions remain over how the UK's engagements with international mining have repercussions for domestic operations. Too much attention to international projects risks domestic projects and local publics feeling abandoned and under-supported²⁴⁵; nascent operations have already started moving abroad to more favourable international contexts with greater financial support and lower energy costs (such as Less Common Metals moving to France²⁴⁶); and as already previously, the poor reputation of international mining has repercussions for local perceptions of mining within the UK.

Key points

- Domestic mining is influenced by actors and circumstances far beyond the UK.
- International investment will be essential for supporting UK mining projects. However, this raises questions over how such investment will affect the likelihood of projects delivering local social and environmental benefits.
- The UK has a major opportunity to set higher standards for international mining ESG practises. Greater clarification will be needed as to how this will occur, however.

10. Conclusion

This report began with two premises. Firstly, that the social and environmental dimensions of onshored critical minerals projects have been relatively neglected. Secondly, that these dimensions are inseparable from the UK's history of deindustrialisation.

Across four domains – environment, just transition, governance, and geopolitics – this report reviews and synthesises existing evidence on the social and environmental dimensions of critical minerals in the UK, identifying a set of interconnected challenges and opportunities:

- Onshoring has multiple environmental risks which could build on the historic impacts of mining in the UK. However, there are also opportunities for large-scale environmental restoration and building a circular economy.
- De-industrialised regions are complex and require more than jobs to achieve a just transition. The critical minerals industry provides a unique and crucial opportunity to achieve this.

- A lack of clarity over the scales of decision-making involved in the permitting, financing, and monitoring of critical minerals projects risks jeopardising social and environmental opportunities.
- Domestic mining is entangled with international actors, affecting the social and environmental challenges and opportunities of critical minerals in the UK.

Taken together, these findings point to a consistent pattern: while the UK has a growing understanding of risks and opportunities in principle, there remains limited clarity on how they will manifest and be navigated in practice. This is not simply a question of evidence gaps. It reflects deeper uncertainties around how knowledge is produced, shared, and used in decision-making.

The UK therefore faces a critical moment. There are clear opportunities across the supply chain, from recycling and circular economy development to new forms of extraction. However, there is a tension between the urgency of advancing projects and the need to understand their social and environmental implications. Efforts to streamline planning and permitting may support delivery, but risk undermining legitimacy if not grounded in a robust and transparent evidence base.

If the UK is to realise the ambitions of its Critical Minerals Strategy, greater attention must be paid to how knowledge and evidence are developed, coordinated, and applied across institutions and scales. Strengthening the relationships between research, governance, industry, and communities will be essential to ensuring that projects are not only viable, but credible and socially and environmentally responsible.

This report does not provide definitive answers. Rather, it sets out what is known, where key gaps remain, and why these matter. Addressing these gaps is not a secondary task, but a necessary foundation for the responsible development of critical minerals in the UK.



II. Endnotes

- 1 direct.mit.edu/glep/article/23/1/20/111308/The-Security-Sustainability-Nexus-Lithium
- 2 www.gov.uk/government/publications/uk-critical-minerals-strategy
- 3 See, for example, work by the British Geological Survey's Critical Minerals Intelligence Centre: ukcmic.org/reports/cmhc.html
- 4 For example: www.hilldickinson.com/our-view/articles/vision-2035-unlocking-government-support-for-uk-mining-projects/
- 5 For example: journals.sagepub.com/doi/full/10.1177/14614529231211746
- 6 www.sciencedirect.com/science/article/pii/S0301420718301296
- 7 iea.blob.core.windows.net/assets/ef5e9b70-3374-4caa-ba9d-19c72253bfc4/GlobalCriticalMineralsOutlook2025.pdf
- 8 tradingeconomics.com/commodity/lithium#:~:text=Mar/25-,Lithium,industrial%20metals%20to%20pull%20back
- 9 iea.blob.core.windows.net/assets/ef5e9b70-3374-4caa-ba9d-19c72253bfc4/GlobalCriticalMineralsOutlook2025.pdf
- 10 www.weforum.org/stories/2025/11/rare-earth-antimony-critical-mineral-supply/; <https://www.sfa-oxford.com/rare-earths-and-minor-metals/minor-metals-and-minerals/antimony-market-and-antimony-price-drivers/>
- 11 www.sciencedirect.com/science/article/abs/pii/S0016718517300787
- 12 www.iai.it/en/publications/c03/geopolitics-critical-minerals
- 13 www.oecd.org/en/topics/sub-issues/export-restrictions-on-critical-raw-materials.html
- 14 www.fastmarkets.com/insights/zimbabwe-imposes-immediate-ban-on-exports-of-raw-minerals-lithium-concentrates/
- 15 www.fastmarkets.com/insights/12-billion-us-critical-minerals-stockpile-could-tighten-supply-chains/
- 16 www.chathamhouse.org/about-us/our-departments-and-programmes/global-economy-and-finance-programme/critical-minerals
- 17 friendsoftheearth.uk/sustainable-living/whats-environmental-impact-critical-minerals
- 18 www.iconbooks.com/ib-title/extraction/
- 19 www.sciencedirect.com/science/article/pii/S0959652624040848
- 20 theconversation.com/drc-is-the-worlds-largest-producer-of-cobalt-how-control-by-local-elites-can-shape-the-global-battery-industry-236205
- 21 ejatlas.org/type/mineral-ore-exploration
- 22 brill.com/view/journals/arlp/9/1/article-p124_9.xml
- 23 www.sciencedirect.com/science/article/abs/pii/S2214790X17300060
- 24 www.sciencedirect.com/science/article/abs/pii/S0013935125027380
- 25 link.springer.com/article/10.1007/s00267-021-01426-5
- 26 www.sciencedirect.com/science/article/abs/pii/S2214790X17300205
- 27 opendocs.ids.ac.uk/articles/report/Bringing_Democracy_to_Governance_of_Mining_for_a_Just_Energy_Transition/26429260
- 28 www.theguardian.com/business/2024/sep/30/the-deep-history-of-british-coal-from-the-romans-to-the-ratcliffe-shutdown
- 29 visit.caerhays.co.uk/tag/sky-disk-of-nebra/; www.bbc.co.uk/news/uk-58946633
- 30 cornishmetals.com/project/uk/cornish-mining/
- 31 According to the BGS, 'Aggregates account for approximately 85 per cent of the non-energy minerals extracted in the UK', providing, 'employment for 88000 people: 38000 directly and 50000 indirectly' – www.bgs.ac.uk/mineralsuk/minerals/mine-and-quarry/construction-minerals/
- 32 Polyhalite is used as a fertiliser. www.icl-uk.uk/
- 33 mining.com.au/mining-is-no-longer-a-dirty-word-a-uk-perspective/
- 34 All aspects are quantified from data sourced from BGS World Mineral Production statistics, trade databases (UN Comtrade; UK Trade Information), industry and academic literature – nora.nerc.ac.uk/id/eprint/539735/1/OR24059.pdf
- 35 All aspects are quantified from trade databases (UN Comtrade; UK Trade Information) and UK economic statistics (Office of National Statistics) - nora.nerc.ac.uk/id/eprint/539735/1/OR24059.pdf
- 36 sarpublication.com/media/articles/SARJET_74_121-125.pdf
- 37 cornishlithium.com/trelavour-lithium-project
- 38 cornishlithium.com/geothermal
- 39 www.sciencedirect.com/science/article/pii/S0883292725001519
- 40 agupubs.onlinelibrary.wiley.com/doi/10.1002/9781119515005.ch2

41 For example: reset.web.ox.ac.uk/

42 www.chathamhouse.org/2025/07/how-uk-can-harness-power-research-its-industrial-strategy

43 For example: Descycle (www.descycle.com/); Ionic Technologies (ionictchnologies.com/); HyProMag (hypromag.com/)

44 assets.publishing.service.gov.uk/media/67e6b6034a226ab6c41b2040/critical-minerals-capability-assessment-frazer-nash.pdf

45 For example: www.bbc.com/news/articles/czxnv7y03nno

46 www.gov.uk/government/publications/uk-critical-minerals-strategy

47 www.tungstenwest.com/project

48 cornishlithium.com/

49 londonminingnetwork.org/get-informed/mining-and-london/

50 responsiblemining.net/what-we-do/standard/irma-mining-standard/

51 www.sciencedirect.com/science/article/pii/S2214790X25000140 ; www.sciencedirect.com/science/article/pii/S2214629622004157

52 journals.sagepub.com/doi/full/10.1177/08883254251403412

53 www.nature.com/articles/s41467-020-17928-5; www.nature.com/articles/s44358-025-00076-3

54 conbio.onlinelibrary.wiley.com/doi/10.1111/con4.70000

55 royalsocietypublishing.org/rspb/article/285/1892/20181926/79066/Mining-and-biodiversity-key-issues-and-research

56 www.nature.com/articles/s44358-025-00076-3

57 ui.adsabs.harvard.edu/abs/2025NRvEE...6..441G/abstract

58 Ibid.

59 Ibid.

60 www.nature.com/articles/s41597-022-01547-4 ; <https://www.nature.com/articles/s43247-023-00805-6>

61 ideas.repec.org/a/nat/natsus/v5y2022i10d10.1038_s41893-022-00921-9.html ; ideas.repec.org/a/eee/jrpoli/v67y2020ics0301420719307470.html

62 scholars.duke.edu/publication/1639279

63 onlinelibrary.wiley.com/doi/10.1111/gcb.70774?af=R

64 conbio.onlinelibrary.wiley.com/doi/10.1111/con4.70000

65 www.nature.com/articles/s41467-020-18661-9

66 scholars.duke.edu/publication/1639279

67 www.mdpi.com/1999-4907/10/9/747 ; www.semanticscholar.org/paper/A-global-review-of-the-threats-of-mining-on-and-Martins-Oliveira-Zanin/4141b109ded477fd3505b83da206ad6b0cf9fefd

68 pubmed.ncbi.nlm.nih.gov/41544950/

69 pubmed.ncbi.nlm.nih.gov/31028621/

70 Ibid.

71 www.sciencedirect.com/science/article/pii/S0960982217311077 ; ui.adsabs.harvard.edu/abs/2021JNatC..6226025M/abstract

72 esajournals.onlinelibrary.wiley.com/doi/full/10.1890/ES14-00421.1

73 esajournals.onlinelibrary.wiley.com/doi/full/10.1890/ES14-00421.1 ; www.jstor.org/stable/2404067?seq=1

74 www.sciencedirect.com/science/article/abs/pii/S0301479716302894

75 eprints.whiterose.ac.uk/id/eprint/215371/1/1-s2.0-S0960982224008959-main.pdf

76 www.science.org/doi/10.1126/sciadv.adl0335

77 Hyman, J., et al., Growing nickel supply from the tropics threatens priority conservation areas. *Nature Ecology & Evolution*, In Press.

78 research.lancaster-university.uk/en/publications/a-review-on-impact-of-mining-and-mineral-processing-industries-th/

79 www.pbl.nl/system/files/document/2024-02/PBL-2024-Environmental-impacts-of-extraction-and-processing-of-raw-materials-for-the-energy-transition-5364.pdf

80 www.sciencedirect.com/science/article/abs/pii/S1342937X25002151

81 scholars.duke.edu/publication/1639279

82 nora.nerc.ac.uk/id/eprint/9605/ ; tandfonline.com/doi/full/10.1080/00794236.2022.2058221

83 www.nature.com/articles/s44358-025-00076-3 ; royalsocietypublishing.org/rspb/article/285/1892/20181926/79066/Mining-and-biodiversity-key-issues-and-research

- 84 www.tandfonline.com/doi/full/10.1080/00794236.2022.2058221 ; journals.plos.org/plosone/article?id=10.1371/journal.pone.0136522
- 85 conbio.onlinelibrary.wiley.com/doi/10.1111/cobi.14261
- 86 www.gov.uk/government/publications/abandoned-metal-mines-in-england-baseline-length-of-rivers-and-estuaries-polluted-by-harmful-metals/abandoned-metal-mines-in-england-baseline-length-of-rivers-and-estuaries-polluted-by-harmful-metals
- 87 pubmed.ncbi.nlm.nih.gov/27023117/
- 88 assets.publishing.service.gov.uk/media/64a6d9c1c531eb000c64fffa/environmental-improvement-plan-2023.pdf
- 89 www.gov.uk/government/publications/abandoned-metal-mines-in-england-baseline-length-of-rivers-and-estuaries-polluted-by-harmful-metals/abandoned-metal-mines-in-england-baseline-length-of-rivers-and-estuaries-polluted-by-harmful-metals
- 90 ore.exeter.ac.uk/articles/journal_contribution/Mines_and_bats_the_impact_of_open-pit_mining_on_bat_activity/29774147
- 91 pubmed.ncbi.nlm.nih.gov/18193487/ ; pubs.acs.org/doi/10.1021/es4025904
- 92 ukcmic.org/downloads/reports/ukcmic-potential-for-critical-raw-material-prospectivity-in-the-uk-cr23024.pdf
- 93 ore.exeter.ac.uk/ndownloader/files/56857460
- 94 wires.onlinelibrary.wiley.com/doi/abs/10.1002/wat2.1201 ; onlinelibrary.wiley.com/doi/10.1111/gcb.16934
- 95 theriverstrust.org/rivers-report-2024
- 96 www.mdpi.com/2075-163X/12/7/848
- 97 ore.exeter.ac.uk/ndownloader/files/56857460 ; https://ideas.repec.org/a/nat/natsus/v7y2024i1d10.1038_s41893-023-01251-0.html
- 98 www.nature.com/articles/s43247-023-00805-6
- 99 royalsocietypublishing.org/rspb/article/285/1892/20181926/79066/Mining-and-biodiversity-key-issues-and-research
- 100 papers.ssrn.com/sol3/papers.cfm?abstract_id=4610350
- 101 www.csr.mq.edu.au/publications/transparency-on-greenhouse-gas-emissions-from-mining-to-enable-climate-change-mitigation
- 102 www.sciencedirect.com/science/article/pii/S0048969724055761
- 103 www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-particulate-matter-pm10-and-pm25
- 104 researchbriefings.files.parliament.uk/documents/CBP-9888/CBP-9888.pdf
- 105 www.nature.com/articles/s41598-026-36410-8
- 106 stateofnature.org.uk/wp-content/uploads/2023/09/TP25999-State-of-Nature-main-report_2023_FULL-DOC-v12.pdf
- 107 Ibid.
- 108 ideas.repec.org/a/eee/jrpoli/v67y2020ics0301420719307470.html
- 109 ukcmic.org/downloads/reports/ukcmic-potential-for-critical-raw-material-prospectivity-in-the-uk-cr23024.pdf
- 110 www.nature.com/articles/s41598-026-36410-8
- 111 www.thebiodiversityconsultancy.com/fileadmin/user_upload/A_cross-sector_guide_for_implementing_the_Mitigation_Hierarchy.pdf
- 112 Ibid.
- 113 www.icmm.com/achieving-nnl-or-ng-biodiversity
- 114 post.parliament.uk/research-briefings/post-pb-0045/
- 115 Ibid ; www.iea.org/reports/introducing-the-critical-minerals-policy-tracker
- 116 commonslibrary.parliament.uk/research-briefings/cdp-2025-0239/
- 117 www.gov.uk/government/publications/extractive-industries-transparency-initiative-payments-report-2018/mining-and-quarrying-in-the-uk
- 118 Ibid.
- 119 commonslibrary.parliament.uk/research-briefings/cdp-2025-0239/
- 120 mineralproducts.org/MPA/media/root/Publications/2023/Smart_Regulation_in_the_Mineral_Product_Sector_Apr2023.pdf
- 121 www.gov.uk/guidance/understanding-biodiversity-net-gain
- 122 Ibid.
- 123 cornishlithium.com/trelavour-lithium-project
- 124 www.nature.com/articles/s41893-022-00850-7

- 125 conbio.onlinelibrary.wiley.com/doi/full/10.1111/cobi.14198
- 126 ora.ox.ac.uk/objects/uuid:befca9ba-f293-485c-9539-4e697e91d396
- 127 stateofnature.org.uk/wp-content/uploads/2023/09/TP25999-State-of-Nature-main-report_2023_FULL-DOC-v12.pdf ; www.int-res.com/articles/cr2008/37/c037p077.pdf
- 128 www.gov.uk/government/publications/uk-critical-minerals-strategy/vision-2035-critical-minerals-strategy
- 129 www.jstor.org/stable/26393227 ; www.sciencedirect.com/science/article/pii/S0169204619302245
- 130 pubmed.ncbi.nlm.nih.gov/40900426/
- 131 umimpact.umt.edu/en/publications/international-principles-and-standards-for-the-ecological-restora/
- 132 pubmed.ncbi.nlm.nih.gov/40900426/
- 133 stateofnature.org.uk/wp-content/uploads/2023/09/TP25999-State-of-Nature-main-report_2023_FULL-DOC-v12.pdf
- 134 espace.library.uq.edu.au/view/UQ:304916
- 135 www.mdpi.com/2071-1050/14/17/10829
- 136 journals.plos.org/plosone/article?id=10.1371/journal.pone.0136522
- 137 pubmed.ncbi.nlm.nih.gov/40900426/
- 138 www.gov.uk/government/publications/uk-critical-minerals-strategy/vision-2035-critical-minerals-strategy
- 139 assets.publishing.service.gov.uk/media/67e6b6034a226ab6c41b2040/critical-minerals-capability-assessment-frazer-nash.pdf
- 140 Ibid.
- 141 www.iea.org/reports/recycling-of-critical-minerals
- 142 assets.publishing.service.gov.uk/media/67e6b6034a226ab6c41b2040/critical-minerals-capability-assessment-frazer-nash.pdf
- 143 Ibid.
- 144 pubs.rsc.org/en/content/articlelanding/2024/cs/d3cs00898c ; www.faraday.ac.uk/insights/insight-20-developing-a-uk-lithium-ion-battery-recycling-industry/
- 145 assets.publishing.service.gov.uk/media/67e6b6034a226ab6c41b2040/critical-minerals-capability-assessment-frazer-nash.pdf
- 146 www.lse.ac.uk/granthaminstitute/explainers/what-is-the-just-transition-and-what-does-it-mean-for-climate-action/
- 147 www.sciencedirect.com/science/article/pii/S0959378021001266
- 148 www.sciencedirect.com/science/article/pii/S2214790X20301982
- 149 For example: corporatejusticecoalition.org/resources/uk-critical-mineral-strategy/ ; londonminingnetwork.org/just-transition/ ; waronwant.org/resources/securing-justice-blueprint-uks-critical-minerals-strategy ; tjm.org.uk/wp-content/uploads/2025/05/Critical-minerals-critical-choices-.pdf
- 150 journals.sagepub.com/doi/full/10.1177/0957650917695448 ; media.rff.org/documents/UK_Report_-_with_Appendix.pdf
- 151 media.rff.org/documents/UK_Report_-_with_Appendix.pdf
- 152 socialmobility.independent-commission.uk/publication/state-of-the-nation-2025-the-evolving-story-of-social-mobility-in-the-uk/ ; www.economicsobservatory.com/how-has-deindustrialisation-affected-living-standards-in-the-uk ; lordslibrary.parliament.uk/regeneration-of-former-industrial-areas-in-the-uk/
- 153 www.economicsobservatory.com/how-is-regional-inequality-affecting-the-uks-economic-performance
- 154 Hinch, forthcoming.
- 155 www.tandfonline.com/doi/full/10.1080/00343404.2023.2224828#abstract
- 156 www.sciencedirect.com/science/article/pii/S0143622821000643
- 157 www.marjon.ac.uk/educational-isolation/The-Pretty-Poverty-Report.pdf
- 158 www.sciencedirect.com/science/article/pii/S0959378025000883
- 159 www.sciencedirect.com/science/article/pii/S2214629625000805
- 160 www.ey.com/en_gl/industries/energy-resources/mining-metals-digital-mine ; minerals.org.au/wp-content/uploads/2022/12/The-Future-of-Work-The-Changing-Skills-Landscape-for-Miners-February-2019.pdf
- 161 criticalmineralschallengecentre.co.uk/wp-content/uploads/2025/07/UK_Green_Skills_Agenda_Critical_Minerals_Challenge_Centre_Brief_3.pdf
- 162 www.automate.org/robotics/editorials/the-rise-of-autonomous-mining-trucks-and-robots
- 163 www.sciencedirect.com/science/article/pii/S2214790X21000046
- 164 Hinch, forthcoming.
- 165 www.iom3.org/resource/iom3-submits-report-on-critical-minerals-value-chain-skills-gaps-to-uk-government.html

- 166 celticseapower.co.uk/cornwall-flow-accelerator/ ; committees.parliament.uk/writtenevidence/133776/pdf/
- 167 internationalwim.org/wp-content/uploads/2022/12/ey-top-10-business-risks-and-opportunities-for-mining-and-metals-in-2023.pdf
- 168 www.cisl.cam.ac.uk/files/ilg_what_can_investors_do_about_decent_work.pdf
- 169 www.nature.com/articles/s41467-025-62905-5
- 170 criticalmineralschallengecentre.co.uk/wp-content/uploads/2025/07/UK_Green_Skills_Agenda_Critical_Minerals_Challenge_Centre_Brief_3.pdf
- 171 www.parliament.co.uk/mp/noah-law/debate/2024-12-03/commons/westminster-hall/critical-minerals-domestic-production
- 172 onlinelibrary.wiley.com/doi/abs/10.1111/dpr.12231
- 173 www.marjon.ac.uk/educational-isolation/The-Pretty-Poverty-Report.pdf
- 174 cioslep.com/lack-of-grid-capacity-undermines-uks-critical-minerals-strategy-and-the-development-of-a-uk-battery-supply-chain/
- 175 www.achilles.com/app/uploads/2025/01/AC1651-UK-Transition-to-Net-Zero-white-paper-V2-compressed_1.pdf ; www.nationalgrid.com/queue-management-next-step-accelerating-grid-connections
- 176 www.cpre.org.uk/wp-content/uploads/2023/11/State-of-Rural-Affordable-Housing_online.pdf
- 177 Hinch, forthcoming.
- 178 localtrust.org.uk/insights/research/communities-of-trust-why-we-must-invest-in-the-social-infrastructure-of-left-behind-neighbourhoods/
- 179 www.tandfonline.com/doi/full/10.1080/00343404.2023.2224828#abstract
- 180 Ibid.
- 181 www.sciencedirect.com/science/article/pii/S1755458621000724
- 182 intellectdiscover.com/content/journals/10.1386/jucs_00011_1
- 183 elibrary.utb.de/doi/abs/10.3224/bios.v31i2.04
- 184 www.taylorfrancis.com/chapters/edit/10.4324/9781003007494-5/everyday-resonances-industrial-pasts-amy-walker
- 185 www.taylorfrancis.com/chapters/edit/10.4324/9781315250304-15/exploring-sense-place-ethnography-cornish-mining-world-heritage-site
- 186 theconversation.com/as-mining-returns-to-cornwall-lithium-ambitions-tussle-with-local-heritage-260525
- 187 www.criticalmineral.org/projects-2
- 188 www.sciencedirect.com/science/article/pii/S2214790X21001623
- 189 www.sciencedirect.com/science/article/pii/S0301420725003022
- 190 foe.scot/press-release/communities-kept-in-the-dark-over-mining/
- 191 Hinch, forthcoming.
- 192 www.sustainability.com/insights/critical-minerals-how-the-mining-sector-can-accelerate-to-meet-energy-security-needs/
- 193 www.iom3.org/resource/getting-back-into-the-race.html
- 194 www.erm.com/about/news/reducing-delays-is-the-crucial-lever-to-driving-up-success-rates-for-critical-mineral-mining-projects-according-to-research-from-erm/
- 195 www.gov.uk/guidance/introduction-to-national-infrastructure-planning-guidance
- 196 www.legislation.gov.uk/ukpga/2008/29/contents
- 197 national-infrastructure-consenting.planninginspectorate.gov.uk/projects/BC0310001
- 198 www.gov.uk/guidance/nationally-significant-infrastructure-projects-2024-pre-application-prospectus
- 199 www.sciencedirect.com/science/article/pii/S0301421517308212#bib7
- 200 academic.oup.com/jel/article-abstract/25/1/33/575878
- 201 www.sciencedirect.com/science/article/pii/S0301421517308212#bib7
- 202 baumaninstitute.leeds.ac.uk/wp-content/uploads/sites/134/2017/11/Building-Democracy-Wright-and-Davis-2017.pdf
- 203 www.tandfonline.com/doi/full/10.1080/13549839.2018.1449821#d1e641

- 204 Hinch, forthcoming.
- 205 journals.sagepub.com/doi/10.1177/23996544251394531
- 206 journals.sagepub.com/doi/10.1177/0308518X18796511
- 207 assets.publishing.service.gov.uk/media/657b0d60095987001295e100/Cornwall_Devolution_Deal.pdf; www.cornwall.gov.uk/media/24dkjyyb/cornwall-good-growth-plan-update-03_03_2025.pdf
- 208 hansard.parliament.uk/commons/2025-07-17/debates/29013FE0-F51F-4C25-978A-EC412D0A8855/IndustrialStrategyCornwall (The Celtic tiger is a reference to Ireland's booming economy in the 1990s - journals.sagepub.com/doi/abs/10.1177/096977649800500402)
- 209 www.cornwall.gov.uk/people-and-communities/cornwall-devolution-deal/devolution-within-cornwall/
- 210 acss.org.uk/devolution-and-cornwall-when-one-size-doesnt-fit-all/
- 211 Ibid.
- 212 www.criticalmineral.org/_files/ugd/5caeff_4889b285b1f6477da8cf820c25bc81f5.pdf
- 213 www.bgs.ac.uk/mineralsuk/planning/uk-mineral-ownership/
- 214 www.criticalmineral.org/_files/ugd/5caeff_4889b285b1f6477da8cf820c25bc81f5.pdf
- 215 Ibid.
- 216 ukcmic.org/downloads/reports/ukcmic-mineral-rights-report-knightsplc.pdf
- 217 Based off conversation with Chris Yeomans from Neo Geo Resources.
- 218 v2.imarexpo.com/_media/content/64dd7c8d73a40-3a4b2f9bca17780c65dfcb5716c8205ffa98c0be.pdf?version=406
- 219 www.neogeo.uk/blog/pre-competitive-geoscience-data-the-first-barrier-to-a-uk-mining-growth
- 220 www.sciencedirect.com/science/article/pii/S2214790X23001181
- 221 Ibid.
- 222 www.gov.uk/government/news/uk-and-us-sign-memorandum-of-understanding-on-critical-minerals
- 223 www.gov.uk/government/publications/ukkazakhstan-strategic-partnership-and-cooperation-agreement-cs-kazakhstan-no12025
- 224 www.gov.kg/ru/post/s/25846-ministrler-kabineti-zana-uluu-britaniya-zana-tunduk-irlandiya-birikken-koroldugunun-okmotu-kritikalyk-maaniluu-mineraldar-boyunca-memorandumga-kol-koyustu
- 225 www.gov.uk/government/publications/industrial-strategy-partnership-joint-statement-between-the-uk-and-france/joint-statement-uk-france-industrial-strategy-partnership
- 226 www.gov.uk/government/publications/uk-japan-critical-minerals-memorandum-of-cooperation
- 227 www.bgs.ac.uk/news/bgs-agrees-to-establish-collaboration-framework-with-ukrainian-government/
- 228 eastasiaforum.org/2026/01/20/social-protections-overlooked-in-mongolia-uk-critical-minerals-cooperation/
- 229 www.gov.uk/government/publications/critical-minerals-uk-indonesia-memorandum-of-understanding/memorandum-of-understanding-between-the-ministry-of-energy-and-mineral-resources-of-indonesia-and-the-foreign-commonwealth-and-development-office-of
- 230 www.hsframer.com/insights/2026-02/uk-governments-vision-2035-critical-minerals-strategy-opportunities-and-fdi-implications
- 231 www.sciencedirect.com/science/article/pii/S2214790X23001181
- 232 www.londonstockexchange.com/news-article/TIN/loi-from-export-import-bank-of-the-united-states/17447236
- 233 cmga.org.uk/case-study/tin-smelter-preliminary-assessment-executive-summary/
- 234 imerysbritishlithium.com/
- 235 imerysbritishlithium.com/environmental-impact
- 236 imerysbritishlithium.com/news/imerys-british-lithium-project-placed-care-and-maintenance
- 237 eastasiaforum.org/2026/01/20/social-protections-overlooked-in-mongolia-uk-critical-minerals-cooperation/
- 238 CMS.

- 239 eastasiaforum.org/2026/01/20/social-protections-overlooked-in-mongolia-uk-critical-minerals-cooperation/
- 240 link.springer.com/chapter/10.1007/978-3-032-00182-5_1 ; www.sciencedirect.com/science/article/pii/S0959378024000451
- 241 www.sciencedirect.com/science/article/pii/S096262982100041X
- 242 www.rusi.org/explore-our-research/publications/occasional-papers/uks-role-advancing-responsible-transition-minerals-supply-chains
- 243 www.lme.com/trading/initiatives/lmepassport
- 244 www.sciencedirect.com/science/article/pii/S2589811625000011
- 245 Hinch, forthcoming.
- 246 lesscommonmetals.com/less-common-metals-establishes-strategic-presence-in-france-to-support-eu-supply-chains/

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