



Enabling the UK's Green Industrial Revolution

# A Blueprint for Responsible Sourcing of Critical Minerals

Environmental, Social and Governance (ESG)

**THE CRITICAL MINERALS ASSOCIATION**  
ESG WORKING GROUP

# Critical Minerals Association

## ABOUT THE CRITICAL MINERALS ASSOCIATION (CMA)

The Critical Minerals Association (CMA) is a key interlocutor between the UK Government and the critical minerals industry.

Our mission is to support the development of socially and environmentally responsible critical mineral supply chains for the UK's security of supply.

The Critical Minerals Association unites industry, academia, and other stakeholders to address risks in critical mineral supply chains. We enable industry to generate a collective voice when outlining concerns and future recommendations, providing a direct line of communication between industry and government.

We aim to improve societal perceptions of the sector by showcasing the economic and social benefits of critical minerals. We work to ensure our critical minerals extraction and processing adhere to internationally recognised standards and best practice.

The Critical Minerals Association provides the Secretariat to the All-Party Parliamentary Group (APPG) for Critical Minerals, established by Steve Double MP in February 2020.

## PURPOSE OF THIS PAPER

The purpose of this paper is to outline the challenges and opportunities for the UK to be a world leader in mining and sourcing critical minerals responsibly.

Critical minerals are essential to enable the UK's Green Industrial Revolution and this paper intends to help the UK Government navigate the complex landscape of Environmental, Social and Governance (ESG) in mining.

We present a number of recommendations for the UK Government to consider what measures it could take to ensure that critical minerals are sourced in a responsible way.



## CMA REPORT CONTRIBUTORS

Aldo Pennini, Associate, Satarla  
 Alex Dawson, Senior ESG Advisor, Tungsten West  
 Brett Grist, Exploration Manager, Cornwall Resources  
 Chris O'Brien, Senior ESG Consultant, SRK  
 Dominic Wells, Senior Analyst, Roskill  
 Fiona Cessford, Corporate Consultant, SRK  
 Jane Joughin, Corporate Consultant, SRK  
 Jeff Townsend, Co-founder, CMA  
 Kirsty Benham, Co-founder, CMA  
 Laurens Tijsseling, Sustainability Manager, Minviro  
 Lucy Crane, Senior Geologist, Cornish Lithium  
 Marla Gale, VP Communications, Dalradian  
 Phoebe Dawes, Independent Researcher  
 Puruvi Poddar, Chief - Corporate & Business Development, Tirupati Graphite  
 Sarah Gordon, CEO, Satarla  
 Veera Johnson, Co-founder, Circulor  
 Yue Jin Tay, Director, Circulor

## EXTERNAL CONTRIBUTORS

Cameron Scadding, Managing Director, Source Certain  
 Jamie Strauss, Founder, Digbee  
 Molly Czachur, Science Communications Manager, NatureMetrics  
 Nathan Dubrich, Head of Sales, Source Certain  
 Kat Bruce, Chief Technical Officer, NatureMetrics  
 Vere Ross-Gillespie, Head of Extractives, NatureMetrics

## REPORT COORDINATOR

Olimpia Pilch, Business Development & Communications Associate, CMA  
 olimpia@criticalmineral.org

## ACKNOWLEDGEMENTS

This report is the product of liaising with various industry members, organisations, consultants and analysts within the mining, processing, financial and technological industries and ESG (Environmental, Social, Governance) fields. We wish to thank all the contributors who have helped to shape this report with their ideas and expert insight.

We are thankful for all our report contributors who have volunteered their time to shape this report and provide material in their field of expertise. Including those that have worked behind the scenes to guide, direct and refine this report.

We would like to extend our gratitude to our ESG Working Group Chair, Aldo Pennini, for guiding discussions and his significant contributions to the report.

We would like to thank our ESG Working Group members for attending meetings and engaging in discussions and providing insights into the challenges faced by the mining industry.

A special thanks to Fiona Cessford for putting together the mining 'ecocosm' and providing expert ESG knowledge.

A further thanks to all those that have provided feedback and were involved in the editing and proofreading of this report, as well as creative direction, including Ian Townsend, Rock Art Consulting and James Blight, Cornwall Resources.

## DESIGN

Infographic design by Mark Mitchell.  
 Report design by Miguel Hernández Véliz.



# Contents

Contents	4
<b>Abbreviations &amp; Acronyms</b>	<b>5</b>
<b>Executive Summary</b>	<b>6</b>
<b>Recommendations</b>	<b>8</b>
<b>1. Critical Minerals &amp; UK's Clean Growth Agenda</b>	<b>10</b>
1.A   UK CRITICAL MINERALS 'ECOCOSM'	13
<b>2. Importance of Sourcing Critical Minerals Responsibly</b>	<b>16</b>
2.A   WHAT IS ESG?	18
2.B   DOWNSTREAM DEMAND FOR CRITICAL MINERALS	21
2.C   CHALLENGES IN PHYSICAL MINING	24
2.D   ESG STANDARDS	26
<b>3. Blueprint</b>	<b>27</b>
3.A   UK ESG LEADERSHIP OPPORTUNITY	27
3.C   DRIVING COLLABORATION	40
3.D   CONCLUDING STATEMENT	43
<b>4. Case Studies</b>	<b>44</b>
4.A   CIRCULOR: SUPPLY CHAIN TRACEABILITY	44
4.B   MINVIRO: LIFE CYCLE ASSESSMENT	45
4.C   SOURCE CERTAIN: PROVENANCE OF RAW MATERIALS	46
4.D   TUNGSTEN WEST: HEMERDON MINE	47
4.E   DALRADIAN: PROPOSED NET ZERO MINE	48
4.F   CORNISH LITHIUM: LITHIUM EXTRACTION	49
4.G   NATUREMETRICS: INNOVATION IN BIODIVERSITY	50
4.H   DIGBEE: ESG DISCLOSURE	51
4.I   TIRUPATI GRAPHITE: MINIMISING WASTE	52
<b>5. Appendix A: Proposed ESG Rating System Considerations &amp; Example</b>	<b>54</b>
<b>6. Appendix B: Alignment of Blueprint with UN SDGs</b>	<b>56</b>
<b>7. Appendix C: Standards &amp; Frameworks</b>	<b>58</b>
<b>8. References &amp; Sources</b>	<b>76</b>

# Abbreviations & Acronyms



<b>APPG:</b> All-party Parliamentary Group	<b>HMRC:</b> Her Majesty's Revenue and Customs
<b>ASM:</b> Artisanal and Small Scale Mines	<b>ICMM:</b> International Council on Mining and Metals
<b>BEIS:</b> Department for Business, Energy and Industrial Strategy	<b>IFC:</b> International Finance Corporation
<b>BGS:</b> British Geological Survey	<b>IRMA:</b> Initiative for Responsible Mining Assurance
<b>CEMI:</b> Centre for Excellence in Mining Innovation	<b>JVs:</b> Junior Ventures
<b>CMA:</b> Critical Minerals Association	<b>LCA(s):</b> Life Cycle Assessment(s)
<b>COP26:</b> 26th UN Climate Change Conference of the Parties	<b>LME:</b> London Metals Exchange
<b>CRC:</b> Carbon Reduction Commitment Energy Efficiency Scheme	<b>LSE:</b> London Stock Exchange
<b>CSR:</b> Corporate Social Responsibility	<b>LSEG:</b> London Stock Exchange Group
<b>DIT:</b> Department for International Trade	<b>MMSD:</b> Mining, Minerals and Sustainable Development Project
<b>DLE:</b> Direct Lithium Extraction	<b>NGOs:</b> Non-governmental Organisation
<b>DRC:</b> Democratic Republic of Congo	<b>OECD:</b> Organisation for Economic Co-operation and Development
<b>EITI:</b> Extractive Industries Transparency Initiative	<b>OEMs:</b> Original Equipment Manufacturer
<b>EPC:</b> Energy Performance Certificate	<b>PE:</b> Performance Expectations
<b>EPRM:</b> European Partnership for Responsible Materials	<b>PFS:</b> Pre-Feasibility Study
<b>ESG:</b> Environmental, Social and Governance	<b>REE(s):</b> Rare Earth Element(s)
<b>ESIA(s):</b> Environment and Social Impact Assessment(s)	<b>RMI:</b> Responsible Mining Index
<b>ESOS:</b> Energy Savings Opportunities Scheme	<b>ROI:</b> Return on Investment
<b>EU:</b> European Union	<b>SASB:</b> Sustainability Accounting Standards Board
<b>EVs:</b> Electric Vehicles	<b>SCI:</b> Source Certain International
<b>FCDO:</b> Foreign Commonwealth and Development Office	<b>SDG(s):</b> Sustainable Development Goal(s)
<b>GHG:</b> Greenhouse Gas Emissions	<b>SECR:</b> Streamlined Energy and Carbon Reporting
<b>GMI:</b> Global Mining Initiative	<b>STEM:</b> Science, Technology, Engineering, Mathematics
<b>GTAG:</b> Green Technical Advisory Group	<b>TCA:</b> Trade and Cooperation Agreement
<b>HMLR:</b> Her Majesty's Land Registry	<b>TSM:</b> Towards Sustainable Mining
	<b>UK:</b> United Kingdom
	<b>UN:</b> United Nations

# Executive Summary

## Enabling UK's Green Industrial Revolution: A Blueprint for Responsible Sourcing of Critical Minerals

Critical minerals are the building blocks of renewable energy technologies and essential in enabling the UK's Green Industrial Revolution. We need these materials for technologies such as: wind turbines, solar panels, electric vehicles and battery storage.

It is critical that the materials we use in these green technologies are responsibly sourced, adhering to world-class Environmental, Social & Governance (ESG) standards, managing environmental impacts, respecting human rights, minimising greenhouse gas emissions and supporting local communities.

This paper provides a blueprint for the responsible sourcing of critical minerals for the UK. The UK has a long history of leadership in advancing universal values on human rights and environmental protection. 'Global Britain' offers a platform to lead in the renewable energy transition and set an example for responsible sourcing in the international critical minerals value chain.

This paper covers the key points needed to understand responsible mining. What is ESG? Why does ESG matter in mining? Who is driving the ESG agenda forwards and why? Why is ESG so challenging in the critical minerals sector? How can investors, governments and consumers place ESG expectations on critical minerals development? How can companies demonstrate that good ESG practice has been implemented? The Critical Minerals Association (CMA) offers insights to these questions from experts across the industry.

Comparisons of ESG performance are challenging as every critical mineral project is unique – there is no one-size-fits-all approach. The same mineral can have different geological and geographical origins, different processing needs, and different ESG considerations. The appendix provides an overview of over 30 ESG standards and legislations that companies may need to consider.

The UK critical minerals 'ecocosm' is diverse, complex and technically challenging. Our 'ecocosm' diagram demonstrates the entire value chain from exploration, through mining, to processing, smelting, manufacturing and recycling or re-use. The UK has an opportunity to influence global trends through:

- Life Cycle Assessments (e.g. Minviro) finding project-specific solutions to decrease that project's carbon footprint;
- Blockchain and traceability technologies (e.g. Circulor) verifying ESG claims and tracking materials from source to product;
- UK mineral exploration and mining projects (e.g. Cornish Lithium, Cornish Metals, Tungsten West, Dalradian, Cornwall Resources) responsibly sourcing critical minerals.

The UK has the opportunity to set an example for other nations to follow, by supporting its ESG-oriented domestic mining sector, and extending its influence through a variety of UK-owned internationally located critical mineral projects.

Throughout the paper, we link our recommendations to the UN's Sustainable Development Goals (SDGs) providing a global framework against which to demonstrate the role critical minerals play in helping communities, industries and countries achieve these goals including by:

- Supporting job creation in host communities;
- Providing minerals and metals for the electric vehicles and renewable energy infrastructure that will enable a low carbon economy;
- Committing to diversity and inclusion in the workplace;
- Investing in schools and hospitals;
- Developing mines that reduce impact on the environment and protect water resources and biodiversity;
- Working in partnership with stakeholders to address challenges and create new opportunities from mining investments;
- Committing to ethical business practices and high standards of governance in the UK and wherever CMA members operate in the world.



Critical minerals are essential to implement the UK's Green Industrial Revolution. To position the UK as a champion of responsibly sourced critical minerals we need to change the narrative away from negative associations with the extractive industry, towards supporting clean and community-focused ways of mining. To do this, this paper has proposed eight recommendations to the UK Government, which will be expanded throughout the paper.



# Recommendations

The CMA recommends the UK Government takes urgent action with respect to the following, with linkages to the UN's Sustainable Development Goals highlighted where relevant:

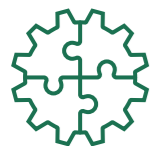


## 1. UK LEADERSHIP ON ESG IN THE CRITICAL MINERALS SECTOR (SDG 7, 12 AND 13)



### STATEMENT OF COMMITMENT FROM THE UK GOVERNMENT

- The UK Government should make a clear statement of commitment prioritising domestic production of critical minerals. This would send a positive message to markets that the UK welcomes investment in the sector.



### RESPONSIBLE VALUE CHAIN ESG RATING SYSTEM

- Support and enable the development of a streamlined and equivalency based ESG performance rating system for domestically produced and externally sourced critical minerals. The rating system would apply to the whole minerals value chain from exploration, through development, production, and processing, to manufacturing, reuse and recycling activities.



## 2. ENABLING RESPONSIBLE INVESTMENT IN UK CRITICAL MINERALS (SDG 4, 8, 9 AND 16)



### ACCESS TO CAPITAL, SETTING EXPECTATIONS, RESPONSIBLE SOURCING, AND INNOVATION

- Establish a regulatory framework for the green finance sector as outlined in Lord Jonathan Hill's UK Listing Review 2021, to enhance access to capital for ESG compliant critical mineral companies and investors, both national and international.
- Explore the application of company law, or amendment, to set expectations of UK companies on ESG performance and disclosure.
- Promote innovation in the critical minerals supply chain through government investments, as well as incentivising private sector investment in new technologies to support responsible production and sourcing of critical minerals. Promote investment in technology innovation to make UK a green energy leader.



### SUPPORTING A TALENT PIPELINE

- Promote and incentivise provision of science, technology, engineering, mathematics (STEM) and geoscience-based courses in secondary, technical and tertiary education sectors to create a talent pipeline for a growing critical minerals industry and support the Green Energy Transition.



### STREAMLINING PLANNING AND PERMITTING

- Establish an enabling environment for developing and growing a domestic critical minerals sector by streamlining processes, improving coordination across the planning and permitting systems.
- Provide regular training events for planning/permitting decision makers on critical minerals exploration, mining, processing, infrastructure/ service needs, ESG, mine closure and stakeholder engagement.



## 3. DRIVING COLLABORATION (SDG17)



### CENTRAL COORDINATING BODY

- Establish a central coordinating body in the Department for Business, Energy & Industrial Strategy (BEIS) to drive the streamlining of planning and permitting systems with the aim of increasing investment in critical mineral production, enhancing stakeholder engagement and incentivising the application of good ESG practice. The CMA offers to provide experts from within its membership to support the body's work.



### MULTI-STAKEHOLDER FORUM

- Establish a multi-stakeholder forum for creating collaborative space to design the proposed ESG rating system and develop a roadmap for implementing other recommendations set out in this report.



### INTERNATIONAL COLLABORATION

- Encourage collaboration between the Department for Business, Energy and Industrial Strategy (BEIS) and the Department for International Trade (DIT) with other areas of government to position the UK as an international leader on critical minerals by incorporating ESG expectations in trade agreements.
- Actively promote and influence multilateral discussions on establishing a global approach to ESG in critical minerals supply chains, leveraging the UK's vast diplomatic network, financial markets and other international relationships.



# 1. Critical Minerals & UK's Clean Growth Agenda

In December 2020, the UK Prime Minister set out an ambitious emissions target, setting the UK on the path to net zero by 2050, through reducing the UK's greenhouse gas emissions by at least 68% by 2030 when compared to 1990 levels. This commitment (the UK's Nationally Determined Contribution) under the Paris Climate Agreement is the fastest rate for any major economy. The target follows the Prime Minister's Ten Point Plan to create and support 250,000 jobs while eradicating our contribution to climate change.

However, the transition to renewable energy is a hugely mineral intensive undertaking. Low carbon technologies such as wind turbines, solar panels, and batteries require a whole suite of raw materials to be extracted to meet their rising demand.

The UK's Green Industrial Revolution cannot be delivered without significant use of raw materials. Products of mineral extraction such as copper, tin, rare earth elements (REEs) and lithium are needed to build the low carbon technologies required to reduce our reliance on fossil fuels. There is a myriad of potential negative impacts associated with the extraction and processing of these critical raw materials, dependent on where and how they are produced – for example, the impact on local water supplies of producing lithium via solar evaporation in the Atacama Desert in South America, or the potential use of child labour to extract cobalt in the Democratic Republic of Congo (DRC). Conversely, there are opportunities and positives associated with the industry that can support the United Nations 2030 Agenda for Sustainable Development, with the 17 Sustainable Development Goals (SDG) at its heart<sup>2</sup>.

There is an increasing need to find new sources of critical raw materials to support the Green Industrial Revolution (SDG7, affordable and clean energy). Appendix B (p.56) illustrates how this blueprint is supporting the SDGs. Recycling the materials that are currently in circulation alone cannot meet this increasing demand. The World Bank estimates humanity has extracted 550 million metric tons of copper over the past 5000 years. They now estimate society needs to extract the same amount again over the next 25 years if it is to build enough low carbon technologies to tackle climate change and stay within the 2°C scenario for global warming.



## What is a critical mineral

Critical minerals are metals and non-metals that are considered vital for the economic well-being of the world's major and emerging economies, yet whose supply may be at risk due to geological scarcity, geopolitical issues, trade policy or other factors.

Critical mineral lists vary from country to country:

- Canada's 2021 list includes 31 critical minerals;
- Australia's 2020 list includes 24 critical minerals; whilst,
- the EU identified 31 critical raw materials in 2020.

Unlike other major economies, the UK currently does not have a defined critical mineral list.

The World Bank estimates a 965% increase in lithium demand, from 2017 production levels to 2050, due to its use in lithium-ion batteries that are used to power Electric Vehicles (EVs). Likewise, they estimate a 585% increase in demand for cobalt and a 7% increase for copper.<sup>3</sup>

It is essential the UK supply chain focuses on sourcing critical raw materials in a secure, sustainable manner to support its battery manufacturing and zero-carbon ambition (SDG12, responsible consumption and production).

The automotive industry is hugely important to the UK economy, generating more than £78.9 billion turnover and adding £15.3 billion in value<sup>4</sup>. As the industry transitions to producing EVs, the new Rules of Origin<sup>5</sup> associated with the UK's Brexit deal with the EU mean the UK must also start producing batteries on shore – and battery components.

The UK Government needs to support and encourage UK supply chains to incorporate responsibly sourced critical minerals in the manufacture of emerging technologies. Ensuring that critical mineral extraction is contributing positively to a just transition (SDG8, decent work and economic growth and SDG11, sustainable cities and communities), rather than leaving a legacy of environmental and social damage, as has been the case with some mineral extraction in resource-rich regions to date.

The UK Government also has the opportunity to improve its domestic critical minerals sector by providing necessary support to promote responsible extraction of key technology metals such as tin, tungsten, lithium and copper located within the UK and extend its influence of good international industry Environment, Social and Governance (ESG) practice expectations to international extensions of the critical minerals 'ecocosm'. The image below demonstrates the UK's potential for sourcing critical minerals domestically.



## Rules of Origin in the UK-EU Trade and Cooperation Agreement (TCA)

TCA allows businesses to trade goods between the UK and the EU on a tariff-free and quota-free basis as long as the exported goods originate in the UK or an EU Member State.



## Annex Governing the Automotive Industry

The annex recognises certain UN type-approvals and provides easements on the rules of origin requirements on electric batteries, EVs and, associated parts.

A six-year phase in period, temporarily relaxes the origin requirements of qualifying goods:

EVs and hybrids will need to meet 40% EU or UK content requirement, rising to the 55% in 2027;

Batteries and their associated parts will initially need to meet 30% EU or UK content requirements, rising to 65% in 2027.

<sup>2</sup>United Nations, 'Sustainable Development Goals', 2021. <https://sdgs.un.org/goals>

<sup>3</sup>The World Bank, 'Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition', 2020.

<sup>4</sup>SMMT, 'UK Automotive', 2021. <https://www.smmmt.co.uk/industry-topics/uk-automotive/>

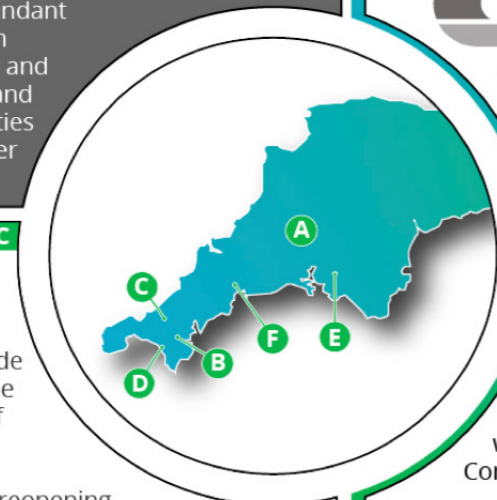
<sup>5</sup>Brunch, M. & Jones S., 'What rules of origin requirements mean for UK-EU trade'. EY. 2021. [https://www.ey.com/en\\_uk/law/state-aid-uk-subsidies-control](https://www.ey.com/en_uk/law/state-aid-uk-subsidies-control)



The UK has the potential to host all steps of the critical minerals value chain; from exploration and discovery of new deposits, through extraction and processing - generating jobs, to recycling, ensuring waste is minimised. All of the above lead to an increase in trade.



**i** Why the focus on Cornwall & the south west?  
In two words: **natural capital**  
Cornwall hosts abundant mineralisation, with historic **tin, copper** and **tungsten** mining, and modern opportunities in **lithium** and other critical metals.



**Cornish Metals** South Crofty mine, Cornwall. High-grade tin and copper mine with long history of production.

Potential for rapid reopening. Recent copper and tin discoveries on additional mineral rights areas.

**Osprey Mining** Great Wheal Vor Project, Cornwall. High grade tin; richest tin mine in world in 1800s. Drilling planned for Q2 2021.

Employment impact: ~200 direct jobs

**Tungsten West** Recently acquired the Hemerdon tungsten mine in Devon, at which £100M already spent. Preparing for restart of operations.

Employment impact: ~200 direct jobs

**British Lithium** Hard-rock lithium exploration. Has identified lithium resource near St Austell, Cornwall

**Critical Minerals Association** Delivering supply for Britain's modern economy

**A** **Cornwall RESOURCES**

**Redmoor project**, Cornwall. Tungsten, tin, copper. One of the **largest undeveloped deposits** of its type in the world.

Employment impact: ~200 direct jobs

Time to opening: **6 years** (With govt. support)

**3 years** (With govt. support)

**B** **Cornish Lithium**

**Lithium** in geothermal waters and in hard rock, Cornwall.

Employment impact: ~100 jobs

Time to operation: **5 years** (With govt. support)

**3 years** (With govt. support)

**DALRADIAN GOLD** **CornishMetals**

**TUNGSTEN WEST**

**G** **Vale** adds value in the UK at its refineries at Clydach in Wales and Acton in W. London. Producing materials containing nickel, PGEs, and precious metals.

Employment: ~240 (Clydach)

**Ni** Nickel

☺ = 10 direct jobs created in a mine or extractive operation  
Each new extractive industry job generates 1-3 jobs in community, bolstering the local economy

CMA UK Mining Members

## 1.A | UK CRITICAL MINERALS 'ECOCOSM'

The Critical Minerals Association has mapped the areas in which the UK influences national and global critical mineral supply chains and ESG in mining. These are:

### • UK SUPPORT SERVICES

- Civil society
- Consultants
- Contractors
- Financial services
- Industry and professional associations
- Insurance
- Non-Governmental Organisations (NGOs)
- Scientists and researchers
- Technology and equipment suppliers
- Universities

### • UK LOCATED CRITICAL MINERAL INDUSTRIES

### • UK OWNED BUT INTERNATIONALLY LOCATED INDUSTRIES

### • FOREIGN OWNED INTERNATIONAL LOCATED INDUSTRIES SUPPLYING THE UK MARKET OR SUPPORTED BY UK SUPPORT SERVICES

The CMA has termed this map an 'ecocosm'. The 'ecocosm' outlines the entire value chain from exploration, through mining, to processing, smelting, manufacturing and recycling or re-use. Mineral exploration, mining and processing within the UK are currently relatively limited in comparison to developed mining jurisdictions such as Australia or Canada. However, the manufacturing, recycling and support services within the 'ecocosm' are well represented in UK with a global reach.

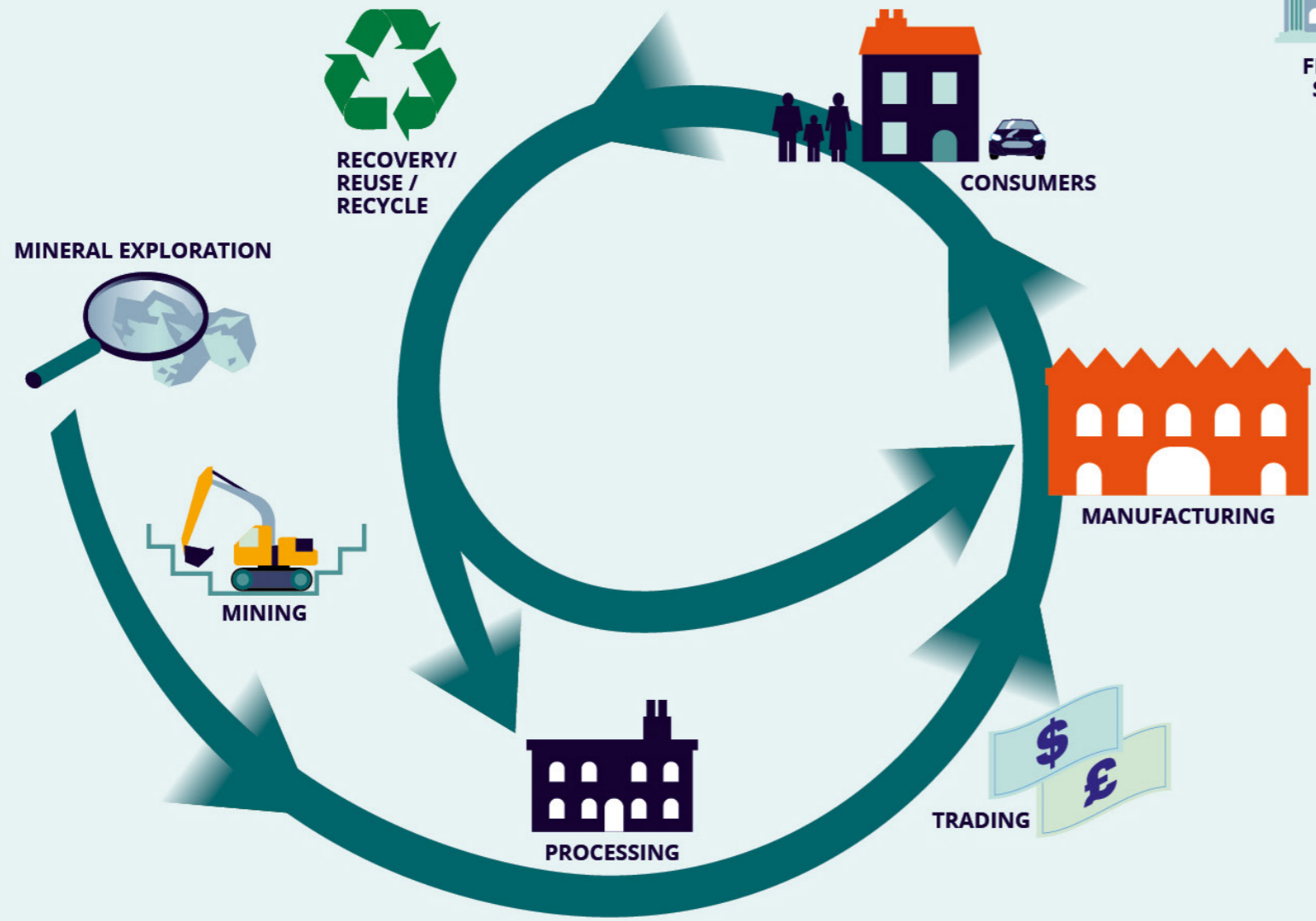
Although occurrence of critical minerals is restricted by geology and geography, the UK hosts significant potential for responsible sourcing of lithium, tin, tungsten and copper in the South West of England. Further, in line with SDG 17<sup>6</sup> the UK has the opportunity to extend global influence and lead the way in responsible sourcing of critical minerals via UK-owned, international sources and foreign-owned international supplies, as well as through our extensive support industries such as financing, insurance and development of the talent pipeline.

<sup>6</sup>SDG 17: Strengthen the Means of Implementation and Revitalise the Global Partnership for Sustainable Development.



# THE UK'S ROLE IN THE CRITICAL MINERALS 'ECOCOSM'

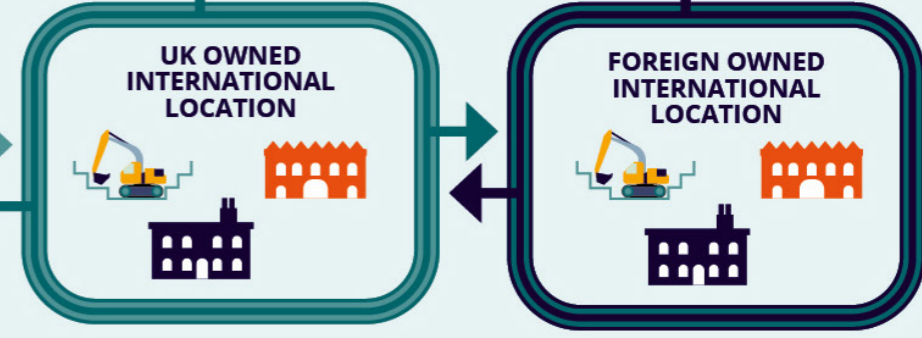
## UK GOVERNMENT REGULATED UK LOCATED CRITICAL MINERALS



## UK GOVERNMENT REGULATED UK SUPPORT SERVICES



## INTERNATIONAL TRADE





# 2. Importance of Sourcing Critical Minerals Responsibly

As we move towards a green economy and technologies requiring critical minerals, it is imperative we support responsible mining practices to achieve this.

Unregulated and poor industry practice in the past has led to a range of issues spanning tailings failure disasters, acid mine drainage pollution, destruction of areas of rich biodiversity, human rights violations and exploitation of local communities.

The effect of these poor ESG practices often continues to impact local communities long after the cessation of mining activity in the area.



Source: Cemaes.

### Parys Mountain, Wales

Parys Mountain is the site of a large copper mine extensively exploited in the late 18th century. Abandoned for decades, the mine is a source of one of Britain's biggest pollutants.

Despite expensive clean-up costs (e.g. £400,000 grant from the Welsh Assembly to tackle settlement ponds) and the Environmental Agency's effort to remove an underground dam to prevent potential discharge of acid mine water, the site remains far from recovered. Historic mines around the UK serve as a reminder of the importance of upholding best ESG practices, highlighting the environmental and economic benefit of early prevention



### Brumadinho, Brazil

The Brumadinho dam disaster in Brazil in 2019 led to the death of 270 employees and local residents. The tragedy sparked a sweeping response from stakeholders including the Church of England pension fund, who together are working hard to ensure such disasters never occur again.

### Other Examples

Poor mining practices include: acid leaching in heavy rare earth element extraction in Southern China; use of mercury in artisanal gold mining; use of coal-fired plants for highly energy intensive mineral extraction processes in places such as South Africa; and unethical exploitation of local workforce and communities often to support ongoing conflicts.



In well-regulated jurisdictions, using modern mining practices, critical mineral companies can operate in a responsible manner. Mining companies, in addition to their own internal expectations of good practice, are incentivised by external stakeholders as outlined in this paper – such as investors, insurers, supply chain, government, society – to meet externally imposed ESG expectations.

External stakeholders, including governments, have a key role to play in championing and developing responsible critical mineral supply chains. Yet, supply chains remain flooded with critical minerals from mines and areas that do not adhere to good international industry practices, primarily due to lack of application of ESG and resultant lower price of product.

When done responsibly, the development of minerals projects can contribute positively to the local area: creating both direct and indirect jobs, upskilling the local workforce and boosting the local economy through the creation of infrastructure and amenities. Following the end of the mine life, remediation of sites can provide revitalised environments for recreation, as well being repurposed to continue to generate revenue for the area e.g. the Eden Project in Cornwall. However, not all mines are suitable to be repurposed for public use.

### South Crofty, Cornwall, UK

The South Crofty tin and copper mine in Cornwall has seen production for over 400 years. Following pilot-scale water treatment trials, Cornish Metals received environmental permits to abstract, treat and discharge mine water in order to dewater the mine.

South Crofty is an example of how potential reopening and production at historic mine sites could mitigate legacy issues around acid mine drainage.



## 2.A | WHAT IS ESG?

ESG stands for **'Environment, Social and Governance'**. The term derives from the concepts of 'socially responsible investing' and 'sustainable development' that emerged in the 1960s and 1970.

**'Socially responsible investing'** relates to investors excluding stocks or industries from their portfolios deemed not socially responsible (e.g. tobacco production).

**'Sustainable development'** is centred on promoting equitable human progress that is also in balance with the natural world. Over the decades, aspects of sustainable development have been referred to as 'corporate social responsibility', 'sustainability' and 'social licence to operate'. In 1987, the term 'sustainable development' was defined in a seminal report by the World Commission on Environment and Development as:

*"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs".<sup>7</sup>*

More recently, ESG has established itself in capital markets. Investors in the raw materials space are increasingly concerned and motivated by the ESG performance of extractive companies. They now view ESG in the extractives sector as a 'must have' in de-risking their investment decisions, rather than something that is 'nice to have'.

Investors use ESG criteria to evaluate corporate behaviour in the sector, report to shareholders, determine the future financial performance of companies and screen investments. Investors and other stakeholders apply ESG criteria to investment decisions and measures of performance along the entire value chain from exploration, through mining, to processing, manufacturing and recycling or re-use.



Source: Roskill Information Services

<sup>7</sup>Gro Harlem Brundtland, 'Report of the World Commission on Environment and Development: Our Common Future', paragraph 27, 1987.

Societal concern focuses on minimising and mitigating the negative impacts of human activity on the planet and people, from environmental damage to sourcing minerals in conflict zones. Societies want to see the positive benefits that can arise from mineral exploitation and subsequent processing. Stakeholders want to see evidence that value is being shared and not just feeding through to international investors. Climate change (SDG13), water stewardship (SDG14), protection of human rights (all SDGs) and preservation of biodiversity (SDG 14 and 15) are at the forefront of these concerns, driving higher expectations on the corporate sector to address these challenges.

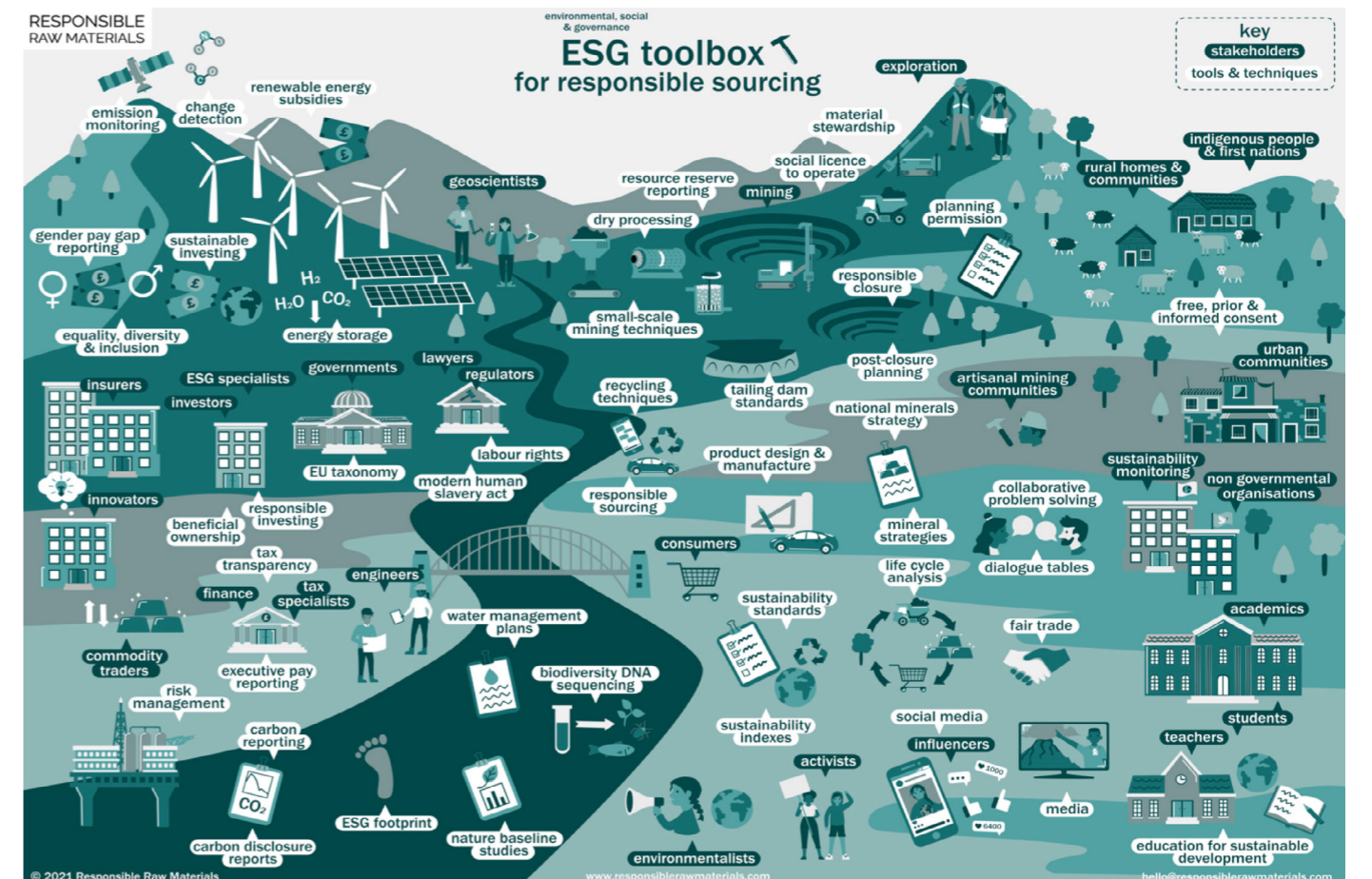
With emerging scrutiny, concerns over sustainability have been thrust into the limelight, resulting in attempts to develop frameworks and standards for ESG reporting to prevent re-occurrence of past mistakes. An appropriate assessment and scoring system will ultimately impact the cost of capital of mining companies - weeding out those that fall short of embracing positive ESG from those that do.

The public's perception of the industry as an exploitative force detrimental to society and the environment has been shaped by negative press surrounding mining.

The public's caution towards mining is justified as the price of the industry's transgressions, paid by those whose environment or lives are severely impacted by the harm done and the lack of support for the communities where the project is located. ESG best practice will play a key role in re-shaping the narrative surrounding mining by regaining the public's trust through positive action and not just promises.

Support from the public is necessary for successful operation. Companies with track records of good industry ESG practice can face strong opposition due to lack of understanding of modern mining processes and ESG standards that have to be adhered to. Large-scale protests have the power to shut down a mining project and prevent further development, as often the media takes facts out of context and ignores the economic, social, and environmental benefit to the wider community.

The 'ESG Toolbox for Responsible Sourcing' demonstrates key stakeholders and examples of tools and techniques used to address ESG concerns. Extraction of critical minerals is not simply about securing supplies and generating profits, it is, and has been for millennia, the pillar of progressing society.



Source: Responsible Raw Materials.



It is also important to consider ESG through the lens of a mining company. A social license to operate, acquired through ESG and regulatory standards compliance along with effective community engagement, is essential to minimise reputational negative risk and uphold investor relations. Mining companies must also consider:

### Reputational Damage Risk

Mistakes made by mining companies are rarely missed by the media. It is right that companies are held accountable for the damages they cause. Ensuring these mistakes do not occur is therefore crucial for mining companies to avoid reputational damage.

### Local Community Engagement

Building good community relationships is imperative for mining companies. How mining is perceived by local communities is critical to a mine's success. A good mining company can raise up communities— by providing job opportunities (skilled and unskilled), training programmes and local development projects. Local communities have to be involved in transparent management plans from the outset, and remain a key stakeholder of a mining project throughout its lifespan. Dissatisfaction in a mine's surrounding regions can stall a mine's progress from the planning stages, through to the operational phase (e.g. mine trespassers and/or protestors can cause delays or outright stop projects being developed).

Local community engagement is different to changing national perceptions. Local relationships are forged and maintained because a mine wants to develop a mutual relationship with the surrounding communities. Activists nationally can be further removed from mining in their backyards and can be less aware of the specific details relating to a mining project and how it will both positively and negatively affect its surroundings.

### Investor Relations

Investors are keen to see high ESG credentials, as ESG is a 'must-have' in lowering investment risk. Demonstrating high ESG performance is important for mining companies to maintain good relations with their investors as it has been proved to significantly add value to businesses. Companies that perform well on ESG are more likely to generate long-term value. S&P 500 companies that ranked in the top quintile for ESG factors outperformed those in the bottom quintile by more than 25 percentage points between 2014 and 2018, with their stock prices being less volatile.<sup>8</sup> Firms in the top quartile of ESG performance delivered growth approximately 40% faster than the averages of their industries.

### Meeting Regulatory Standards

Critical mineral companies must meet the regulatory standards in their operating jurisdiction and adhere to international law. Where UK owned companies operate internationally, UK corporate law will also be applicable.

## 2.B | DOWNSTREAM DEMAND FOR CRITICAL MINERALS

Downstream users of critical minerals, particularly Original Equipment Manufacturers (OEMs), are increasingly aware of the critical minerals in their supply chains and are keen to understand the ESG aspects of mining. Scarcity of critical metals for supply chains is recognised and addressed by setting up long term partnerships. Currently, the development of these partnerships is primarily based upon price and security of supply. However, OEMs are placing increasing weight on sourcing critical minerals as responsibly as possible to answer their consumer's demands for ethically sourced end-products.

As a consequence, premiums will likely be paid for critical metals with stronger ESG credentials in future. Alternatively, products lacking ESG credentials may receive a discounted price or be excluded from certain supply chains as exemplified by BMW Group's refusal to use bauxite from Atewa Forest, Ghana.<sup>9</sup>

Currently the supply of critical minerals outside of China is limited. While many downstream users of products aim to source products as responsibly as possible, this is not always possible. Large quantities of critical minerals with poor ESG adherence and a detrimental impact on the environment are often cheaper and quickly flood the market. Battery-grade nickel products produced through an environmentally insensitive and energy intensive process in Indonesia are an example of this<sup>10</sup>. This can lead to a long-term decrease in the London Metal Exchange (LME) nickel pricing, putting responsible producers and developers at risk of closure due to higher costs associated with ESG compliance.

Further, OEMs are under increasing pressure from both consumers and investors to guarantee that end-products have been made from raw materials sourced from conflict-free zones. Conflict minerals often gain spotlight in the media as critical mineral exploitation in unstable jurisdictions is synonymous with corruption, human rights violations, loss of life amongst other tragedies.



### Atewa Forest, Ghana

Three global manufacturing companies — BMW Group, Tetra Pak and Schüco International — have signalled concern over the use of bauxite potentially sourced from Ghana's Atewa Forest for aluminium, stating they would be unwilling to accept these supply chains due to the catastrophic and irreversible effects on the people and wildlife that depend on the forest. Atewa Forest is a Key Biodiversity Area teeming with thousands of species, and a source of clean drinking water for more than 5 million Ghanaians.

Alternative major bauxite sources include Australia, Guinea, China, Brazil, Indonesia, India and Jamaica. Bauxite deposits are typically found in tropical and subtropical regions associated with areas of high biodiversity.

<sup>8</sup>The Motley Fool, 'Does ESG Investing Produce Better Stock Returns?', 2019. Arabesque Asset Management.

<sup>9</sup>Rainforest Trust, 'BMW Group, Tetra Pak and Schüco International Express Concerns About Sourcing Aluminium from Ghana's Irreplaceable Atewa Forest', 2021.

<sup>10</sup>Trytten, L., 'ESG Considerations – Where Should the "Next Nickel" be Sourced?', 2021. Trytten Consulting Services.



However, global supplies of critical minerals often originate from unstable jurisdictions such as cobalt from the DRC due to natural geological endowment. In many cases, conflict zones such as DRC contribute significant volumes of critical minerals in use worldwide due to natural endowment of accessible resources. Combined with increasing global demand for critical minerals, it is impossible to exclude conflict minerals from supply chains. Instead, focus should be shifted onto how conditions within the countries of origin can be improved to establish secure and responsible supplies.

The European Union released its Conflict Minerals Regulation in May 2017 that sets out regulatory rules that prevent conflict minerals (tin, tungsten, tantalum and gold) being imported to the EU or being sent to smelters exporting to the EU, and sets out obligations to stop the exploitation of those working in mines. As the UK left the European Union prior to the date of implementation, the Regulation has not been adopted across the whole UK, although as a result of the EU-UK withdrawal agreement the Regulation has been transposed into the Northern Ireland statute book through the Conflict Minerals (Compliance)(Northern Ireland)(EU Exit) Regulations 2021. As a result any tin, tungsten, tantalum or gold imported into Northern Ireland from the UK must be in compliance with the Regulation.



### Cobalt Supply from the Democratic Republic of Congo (DRC)

In 2020, approximately 66% of contained cobalt metal was extracted within the DRC, where there has been sporadic armed conflict in the eastern provinces. The main issues involve alleged human rights abuses by government and corporate security forces, particularly against artisanal miners.

Cobalt is not the only commodity produced under questionable social or environmental conditions. For example, tantalum and niobium, via coltan production in the DRC have similar social concerns within its supply chain. However, completely refusing to source cobalt from the DRC would deprive local communities of their livelihoods. That is why traceability innovations are key. Blockchain solutions, such as Re-Source, developed by Glencore, Eurasian Resources Group, CMOC and Umicore, seeks to track responsibly produced cobalt from the mine to the endpoint of the electric vehicle.



### Conflict Zones

Conflict zones can vary from localised border disputes to international armed conflict. The boundaries of these areas are often not clearly defined due to fluctuations in regions' regional borders and the parties involved. Exclusive of the negative humanitarian impact, conflict zones bring with them unfavourable market conditions which limit or prevent governments from being able to provide safe and legal working conditions for their population.

Countries worldwide containing conflicts within their land and/or sea borders in May 2021



Source: Council on Foreign Relations.

At present, it is extremely difficult to track responsibly sourced metals and minerals, mainly due to the presence of low transparency of metal and mineral traders between the operators, developers and the end users of the products. Blockchain has been suggested as a technology to enable traceability of the origin of minerals and metals, to ensure downstream users are aware of the upstream sustainability of the products that are being consumed. Companies such as Circular are utilising traceability systems to track raw and processed materials throughout the supply chain and establish origin of critical minerals.

The LME, a global trading hub for metals, is leading with its sustainability strategy announced in 2020 that includes the introduction of an LMEpassport<sup>11</sup>, a new digital register that will enhance industry disclosure against LME sustainability standards, in particular carbon footprint and recycled content – key priorities for the critical minerals sector. The London Stock Exchange Group (LSEG) has issued guidance, setting out recommendations for good practice in ESG. The global guide responds to demand from investors for a more consistent approach to ESG reporting, which is now a core part of the investment decision process.

### LSEG's eight ESG reporting priorities include:

- Strategic relevance
- Investor materiality
- Investment grade data
- Global frameworks
- Reporting formats
- Regulation and investor communication
- Green revenue reporting
- Debt finance

Such initiatives are sending signals to markets that the UK would only purchase metals and minerals from companies operating at a level that meets or exceeds these expectations, either through the selection of suppliers meeting these expectations or committing to work with them to incentivise improved performance.



### Case Study CIRCULAR

Circular's supply chain traceability system tracks the flow of material through processing and manufacturing by creating an immutable record of the chain of custody of materials from mine to manufacturer, and at the end of life, when they are recycled. Read more on p.44.



### LME Passports

Metals listed on the London Stock Exchange (LSE) are going to have electronic passports. LME designed an electronic system to support details accompanying metals going in and out of warehouses which originally used paper-based systems.

Companies can now add sustainability information to these passports on a voluntary basis. There are no thresholds for inclusion. LME will soon be providing categories of information such as emissions data, recycled content, use of carbon offsets, membership of industry associations such as ASI and verification of claims / certification / independent validation.

<sup>11</sup>The digital register – part of a sustainability package that includes a spot trading platform and new contracts - is designed to provide a centralized transparency source, the data from which will form the basis of future access to sustainable metals via the LME's proposed online marketplace.

## 2.C | CHALLENGES IN PHYSICAL MINING

Sources of critical minerals are restricted both geologically and geographically. As a result, approaches to extraction and the associated impact on the environment and wider community vary immensely. Every mine or project will have a unique set of ESG considerations specific to that site.

Depending on the commodity being extracted, the mining techniques and resultant effect on the local landscape and environment will vary based on the deposit type, scale, economic viability and stakeholder considerations at the time of operation. Processing techniques will vary, involving physical, chemical and thermal methods of separating the desired minerals from the host material. Further considerations include the impact of transporting by-products, processing of penalty elements<sup>12</sup>, other resource needs (water, power) and utilisation of waste materials.

### Case Study DALRADIAN

Dalradian own a silver, copper and gold project in Northern Ireland. It plans to minimise the surface footprint of its proposed underground mine by mining and carrying out some processing underground and retaining the majority of mined materials underground. Read more on p.48.

Penalty elements can seriously restrict the market for some mineral concentrates, e.g. arsenic in copper concentrate. There are few places that can process high arsenic concentrate, typically in China. UK universities have the opportunity to collaborate with UK mining companies to create treatment routes for these minerals that adhere to industry best practice ESG standards.

Waste materials are increasingly more repurposed and / or reprocessed, including: the use of tailing as sand for construction; the use of tailings as backfill for mined-out sections of underground mines; or the use of waste as aggregates for construction. Ultimately, new applications of materials that are otherwise considered waste will prevent more waste from going to landfill.

### Case Study TUNGSTEN WEST

Tungsten West identified the opportunity to reduce the emissions intensity of producing tungsten and tin concentrates by maximising the use of the process materials formally defined as 'waste', as high-quality aggregates for a local market. Read more on p.47.

### Case Study TIRUPATI GRAPHITE

Tirupati Graphite has reduced waste by developing a new technology that extracts the waste as a by-product (construction sand) in step 1 of processing. The remaining waste is clay which is being used for social development like brick making. Read more on p. 52.

Levels of integration of physical mining with subsequent supply chains vary immensely in the critical minerals sector. For example, ore may need to be transported long distances to processing facilities or conversely, ore may be processed onsite. There may be a need for the creation of infrastructure that will have adverse effects on ecosystems or a project may be conveniently located in areas of existing infrastructure.

### Role of management systems to address the unique set of ESG considerations specific to each site:

Good international industry practice encourages companies to implement robust management systems starting with a comprehensive environmental and social impact assessment. If done appropriately, this proactively informs project design and implementation. When tied to an operating management system (for environment, social and health and safety) it results in improved compliance with statutory requirements, continuous improvement in ESG performance and enhanced opportunities for disclosure to all stakeholders.

Every mine or project will have a unique set of ESG considerations specific to that very site.

<sup>12</sup>Penalty elements are detrimental to the environment and to human health when present in concentrations which are greater than which they occur naturally (e.g. arsenic, antimony, cadmium, lead, mercury). Mining companies are typically charged by processing facilities for presence of penalty elements in supplied raw material.



The impacts of the project can be assessed using Life Cycle Assessments (LCAs) to provide a quantitative understanding of the total life cycle environmental impact associated with the value chain of a product and to incorporate good industry ESG practice. The degree of flexibility in implementing ESG-informed decisions decreases significantly once a project is operational due to the associated financial and technical risk. Changes to the project setup lead to delays and even complete interruption of production.

Extraction, processing and ESG risks associated with deposit types can be quantified and integrated into a rating system. For example, waste and environmental related issues can be quantified using Life Cycle Assessment, whereas it is more difficult for environmental issues related to biodiversity or acute impacts such as tailings collapse or spillage.

Also, there are challenges with quantifying social and governmental risks owing to increased subjectivity. The EU proposed Social LCA is a tool for this, although that approach is evolving and not yet mature or widely applied in industry.

A framework attempting to assess the sustainability of the mining sector must attempt to accurately weigh the importance of these factors against each other and determine the key areas of concern in supply of these commodities. This is not possible under a one-size-fits-all approach. Additionally, this method is susceptible to exploitation when attempting to agglomerate these ESG factors and their impacts into a single score. Quantitative metrics cannot solve qualitative problems. A system made to measure the physical impact of an operation may be incapable of assessing the social impact on local communities and vice versa.

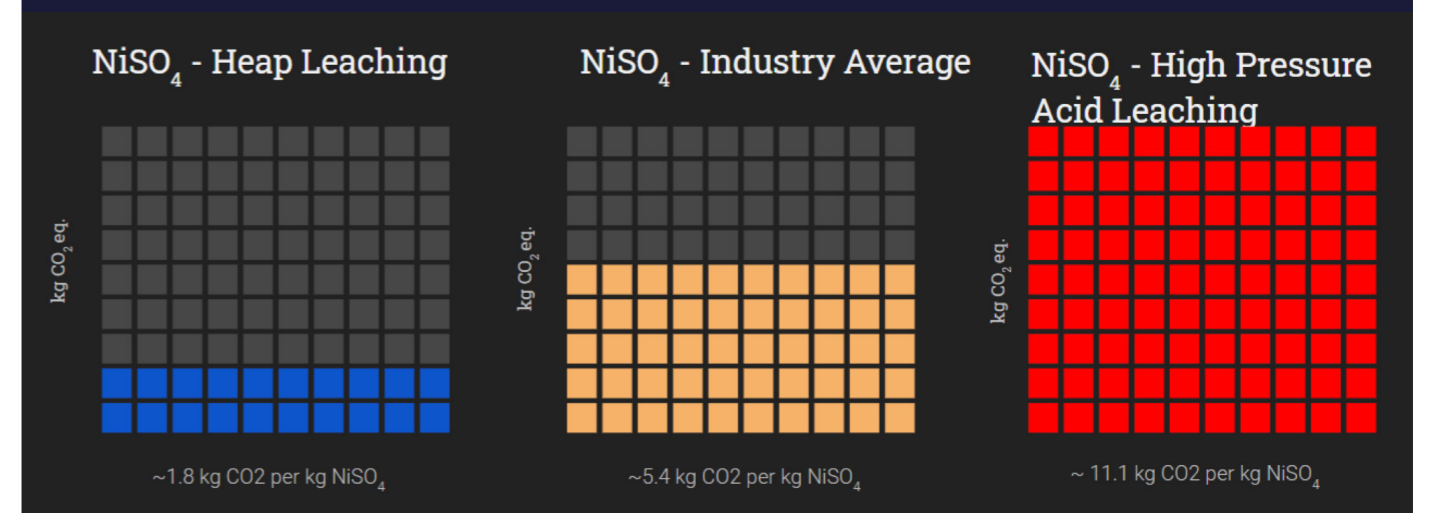
### Case Study MINVIRO

When the results of Life Cycle Assessment (LCA) studies are deployed during development stages, decisions can be supplemented by environmental impact data, enabling incorporation of environmentally informed solutions.

The results for three LCA studies for nickel sulphate are shown below. On average, the impact of the industry is 5.4 kg CO<sub>2</sub> eq. per kg of nickel sulphate product. If the same product is sourced from a low-grade nickel sulphide operation through a heap leach method the impact is 1.8 kg CO<sub>2</sub> eq. per product, showing strong environmental benefits for that supply chain.

On the other side of the spectrum, nickel sulphate produced from laterite ore through a high-pressure acid leaching route can have an impact that is double that of the industry average.

While heap leaching is always an option, it is subject to location. It is less suitable in cold climates as the solution sprayed onto or percolating through the heap may freeze. The heap leaching pads must prevent ingress of leach liquor into ground water to prevent contamination of groundwater supplies. However, evolving technologies and LCA studies help to weight-up the pros and cons of select mining and processing routes to help make informed, data-driven decisions. Read more on LCA on p.45.



## 2.D | ESG STANDARDS

To either provide guidance on expected performance levels or to give a framework for disclosure of performance, a vast number of standards, regulations and monitoring initiatives have been developed over the last couple of decades. These cover various geographic areas and focus on different themes including key performance indicators, biodiversity, environmental protection, human rights, conflict, greenhouse gases (GHGs) etc. There is no single overarching standard that addresses all aspects of what constitutes good ESG performance. It can therefore be challenging for diversified mining companies with geographically dispersed projects to comply with all relevant standards.

Likewise, OEMs, consumers, governments and investors find it difficult to understand which standards are expected and what areas they cover. Disclosure on ESG topics can be cumbersome, and without appropriate monitoring, any claims of adherence to outlined standards will not be fully verified.

Some of the most recognised standards include ICMM<sup>13</sup>, TSM<sup>14</sup>, IRMA<sup>15</sup> and EITI<sup>16</sup>. **For more information on the different ESG standards and legislations that exist globally, please see the 'ESG Standards' table in the appendix on page 54.**

### EITI

The Extractive Industries Transparency Initiative (EITI) implements the global standard to promote the open and accountable management of oil, gas and mineral resources. EITI was launched in 2002 by the then Prime Minister Tony Blair during the World Summit on Sustainable Development.

The EITI Standard is implemented in 55 countries around the world. Each of these countries is required to publish an annual EITI Report disclosing information on: contracts and licenses, production, revenue collection, revenue allocation, and social and economic spending.

### ICMM

One of the leading initiatives on ESG is the adoption of validation requirements by the London-based International Council of Mining and Metals' (ICMM). These requirements seek to maximise the benefits of mining and metal production to host communities and minimise their negative impacts to effectively manage issues of concern to society.

ICMM's ten mining principles define good ESG practice through a set of Performance Expectations (PE) or standards, last updated and made public at the end of 2018.

### IRMA

The Initiative for Responsible Mining Assurance (IRMA) offers independent third-party verification and certification against a comprehensive standard for all mined materials that provides 'one-stop coverage' of the full range of issues related to the impacts of industrial-scale mines.

IRMA leadership is made up of non-government environment and social justice groups (NGOs), organized labour unions, mining-affected communities, mining companies, and companies that purchase mined materials to make into other products.

### TSM

The Mining Association of Canada's Towards Sustainable Mining (TSM) standard is a globally recognised sustainability program that supports mining companies in managing key environmental and social risks.

Increasingly, other mining associations, governments, investors, and manufacturers are looking to TSM as global best practice in sustainable and responsible mining. In recent years, mining associations in Spain, Finland, Norway, Botswana, Argentina, Brazil, Australia and the Philippines have adopted the program.

<sup>13</sup> ICMM, 'Member Requirements', 2021. <https://www.icmm.com>

<sup>14</sup> The Mining Association of Canada, 'Towards Sustainable Mining', 2021. <https://mining.ca/towards-sustainable-mining/>

<sup>15</sup> IRMA, 'Standard', 2021. <https://responsiblemining.net/what-we-do/standard/>

<sup>16</sup> EITI, 'What We Do', 2021. <https://eiti.org>



# 3. Blueprint

## 3.A | UK ESG LEADERSHIP OPPORTUNITY

The UK has a long history of leadership in advancing universal values on human rights and environmental protection. The UK was the home of the first industrial revolution 200 years ago, an economic and social transformation driven by fossil fuels, namely coal. Today the UK can lead the technological revolution that is underway and help address environmental legacies of the industrial age. It can do so by responsibly producing domestically or responsibly sourcing from overseas the critical minerals required to make the electric vehicles, infrastructure and communications technology of the nascent low carbon era.

### Landmark laws and initiatives:

- Modern Slavery Act 2015 filtered out beyond UK's borders and was used as a model by the Government of Australia to form the Modern Slavery Act 2018.
- Bribery Act 2010 has international obligations for all British firms (either operating in or registered in the UK). This is particularly important for British firms operating in jurisdictions where access to potential projects is often susceptible to corruption.
- The Dodd-Frank Act brought in regulations on transparency ranging from core samples to tax structures. It also set out rules around conflict minerals, specifically highlighting the DRC in their formation.
- The UK Government established the Extractive Industry Transparency Initiative (EITI) by adopting the Equator Principles<sup>17</sup> in 2003 and set out international good governance standards on extractive industry projects: how they are awarded, their payment and how subsequent finance stemming from them is used by the host government. EITI gained endorsement from International Monetary Fund and the World Bank.
- The UK is a world leader in energy and climate change action, and has committed for further improvements through its ten-point plan, and driving global action through its Presidency of COP26 (the 26th United Nations Climate Change Conference). The UK was the first country in the world to enshrine the obligation to achieve net zero by 2050 in domestic law. Factors generated by our own Department for Environment, Food and Rural Affairs are used globally to calculate greenhouse gas (GHG) emissions as they are trusted and updated regularly.

The UK is a world leader in health, safety and labour standards. Manufacturers and consumers can be confident that materials produced in the UK are ethically sourced and the health and safety of the workforce is safeguarded by a suite of rigorous laws enforced by an unbiased competent authority in the Health and Safety Executive.

Global Britain offers a platform for playing a leading role in the energy transition while setting expectations on ESG performance in the international critical minerals value chain through leveraging its position as a hub for:

- Global finance, metal trading and insurance;
- Research, science and innovation;
- High-tech manufacturing;
- Renewable energy production;
- Provision of high-quality education and supporting services.

<sup>17</sup><https://equator-principles.com/>

<sup>18</sup><https://www.criticalmineral.org/post/appg-critical-minerals-australia-uk-critical-minerals-strategy>



### Support from Government Leaders

UK Government leaders are already outlining their support for strong ESG credentials in critical mineral supply chains. Her Excellency Vicki Treadell CMG, MVO, the British High Commissioner to Australia said:

'There should be consideration for reduction of pollution, sustainability, and human rights of those who work in these fields. We have worked with the Australian Government and helped to set ISO standards on critical minerals.'<sup>18</sup>



For the UK to continue to become a world-renowned champion of ESG in critical mineral supply chains, we recommend the UK Government implements CMA's recommendations.

## STATEMENT OF COMMITMENT FROM THE UK GOVERNMENT

### i. Recommendation

The UK Government should make a clear statement of commitment prioritising domestic production of critical minerals. This would send a positive message to markets that the UK welcomes investment in the sector.

There is an increasing argument for extracting critical minerals domestically where the UK has geological endowment (e.g. lithium, tin, tungsten). The benefits of ESG-adherent domestic mining span beyond financial gain. In the UK, high environmental standards will be adhered to, workers will be paid fairly and treated well, and companies will be held accountable for their actions. The alternative is 'exporting' the impact of this mineral extraction to elsewhere, where it can be much harder to have oversight of supply chains.

The UK domestic metals sector has great potential to achieve significant production of the critical metals the UK needs as materials to supply the green revolution, and which can be produced to high ESG standards.

Such a statement would also send a message globally that the UK is serious about its critical minerals development and position the UK as a hub for the services and financial markets that support strong ESG credentials.

## RESPONSIBLE VALUE CHAIN ESG RATING SYSTEM

### i. Recommendation

Support and enable the development of a streamlined and equivalency-based ESG performance rating system for domestically produced and externally sourced critical minerals. The rating system would apply to the whole minerals value chain from exploration, through development, production, and processing, to manufacturing, reuse and recycling activities.

The UK is in a position to set its own expectations on the responsible production and sourcing of critical minerals, as well as validating performance along the whole value chain. Our recommendation to create an ESG rating system would enable the UK to do this across all industries working with minerals and metals.

ESG is an evolving field and a wide array of standards, guidelines and assurance frameworks have emerged in recent years to improve and rate performance in the extractive and other sectors (see p.58 for an overview of ESG standards/ legislations). An international standard on ESG would provide clear and consistent rules for a responsible minerals value chain, wherever these are sourced and traded. Such a standard is a longer-term ambition. In the meantime, industry bodies, individual countries and other interested stakeholders are developing their own sets of expectations on companies' ESG performance, ranging from the ICMM's site-based performance assurance, to Canada's TSM framework and moves by Australia to establish a 'quality mark' that certifies responsibly sources critical minerals. Industry-specific or global frameworks such as SASB<sup>19</sup> would be applied across other segments of the value chain such as smelting and manufacturing.

<sup>19</sup>Sustainability Accounting Standards Board

The UK should aim to play a leading role in setting international rules for the extraction and supply of critical minerals and metals, as an emerging producer; significant importer; leading manufacturer; and global finance and commodity trading hub. A step in that direction would be for the UK to develop a national system for assessing the ESG performance of its domestic industries and the value chain of imported critical minerals that support them. Due to the over saturation of standards, guidelines and assurance frameworks currently be developed and implemented, the creation of yet another set of standards or principles is unlikely to be well received by any part of the value chain. Digbee and Satarla have partnered together to deliver an online ESG disclosure which brings a myriad of standards and frameworks together to assist with exploration, mining and production.

The CMA's objectives in making its recommendation on a streamlined and equivalency based ESG performance rating system are as follows:

- Establishing an efficient, effective and transparent ESG rating system for industries along the entire minerals and metals value chain that is easily accessible to all stakeholders.
- A single system that draws from existing recognised industry and government standards to facilitate a level playing field for the sector.
- Reducing the resource-intensive reporting burden currently faced by companies, particularly smaller ones.
- Leveraging established successful systems such as the UK's Energy Performance Certificate (EPC) rating for property, based on a sliding scale, providing a visual and easily understandable summary of the organisation's current status, as well as potential for improvement.

The rating system would be developed by a multi-stakeholder group leveraging the UK's world-leading mining, academic, scientific, finance, manufacturing and other sectors to deliver a cutting-edge system with broad stakeholder support.



**For considerations surrounding the ESG rating system and an example of a possible approach see appendix A on p.54.**

### Case Study DIGBEE

Digbee ESG is a disclosure platform that allows mining companies to share their ESG status with investors and other interested parties.

A carefully designed set of ESG focused questions complete with rationale and mapping to international standards provides the basis of each mining company's board-approved self-assessment. This data is then scored by experts with deep experience in the mining sector. The publicly available output allows e.g. investors to ensure they are investing in responsible mining companies. Read more on p.51.

## 3.B | ENABLING RESPONSIBLE INVESTMENT IN UK CRITICAL MINERALS

Finance is a central part of the critical mineral mining supply chain. From raising funds for initial stages of exploration through to guarantees and bonds for decommissioning, mine closure and site reclamation. The foundation of any successful critical mineral exploration project, mine, midstream operation, or their implementation into component manufacture, is dependent on a strong and consistent stream of financial support. Financiers have historically (but not always) been more interested in a return on investment than the project contributing to wider stakeholder shared value or having minimal impact on the environment.

This is to be expected due to the risk and time involved in bringing an exploration project to operational levels. Historically, there are a number of factors (not exhaustive) that influence financiers decisions to invest:

- Banks and institutional investors utilise funds to finance, meaning they are responsible for their backers and are less likely to invest unless overly sure of success (+10% ROI<sup>20</sup> minimum).
- Mining success rates are relatively low compared to other industries (1:300/1:500).
- The potential of a mine site successfully progressing from exploration to operating is determined predominantly on time spent in the field. Unlike other businesses where success can be driven externally (drilling, geology vs marketing, networking) Therefore, extensive finance is most likely to be secured only after pre-feasibility and bankable feasibility have been finished.
- Critical mineral exploration is predominantly carried out by small and midscale miners. Therefore, financiers cannot usually rely on scale or prior success. Decisions on board members are likely to become a critical factor in betting on the success of the exploration project.
- The jurisdiction of the site can make even the best projects a bad investment. For instance, a government with a poor governance record, a country with poor security, aggressively opposed local communities or even just a lack of infrastructure access.

Given the limited size of most critical mineral exploration companies, and the relatively low chances of success in the sector, the options for finance tend to be limited. The following finance options exist, but are not always accessible to junior companies:

- Cash reserves – requires companies to operate at profit;
- Cryptocurrencies and crowdfunding – gaining traction in recent years, particularly in Australia and Canada;
- Debt funding:
  - Private debt – usually exercised by smaller ventures where success is not guaranteed but rewards are more likely to be substantial. The level of interest is usually high;
  - Corporate debt – convertibles, corporate bonds, VAT monetization, bank loans requiring companies to meet due diligence requirements;
- Equity;
- Project/asset linked – joint ventures (JVs), sale and lease back;
- Royalty funding – streaming and net smelter returns, net profit interests.

As access to capital becomes harder for the extractives sectors, competition for investment will require companies to move beyond compliance and to demonstrate to investors they are adopting good international industry practice that extends far beyond 'box-ticking'.

<sup>20</sup>ROI – Return on Investment.

Companies that do not achieve the required ESG standards cannot get insurance or pay very high premiums. Standard insurance and government guarantees for export initiatives / mining can be difficult to obtain by companies using new innovative approaches to exploration, mining and processing. However, if a company is able to demonstrate that a potential new, innovative approach can perform more efficiently and adhere to ESG standards, then incentives should be provided for these companies to trial such new approaches in the form of reduced or Government-subsidised insurance premiums.

High standards for ESG can ensure UK supply chains are as responsible as possible, for both domestic mineral production and for the companies that are headquartered in the UK but operate internationally. However, this requires companies to report regularly on sustainability factors - transparency is key to facilitate accountability. This is increasingly an expectation from investors. **For an overview of financial reporting standards for ESG (such as SASB – Sustainability Accounting Standards Board; GRI – Global Reporting Initiative), see the appendix on page 58.**

### ACCESS TO CAPITAL

#### i. Recommendation

Support current initiatives in the City of London to enhance access to capital for ESG compliant critical mineral companies and investors, both national and international. This includes supporting initiatives such as the London Metals Exchange's LMEpassport or LSEG guidance on ESG reporting.

#### ii. Recommendation

Establish a regulatory framework for the green finance sector as outlined in Lord Jonathan Hill's UK Listing Review 2021, to enhance access to capital for ESG compliant critical mineral companies and investors, both national and international.

Approaches to responsible investment require a 'carrot and stick' approach. Financial markets recognise the business sense behind strong ESG credentials and have developed a number of disclosure frameworks and supporting guidance for companies. Different jurisdictions are moving towards updating or creating new regulation on both ESG performance and non-financial disclosure, such as Europe's Green Deal.

From the 'carrot' perspective, we recommend the UK leverages current initiatives in the City of London to enhance access to capital for ESG-compliant critical mineral companies and investors, whether national or international. This includes supporting initiatives such as the London Metals Exchange's LMEpassport or LSEG guidance on ESG reporting. A success story of this approach includes Digbee ESG disclosure – a company which has benefited from UK's research and development, bringing value to its shareholders, and is now having global impact across the sector from exploration through to production.

The 2021 UK Listing Review by Lord Jonathan Hill also provides opportunity to promote and contribute to the design of a regulatory framework aiming to establish the City of London as a global leader for green finance, enhancing access to capital for mining companies that meet global ESG standards. The UK Government should seek to engage the City of London on ESG standards, including through the proposed multi-stakeholder forum on the design of an ESG rating system, in applying global standards in the UK market.



As Lord Hill states in his Review, “where I believe we now have an opportunity after leaving the EU is in the intelligent application of global standards to our own market. We should be able to move faster, more flexibly and in a more targeted way; this may have a particular relevance as we think about regulation of the growth sectors of the future where the UK should be able to move more quickly – for example in fintech, where we are already the leader in Europe, or in green finance, where we should be well-positioned to become a global leader”.<sup>21</sup>

## SETTING ESG EXPECTATIONS THROUGH LAW

### i. Recommendation

Explore the application of company law, or amendment, to set expectations of UK companies on ESG performance and disclosure.

The UK remains a key location for international trade via the City of London. The UK is a big economy, our influence is in our buying power. One tried and tested approach of extending the UK's ESG expectations out into the world is through company law.

Companies that are medium-sized or larger must report on how they generate and preserve value, relevant risks and uncertainties and business performance. Companies with more than 250 employees must produce a Section 172 statement in their annual strategic report. This should explain how stakeholders have been engaged and how pertinent issues have influenced company decisions and strategy in the last year. Companies with more than 500 employees, listed companies and financial institutions must report on ESG matters (environmental, employee, social, community and human rights matters).

### Section 172 of the Companies Act

This section is clear that business leadership is not just about profit for shareholders. It encourages directors taking a stewardship approach to their business, their stakeholders and the environment. Company directors are under a statutory duty to promote the success of the company, which requires directors to consider (amongst other matters):

- the likely long-term consequences of any decision made;
- the interests of employees;
- the need to foster the company's business relationships with suppliers, customers and other stakeholders;
- the impact of the company's operations on the community and the environment;
- the desirability of the company to maintain a reputation for high standards of business conduct; and
- the need to act fairly as between the members of the company.

Examples of company law being used to enforce energy savings and reporting are the ESOS and SECR. The Energy Savings Opportunities Scheme (ESOS) Regulations of 2014 require large undertakings registered within the UK to assess their energy use, identify opportunities and present them for top management sign off. The requirement extends to other entities that are part of the group, even if they are overseas.

Similarly, the Streamlined Energy and Carbon Reporting (SECR) framework that replaced the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) in 2019 is implemented through company law, specifically the Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018. Qualification criteria for SECR are similar to ESOS, in that large UK incorporated undertakings must meet the requirements of the regulations. These regulations extend to non-UK undertakings.

From a 'stick' perspective, company law in the UK could be used as a mechanism for regulating ESG expectations around both performance and disclosure of UK companies. The UK has answered the call to implement similar initiatives to those occurring as part of Europe's Green Deal as outlined below, through The Green Technical Advisory Group (GTAG). The GTAG will oversee the Government's delivery of a “Green Taxonomy”, support investors, consumers and businesses to make green financial decisions:

“The Green Taxonomy will help clamp down on greenwashing – unsubstantiated or exaggerated claims that an investment is environmentally friendly – and make it easier for investors and consumers to understand how a firm is impacting the environment”<sup>22</sup>.

### Europe's Green Deal

The European Green Deal sets out the European Commission's plan to make Europe climate-neutral by 2050. It moves climate change concerns to the heart of EU policy making and envisages transition of the EU economy to a sustainable economic model. The European Climate Law will require alignment of all existing EU laws with the climate neutrality goal and corresponding strong coherence across EU policies.

Financing of the European Green Deal is covered in the European Green Deal Investment Plan that intends to deliver EUR 1 trillion through several mechanisms, including direct provisions from the EU budget and EU Emissions Trading System and funding from the InvestEU Programme.

A portion of the finance will be dedicated to a Just Transition Mechanism that will provide targeted support regions and sectors most affected by the transition towards the green economy, such as those with current high dependence on fossil fuels or carbon intensive processes. The support aims to drive economic diversification, creation of new jobs and re-skilling of workers. It also addresses energy poverty and access to clean, affordable and secure energy.

The European Green Deal proposes measures to ensure European industry does not experience unfair competition if countries outside of Europe are less ambitious on climate. These measures include a tax on certain imports; specifically, a Carbon Border Adjustment Mechanism is proposed to ensure that the price of imports reflects more accurately their carbon content. World Trade Organization rules and other international obligations of the EU will be observed in the design of this mechanism.

### UK's Green Taxonomy UK Energy Minister Anne-Marie Trevelyan said:

“Transforming our financial system for a greener future is vital so we can protect the planet, reach net zero and grow our economy, and establishing a Green Technical Advisory Group and Energy Working Group are both crucial steps forward in developing our green UK taxonomy.”

“This will help the financial sector invest in the projects, technologies, and services of the future, strengthening the UK's position as global leader in green finance and tackling climate change.”

<sup>21</sup>Lord Jonathan Hill, UK Listing Review, 3 March 2021, page 4

<sup>22</sup>HM Treasury, “New independent group to help tackle ‘greenwashing’”, 2021. UK Government. <https://www.gov.uk/government/news/new-independent-group-to-help-tackle-greenwashing>

## RESPONSIBLE SOURCING AND INNOVATION

### i. Recommendation

Promote innovation in the critical minerals supply chain through Government investments, as well as incentivising private sector investment in new technologies to support responsible production and sourcing of critical minerals. Promote investment in technology innovation to make UK a green energy leader.

It is vital the UK Government fully considers the supply chains of the raw materials needed to deliver the country's net zero ambitions, and ensures these minerals are sourced responsibly. This means traceability and accountability are key – transparent supply chains are needed to ensure the positive impacts of the UK's energy transition are not mitigated by the lifecycle impacts of delivering it.

To deliver on ESG expectations and promises, it is essential to begin resetting expectations around the transparency and integrity of critical mineral supply chains and ask questions about where materials and products have come from and how they have been made. The UK requires a strategy to leverage the power of unique identification and information sharing within a supply chain and bring together technologies that can mediate and verify this information.

Investment in traceability technologies is one area of innovation that can deliver a trusted programme and support the ESG rating system. It would enable the UK to drive global change across the critical minerals sector, by facilitating world-leading collaborations between technology suppliers that ensure greater transparency and integrity within a secure and trusted domestic supply chain.

#### Case Study SOURCE CERTAIN

Source Certain deploys technology that chemically fingerprints raw and processed materials to verify the origin, or 'provenance', back to the mines and downstream processing facilities. Read more on p.46.

The UK Government should reward companies (e.g. tax breaks, subsidies) that invest in innovations that improve their company's ESG. Company investment in ESG innovations is an additional cost, and it should be seen as a factor that increases competitiveness. However, if only the 'lowest cost producer' is rewarded, fewer companies will spend more of their potential profit margins on high-risk innovations.

These are the innovations that can make significant impacts on ESG, not just for the company, but potentially for the entire industry. For example, Nordgold has invested in a new satellite technology system to improve environmental and safety monitoring of its mine's tailings storage facilities in Guinea.<sup>23</sup> Cornish Lithium hopes to be using Direct Lithium Extraction (DLE) technology to selectively remove the lithium compounds from the geothermal waters, and believes this is the most environmentally responsible method of extracting lithium from solution (read more on p.49).

Another key area in which innovation should be embraced is assessment and monitoring of biodiversity. Nature is inherently complex, and traditional survey methodologies are limiting, requiring significant expertise, cost and time to generate useful data for assessment of ecological change at the site level. For this reason, detailed biodiversity assessment is commonly bypassed in favour of simple area-based proxies or a focus on a narrow set of species.

<sup>23</sup>Brightmore, D, 'Nordgold launches tailings monitoring system at Lefa', Mining Global, 2021. <https://miningglobal.com/technology/nordgold-launches-tailings-monitoring-system-lefa>

Against a backdrop of rapid biodiversity losses and an increasing understanding of our own dependence on natural ecosystems, it is critical to adopt more sophisticated, data-driven approaches to environmental management.

Investment in demonstrating, refining and combining these tools to produce a new generation of science-based biodiversity and ecosystem metrics should be a priority so these can be incorporated into ESG reporting frameworks and used to evaluate progress in meeting commitments to 'no net loss' or 'net gain' of biodiversity at site level.

Major economies are cultivating the best of innovation through collaborative approaches. In March 2021, the Centre for Excellence in Mining Innovation (CEMI) launched the Canadian Mineral Processing Ecosystem Innovation Portal to support the community of innovators and end-users in the Canadian mineral processing innovation ecosystem. The portal is aimed at helping mobilise innovators to create a cleaner, more productive, and globally competitive Canadian mineral processing industry.

The UK needs to take urgent action in this space to be at the forefront of innovation for responsible critical minerals sourcing.

## SUPPORTING A TALENT PIPELINE

### i. Recommendation

Promote and incentivise the provision of science, technology, engineering, mathematics (STEM) and geoscience-based courses in secondary, technical and tertiary education sectors to create a talent pipeline for a growing critical minerals industry and support the Green Energy Transition.

For the UK to continue excelling in innovation, it also needs to create a talent pipeline of innovators and STEM graduates, with emphasis on exploration and mining geologists, metallurgists and mineral processors. Government investment in research and innovation also creates an incentive for young people to go into these disciplines – if there are job opportunities at the end of a degree, this can factor into decision-making for subject choices.

Mining professionals are needed in all aspects of the critical minerals ecosystem. There are several active exploration and developing mining projects in the UK, some of which are focused on minerals that are critical to new green economy. The mining industry in the UK is currently more active than it has been for many years. These projects will all need mining professionals.

#### Advances in Biodiversity

There is a rapid pace of development of new technologies in this area.

Advances in tools such as remote sensing, bioacoustics and environmental DNA mean that routine implementation of detailed biodiversity assessment at large spatial scales is now possible (see case study on p.50).

#### Geoscience University Course Closures

University of Exeter has enacted a decision to "pause" recruitment into its BEng/MEng Mining Engineering program. The University of Exeter's BEng/MEng Mining Engineering degree is the last mining engineering degree in the UK, down from around seven courses back in 1990. Similar course closures or threatened closures are occurring in other geo-science and mining-related engineering universities.

Beyond just supporting a mining industry, mining professionals may also be mining analysts, insurers, involved in the stock market and supporting finance organisations. Mining professionals form the backbone of several world-class consultancy groups in the UK, as well as internationally, and these groups provide a large number of employment opportunities in the UK. As an example, and referencing the University of Exeter course (see box), the majority of last year's graduates received 2 or 3 job offers each; the demand from industry is there.

Filling University places for mining-related courses is becoming increasingly challenging due to the current population demographic, lack of information around the role mining plays in green technologies, the reduction in overseas applicants, deterring financial costs and, more recently, the impact of COVID-19. Exposure to geosciences is extremely limited at GCSEs and A-levels. Geology is taught within a limited number of institutions at A-level, making accessibility a function of geography.

While effort has been made to 'rebrand' geosciences as essential to progressing society, little has been done to make university courses financially accessible to a wider demographic of students. By nature, geoscience courses are expensive due to essential field equipment and associated compulsory fieldtrips which are not always covered by tuition fees.

Calls have been made to decrease the number of field days required to obtain accreditation by professional bodies such as the Geological Society (with suggestions of replacement by online alternatives), to cut costs of geoscience education at the expense of practical experience. However, this is not the answer to producing a diverse, high-calibre talent pipeline.

The possibility of international travel is a huge incentive for students to join geoscience courses. Universities cutting international travel in light of climate change are removing an appealing part of the course for young adults, along with it, the benefits of culturally enriched experiences. UK geoscience graduates are world-renowned in the mining sector. Reduction of domestic and international fieldwork threatens the world-renowned talent pipeline.

The UK Government can take an active role in promoting diversity and encouraging more women and individuals from diverse backgrounds to join the traditionally white male-dominated mining industry by removing financial obstacles as a start. The industry needs to take an active role in combating stereotypes by setting an example of inclusivity and diversity.

#### Benefits of a diverse workforce:

- Cognitive diversity can enhance team innovation by up to 20% and decrease risk by up to 30%.
- Organisations with inclusive cultures are:
  - 8x more likely to achieve better business outcomes;
  - 6x more likely to be innovative and agile;
  - 3x as likely to be high-performing.

To make geosciences more appealing as a university degree destination, it is essential to remove the financial burden of essential costs by:

- Providing bursaries to fully cover the costs of all fieldwork and equipment;
- Extending postgraduate loans to cover the full amount of tuition fees (due to expenses associated with practical fieldwork, tuition fees can vary, up to twice the maximum available amount of a postgraduate loan);
- Introducing a postgraduate maintenance loan to cover the costs of living for the duration of the course;
- Providing easily accessible research grants to promote domestic and international innovation.

It is vitally important to protect the future of geoscience and STEM courses that support the critical minerals ecosystem. This will ensure the UK continues to produce world-class mining professionals, not only to support UK-based projects but also to support the UK's active engagement with the global geoscientific community. In turn this will ultimately help to drive international best practice and policy changes. In the face of Brexit, we feel that retaining this skillset to enable participation in such activities is more important than ever.

### STREAMLINING PLANNING AND PERMITTING

#### **i. Recommendation**

Establish an enabling environment for developing and growing a domestic critical minerals sector by streamlining processes, improving coordination across the planning and permitting systems.

#### **ii. Recommendation**

Provide regular training events for planning/permitting decision makers on critical minerals exploration, mining, processing, infrastructure/ service needs, ESG, mine closure and stakeholder engagement.

If the UK did not have any geological endowment of such materials the country would be forced to continue to rely on imports. However, the UK does have the geological potential for these materials, as demonstrated by the recent successful exploration in the South West. Such efforts have highlighted the geological potential, but more importantly, the economic opportunity to build a secure supply of such metals in the UK.

Unlike many other mineral producing countries, the UK's resource endowment is not owned by the state. ESG governance within the UK is therefore not a prerequisite for allowing mineral extraction.

Mining companies in the UK must undertake the same planning and permitting processes as other industrial developments (e.g. housing, manufacturing). A straightforward planning and permitting process with some degree of certainty on timelines is an area where the UK Government can help to develop mining exploration companies. A streamlined planning and permitting process for UK mining companies would encourage greater investment into this industry and lower barriers to entry to this market.

**However, if the process by which companies apply for permits / planning permissions is confused, delayed, or poorly understood, we are hindering the efficient development of mining projects and also running the risk of not setting the right expectations of mining companies.**

In UK planning, CMA has identified five major challenges to both high ESG Standards and increasing the competitiveness of UK domestic mining on a global stage. These are:

- Limited knowledge of the mining sector by UK Government decision makers;
- Time delays and open-ended consultation timelines by UK Government;
- A lack of coordination in planning across UK Government;
- The risk of nimbyism (not in my backyard), depending on the UK region;
- Loopholes in the Environmental Regulatory Framework.

The UK Planning Permission process does not align with large projects such as mining / resource extraction. In other jurisdictions mineral permissions are granted by a mining or minerals departments within the government, either with specialist environmental teams, or with processes that request other environmental focused ministries to assess the environment and social impact assessments (ESIA).

There is a lack of experience and understanding of the mining sector amongst Government officials and the public, especially in popular culture. Misinformation in the media has led to protests and indefinitely delayed mining projects in the past. Turnover of staff within regulatory agencies is high due to rigid management and payment structures (which is not unusual globally), but the complexity of UK environmental laws is prohibitive to rapid training of regulators required in this environment. This leads to:

- Government decision makers being averse to making decisions and delaying processes.
- Government decision makers not fully understanding important aspects of ESG in mining such as:
  - Mine closure;
  - Impacts on ground water / geochemistry;
  - Main Greenhouse Gas Emissions in mining.

It is also worth mentioning the environmental regulatory framework has a multitude of loopholes, in particular qualification thresholds in major legal instruments including the Environmental Permitting Regulations, the Industrial Emissions Directive, the Extractive Wastes Directive, the Landfill Directive, ESOS, SECR, the Large Combustion Plant Directive, the Medium Combustion Plant Directive and the Emissions Trading Scheme. Environmental Law in the UK is an intricate web of overlapping rules interlaced with exceptions, exemptions and derogations. It would be worth looking into this to ensure the process is streamlined and important environmental frameworks are considered even for 'small' mining companies.

In other mining jurisdictions, mineral permissions are granted by a mining or minerals department within the government either with specialist environmental teams or with processes that request other environmental focused ministries to comment on the environment and social impact assessments (ESIA).

These assessments are considerably more accessible and reader friendly than UK applications, and typically cover all elements of mining, processing and waste management when permission is granted. Under the UK system, as it has not been developed with mining in mind, the planning permission is only one of many permits required. Others may include installation permits, water abstraction and discharge permits, extractive waste permit, species licences and greenhouse gas permits, some of which may be regulated by different bodies depending on the size of the mine.

**In the Critical Minerals Association's UK mineral rights consultation, we received feedback relating to the planning process:**

"Planning has become extremely challenging and expensive for developers, particularly where novel projects are being promoted and planning authorities lack the specialist knowledge to determine applications with confidence. There also seems to be a lack of recognition / guidance at a national level in respect of minerals and their importance to the UK economy (whether from the continuation of aggregate supply for UK construction or the development of new mining ventures that could benefit the global economy). Planning authorities seem to be hampered by the (fear) potential for third-party appeals and challenges on social / environmental grounds - some of which are valid but often agitated by groups with an anti-mineral extraction agenda. If nothing else, mineral development projects are often delayed and run up significant cost before development can commence e.g., high profile cases such as Cononish, West Cumbria Mining, Dalradian, Highthorn etc."

**Wardell Armstrong**

Streamlining the regulatory framework while maintaining and even improving ESG standards in the UK would benefit the UK critical minerals industry and create a more enabling framework for critical minerals development.

## 3.C | DRIVING COLLABORATION

### CENTRAL COORDINATING BODY

#### i. Recommendation

Establish a 'central coordinating body' in the Department for Business, Energy & Industrial Strategy (BEIS) to drive the streamlining of planning and permitting systems with the aim of increasing investment in critical mineral production, enhancing stakeholder engagement and incentivising the application of good ESG practice. The CMA offers to provide experts from within its membership to support the body's work.

Significant potential now exists for creating an enabling environment through the consolidation of law into a streamlined framework, maintaining the high standards the people of the UK have come to expect, and by pulling together regulators with expertise in mining into a task-force to assess mining applications.

The CMA proposes this can be achieved by the central coordinating body, in collaboration with a recommended multi-stakeholder forum, to streamline the planning and permitting process to benefit domestic mining without compromising on ESG performance. The central coordinating body's scope would cover UK domestic mining projects and complement the BEIS work on critical minerals policy. This body should consider the 'bigger picture' perspective of UK mining in the context of its importance for the UK's security of supply and the UK's position globally.

A central coordinating body would improve the current planning and permitting process, which is fragmented across UK Government departments and Local Government. This lack of coordination means that any single UK Government decisionmaker can almost indefinitely hinder the planning / permitting decision making process. Regulatory deadlines may be 28 days but responses often take months instead.

The critical minerals industry would benefit from a single body to oversee and coordinate this planning and permitting process, to provide support to the private sector and the respective Government agencies who are making these decisions and to listen to wider stakeholder concerns so these can be appropriately balanced and considered as part of the wider critical minerals strategy.



#### UK Government agencies involved in mine planning and permitting include:

Environment Agency, Health & Safety Executive – Mines Inspectorate, County Council, Town/Parish Councils, British Geological Survey (BGS), Coal Authority, Local Enterprise Partnerships, BEIS, Her Majesty's Land Registry (HMLR), Companies House, Her Majesty's Revenue and Customs (HMRC) – Taxation, HMRC – VAT, HMRC – Import duties, Power network operators, Water companies, Ofcom – radio licensing, Police, Council - Explosives licensing, Fire Authority.



### MULTI-STAKEHOLDER FORUM

#### i. Recommendation

Establish a multi-stakeholder forum for creating a collaborative space to design the proposed ESG rating system and develop a roadmap for implementing other recommendations set out in this report.

The Forum would convene representatives from across the UK's world leading sectors including:

- UK-listed mining companies;
- University researchers and scientists;
- Investors and insurers;
- Stock and metals exchanges;
- The City of London;
- Industry associations, multilateral and other organisations that play a leading role in setting ESG standard for the mining industry;
- ESG systems experts;
- Downstream critical mineral consumers including manufacturers;
- Civil society.

The critical minerals sector is strongly influenced by external stakeholders. Investors dictate a project's finances, Governments implement legislation and controls, Universities develop future workforces, and society decides whether to support an industry. Consulting all these different stakeholders is key as the UK seeks to become a leader in responsible sourcing of critical minerals.

The multi-stakeholder forum would advise on how to implement the recommendations proposed by this paper – creating an ESG rating system, developing a talent pipeline, promoting innovation and streamlining UK planning / permitting. These should all be discussed with the relevant stakeholders, as featured in the CMA's ecosm (see p.16).

The forum should be led and funded by UK Government as a way for the UK to demonstrate its support of responsible sourcing of critical minerals. The CMA can support in organising this multi-stakeholder forum and would recommend the forum be divided into thematic working groups for the relevant parties to attend (e.g. ESG Rating System, Innovation, Talent Pipeline, Planning / Permitting etc.). Monthly meetings (virtual and in-person) would help build momentum for this.



## INTERNATIONAL COLLABORATION

### i. Recommendation

Department for Business, Energy and Industrial Strategy (BEIS) and the Department for International Trade (DIT) to collaborate with other areas of government to position the UK as an international leader on critical minerals by incorporating ESG expectations in trade agreements.

### ii. Recommendation

Actively promote and influence multilateral discussions on establishing a global approach to ESG in critical minerals supply chains, leveraging the UK's vast diplomatic network, financial markets and other international relationships.

Critical mineral supply chains and ESG standards are global in nature. The UK's approach to ESG should therefore seek to maximise international collaboration, using the UK's existing diplomatic network, financial markets and other international relationships through its support services.

The Critical Minerals Association is already in conversation with the UK's Foreign, Commonwealth and Development Office (FCDO) in Canada, as well as the Australian Government's Critical Minerals Facilitation Office. Through the CMA's events with the Australian and Canadian Governments, support for international collaboration with the UK has been outlined.<sup>24</sup>

The UK can collaborate with a number of partner nations – e.g. the Five Eyes, and this will be key to draw on everyone's strengths, particularly as various parts of the supply chain will occur in different international locations. In addition, a number of highly developed ESG standards are internationally located (see p.56).

The UK has an opportunity to become a world leader in ESG standards and implementation. However, before the UK is in position to extend its international influence, it is essential the UK sets an example to other nations. This is already happening, the case studies illustrate the innovation taking place in the UK and how it is helping UK mining projects to operate to high ESG standards.

## 3.D | CONCLUDING STATEMENT

To successfully deliver the Green Industrial Revolution, lessons from the past have to be learned to ensure a new green economy is not built on exploitation, conflict, and environmental disasters.

The UK Roadmap highlights issues that require urgent attention by the UK Government. Solutions are needed to provide sustainable and secure critical mineral supply chains to decrease the UK's reliance on China and unstable jurisdictions.

There is no quick-fix or one-size-fits-all approach. ESG is an evolving and complex field that needs continuous development. As technology improves, and new, better methods of extraction and processing become available, it is essential that barriers are removed that make it more difficult to keep up with innovation in the industry (e.g. permitting issues or, higher insurance premiums for new, more sustainable extraction and production methods).

A pipeline of UK critical projects is growing and requires support from the UK Government to continue towards production. The UK Government is in a position to endorse its ESG-compliant mining sector, which will significantly boost local economies, benefit communities and set an example of sustainable resourcing to the rest of the world.

Without urgent action, the UK Government will not only be left behind in global ESG leadership on critical mineral mining and supply chains, but also fail to sustainably source essential critical minerals to drive the Green Industrial Revolution.

<sup>24</sup><https://www.criticalmineral.org/post/appg-critical-minerals-australia-uk-critical-minerals-strategy>

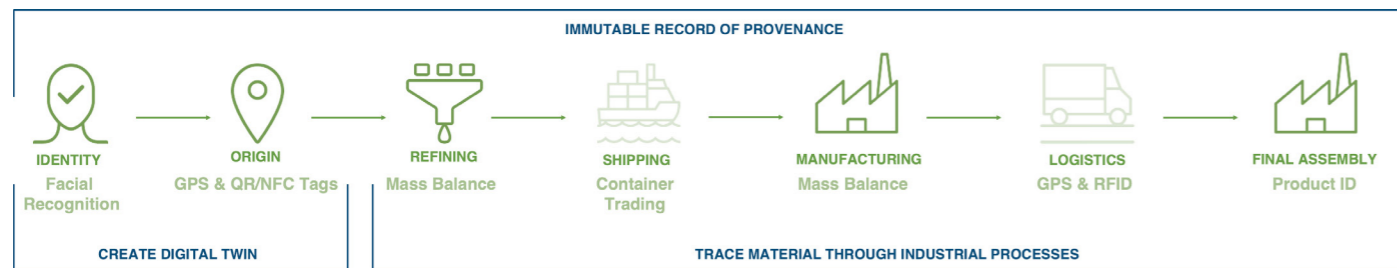
# 4. Case Studies

## 4.A | CIRCULOR: SUPPLY CHAIN TRACEABILITY

Circular's Supply Chain Traceability system provides materials with a unique digital identity and then tracks the flow of this material, even as it changes state through processing and manufacturing by creating an immutable record of the chain of custody of materials from mine to manufacturer, and at the end of life, when they are recycled.

As a consequence of this, organisations are also able to dynamically track and attribute CO2 to the flow of materials, including Scope 3 emissions. This traceability data enables organisations to make informed decisions to reduce their carbon footprint and United Nations (UN) sustainable development goals (SDGs) targets.

The solution provides assurance that no cobalt and mica of unknown origin enters the supply chain at any step of the process. The platform uses technology to provide materials with a unique identity (Digital Twin) and then tracks the flow of this material via a digital thread all the way through the supply chain.



OEMs such as Volvo recognise the need for a more innovative and effective solution to prove that materials used in their supply chain had indeed been responsibly sourced, particularly due to increasing legislative and consumer demands for transparency in the provenance of raw materials.

Using the Circular Platform, Volvo has mapped the production flow of materials for its lithium-ion batteries and with the further support of machine learning, Volvo has been able to identify data anomalies to target compliance and due diligence. Volvo is aiming to manage the risk and demonstrate with as much certainty as possible that no material that was not responsibly sourced entered the supply chain at any point.

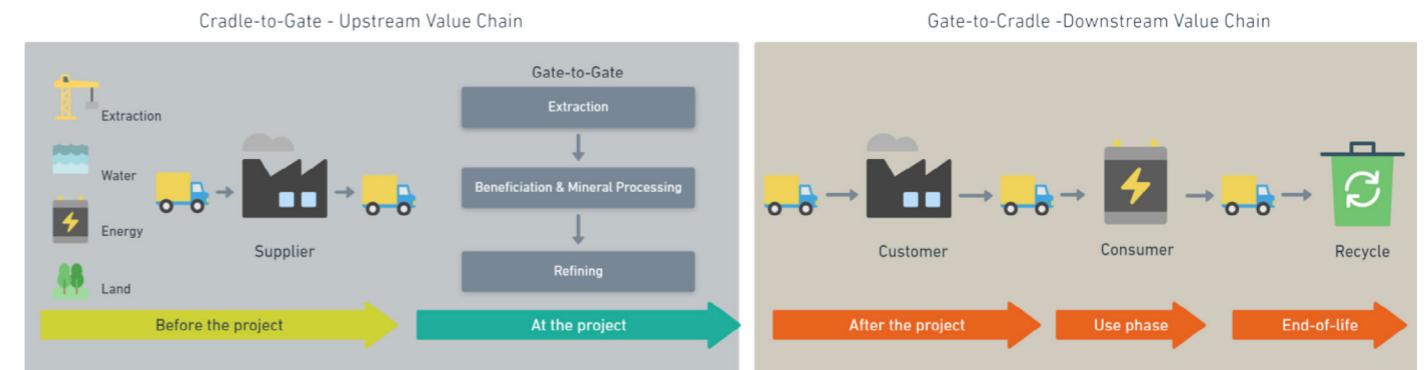
Volvo has also been able to trace recycled cobalt in its various physical transformations throughout its manufacturing process across the battery supply chain and validate the integrity of the raw materials, with proof of time, duration, location and mass balance of input and output. Having now embedded traceability in its core business, Volvo is now adding other minerals into its traceability drive including mica, nickel and lithium.

Battery cell suppliers for Volvo Cars' EV platforms are required to implement systems that provide full traceability of cobalt materials to give management and stakeholders confidence that the cobalt that is used in production complies with responsible sourcing standards.



## 4.B | MINVIRO: LIFE CYCLE ASSESSMENT

Life Cycle Assessment (LCA) is a tool used by Minviro to assess the environmental impacts associated with all stages of a product, process or activity.



LCA provides the producer and user of critical minerals a quantitative understanding of the total life cycle environmental impacts associated with the value chain of a product, including direct emissions and embodied impacts of the materials and energy required to produce certain products.

OEMs and the LME recognise LCA's benefit as a single integrated framework that generates results on how decisions made at one stage of the life cycle might have consequences elsewhere. This ensures potential trade-offs can be balanced and the environmental burden is not simply shifted. A schematic visualisation of where impacts come from before, after and during the project is shown below.

LCA is more likely to yield actionable outcomes when used during development phases of critical minerals project rather than when used retrospectively. This is due to prior commitment of capital to certain energy sources (e.g. a coal fired power plant or renewable energy on site) or process design considerations creating increased financial and technical risk.

When deployed during development stages, decisions can be supplemented by environmental impact data, enabling incorporation of environmentally informed solutions. This approach is currently being used to evaluate the impact of project configurations in the critical mineral space.

### LCA highlight outcomes for:

#### REE Project in Malawi:

Resulted in 81% reduction in product carbon footprint through integration of electricity production from a solar source and battery storage;

#### Lithium project in the USA:

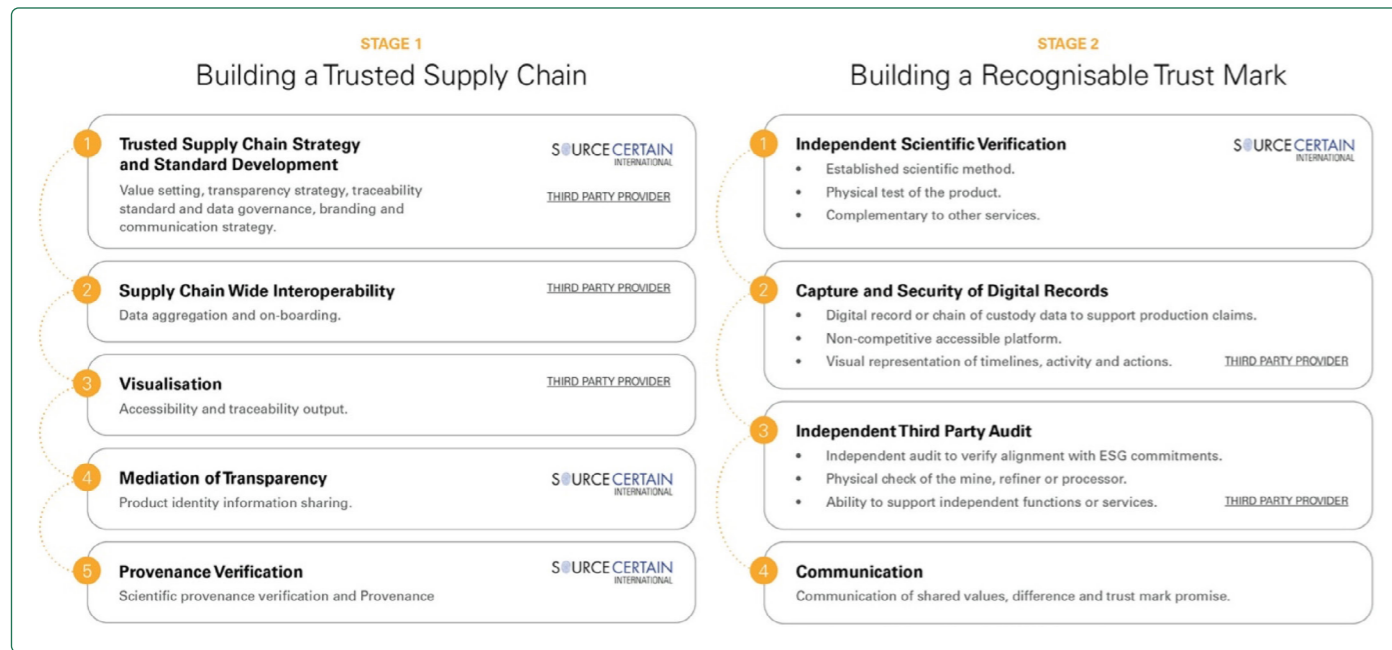
Provided quantitative insights into the value proposition of alternative haulage technologies (diesel fuelled trucks vs. electricity powered conveyor belt) and alternative spodumene processing solutions;

#### Nickel project in Australia:

Environmentally informed decision making, highlighted the effects of using hydrogen as an energy source compared to natural gas.

## 4.C | SOURCE CERTAIN: PROVENANCE OF RAW MATERIALS

Source Certain International (SCI) deploys technology that chemically fingerprints raw and processed materials to verify the origin, or 'provenance', back to the mines and downstream processing facilities.



The ongoing and independent product verification introduces transparency into the supply chain and mitigates the risk of 'greenwashing' by verifying ESG claims and 'green promises' attached to end products.

SCI have formed a partnership with USA Rare Earths to support their Mine-to-Magnet Strategy through the use of scientific verification of provenance. The partnership will demonstrate a unique platform that shares critical information, including key metrics that relate to the carbon footprint of the product, plus any relevant ethical, environmental or sustainability certifications and product provenance – all scientifically verified and transparently documented.

"Supply chain transparency and traceability for critical and strategic minerals supply chains - particularly for green and clean technologies - is fast becoming a requirement for end-users and for governments."

"We've seen it most recently in the solar power sector, with the spotlight on essential solar materials reportedly being produced in China using forced labour. Consumers want to know the products they purchase and use are ethically sourced, and they are going to demand that companies become transparent about their supply chains. USA Rare Earth sees this as core to how we meet our mission as a trusted source for critical and strategic minerals and metals. With SCI as our partner, customers and consumers will know exactly where USA Rare Earth materials come from, how they are mined, refined, recycled and reclaimed – that the work was done responsibly, and in jurisdictions that have high standards with respect to the environment, safety and social responsibility."

Pini Althaus | Chief Executive Officer | USA Rare Earth.



## 4.D | TUNGSTEN WEST: HEMERDON MINE

Tungsten West Limited has recently completed a Bankable Feasibility Study on the restart of the tungsten and tin Hemerdon Mine, formally Drakelands Mine as operated by Wolf Minerals (UK) Limited.



View of the Hemerdon Mine site. Source: Tungsten West.

Tungsten West hopes to reduce the emissions intensity of producing tungsten and tin concentrates. The aim is to maximise the use of process materials, formally defined as 'waste', as high-quality aggregates for a local market.

The approach is supported by policy and the aggregates by-product has been signed off as a new mineral resource, approved by the Mineral Planning Authority and the Devon County Council Highways Authority.

**The benefits include:**

- Avoidance of transport, disposal costs and direct emissions;
- Reducing onsite road haulage activities and transport emissions;
- Shortening local supply chains;
- Conserving primary resources of virgin material;
- Reduction in 'wet' tailings disposal;
- Protecting ecosystems and maintaining biodiversity;
- Offsetting of emissions intensity 'upside' from the supply of secondary aggregates against the production of tungsten and tin concentrates.

Tungsten West Limited's business model has sought to maximise the tungsten and tin resource by exploring material handling efficiencies within the process. Further, Tungsten West Limited have founded the business using an integrated management system compliant with ISO14001, 50001, 45001 and 9001 to continue to deliver industry best practice and continual improvement. The aggregates project is just one of a number of ESG upsides for the updated plans to be presented at Hemerdon.



## 4.E | DALRADIAN: PROPOSED NET ZERO MINE

Dalradian has been working in Northern Ireland for more than 11 years, advancing its project, which contains a mineral deposit of gold, silver and copper.



Site plan for proposed modern underground mine. Source: Dalradian.

The regionally significant project is currently moving through the planning process, with the aim of being one of the world's top underground mines utilizing the best available technology for modern mining.

### Features of the proposed mine include:

- Potential to be Europe's first net-zero / carbon-neutral mine;
- State-of-the-art water recycling and reverse osmosis treatment facility;
- Buildings designed to blend in with local area;
- Stimulating the local economy by creating c. 1000 jobs (including 350 direct jobs);
- A commitment of £4 million in community funding once planning approval is received;
- Mining and some processing underground, minimising the surface footprint;
- The majority of mined materials to be retained or returned underground;
- The remaining waste rock contained in an engineered dry stack. This will be progressively reclaimed, planted and contoured during operations to reflect the local landscape;
- Full site reclamation secured in advance with a financial guarantee provided by Dalradian (options include restoring the site to its original farming use or community-driven purposes such as recreation or a nature preserve, to be decided in consultation with community and regulators).

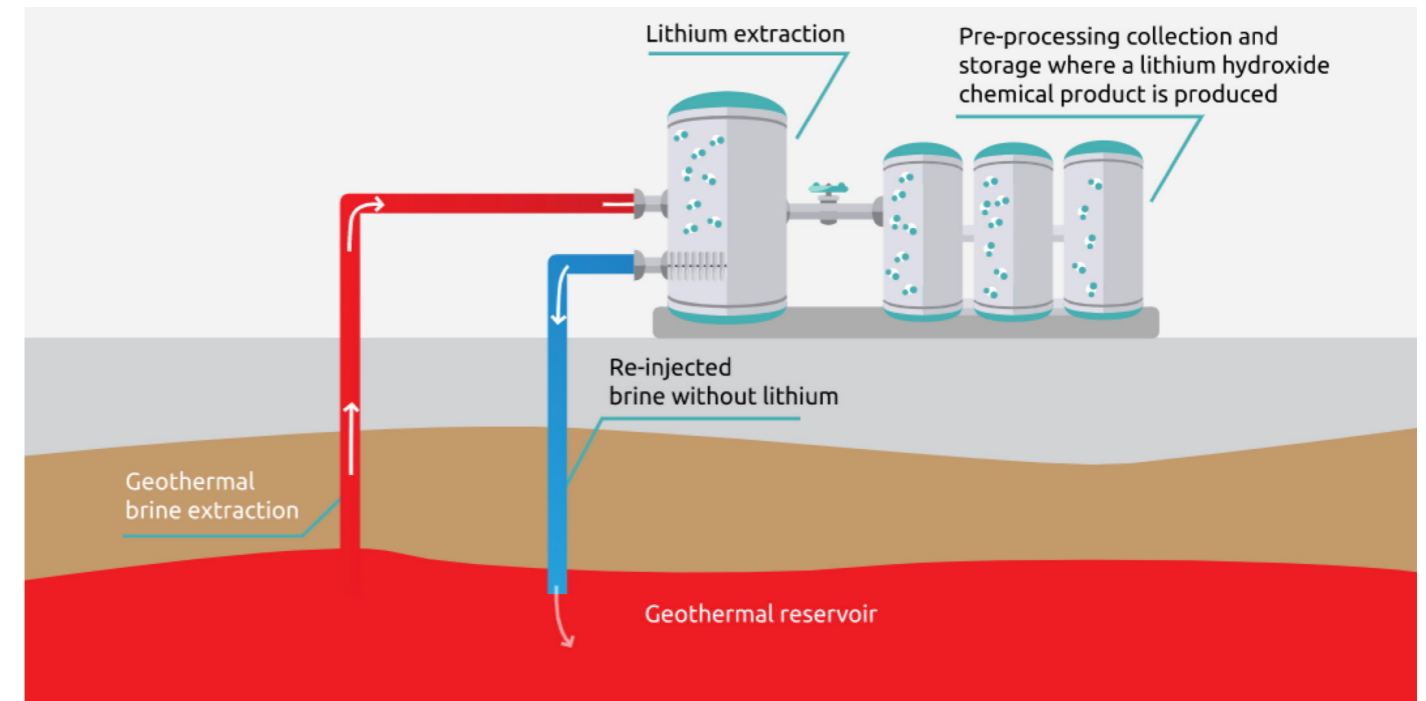
Dalradian has listened carefully to its community and as a result, introduced environmental enhancements to the project such as completely removing cyanide from the process, reducing water usage by 30% and cutting greenhouse gas emissions by 25% as part of its aspiration to become Europe's first net zero / carbon neutral mine.

The project is better as a result. Ongoing communication is frequent and broad-based, including more than 100 advertorials in the local newspapers, a quarterly newsletter to local residents and regular updates on various social media channels.



## 4.F | CORNISH LITHIUM: LITHIUM EXTRACTION

It is increasingly important that raw materials are extracted in the most environmentally responsible, low carbon manner possible, otherwise this could mitigate any of the positive impacts associated with these technologies replacing fossil fuels.



Direct Lithium Extraction. Source: Cornish Lithium.

The use of Lifecycle Assessments (LCAs) can be a useful tool for comparing possible production routes for raw materials, and the impacts associated with them (see case study on p.46).

Companies must embrace new technologies that allow more efficient extraction of critical raw materials, and minimise waste at the same time. Cornish Lithium is pioneering the low carbon extraction of lithium from hard rock mica minerals, and from within lithium-enriched geothermal waters in Cornwall, South West England.

It is the advent of new extraction technologies that have helped to 'unlock' these mineral deposits, which were previously considered unconventional. Recent advances in lithium extraction technology are enabling the economically viable extraction of lithium directly from fluids, in the concentrations historically present in Cornwall's hot springs. Cornish Lithium hopes to be using Direct Lithium Extraction (DLE) technology

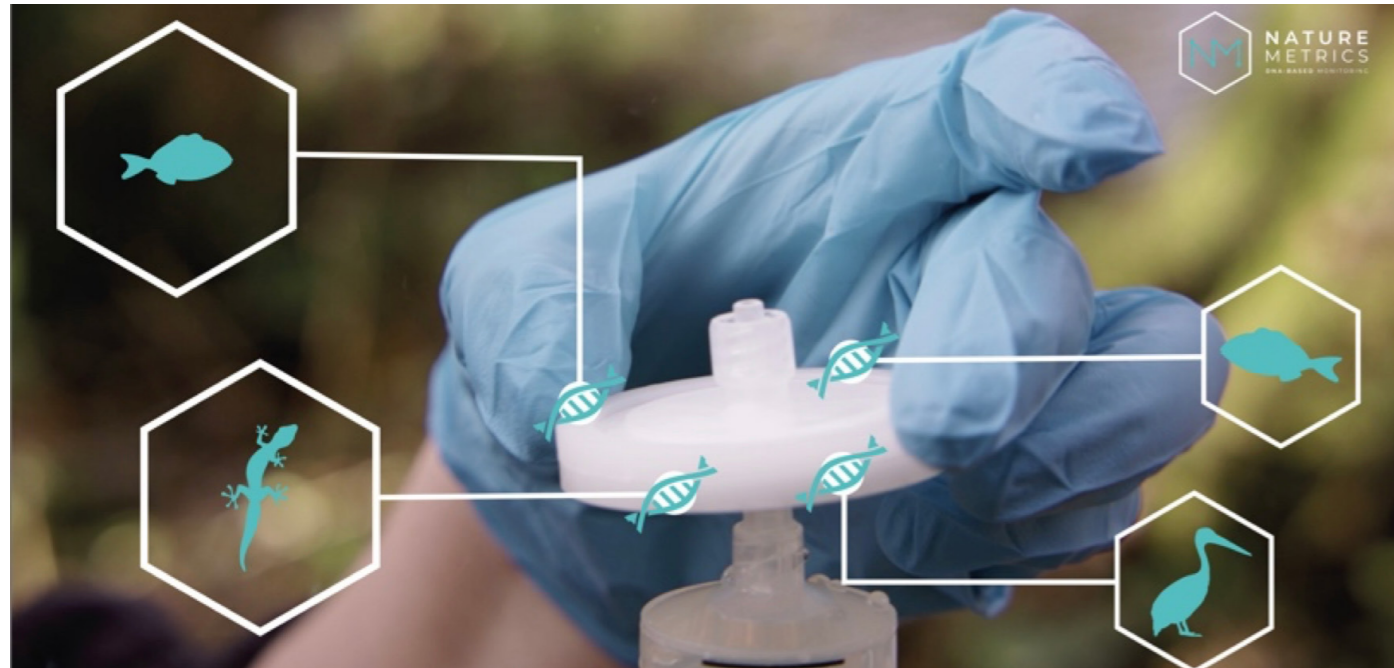
to selectively remove the lithium compounds from the geothermal waters, and believes this is the most environmentally-responsible method of extracting lithium from solution.

Various companies have developed their own proprietary extraction technologies, and Cornish Lithium is in discussion with potential partners to work out which may be best suited to extract lithium from Cornish geothermal waters. These technologies are often based around particular membranes, or ion absorption, to allow the selective removal of only lithium compounds from the waters. Ultimately, Cornish Lithium aims to produce a battery quality lithium hydroxide product from the geothermal waters.

Cornish Lithium is also evaluating the potential to utilise the heat energy contained within these geothermal waters, The co-production of lithium with heat and power represents an exciting opportunity for low (or even net zero) carbon production of lithium.

## 4.G | NATUREMETRICS: INNOVATION IN BIODIVERSITY

Across freshwater, marine and terrestrial environments, NatureMetrics work with clients to integrate eDNA and other molecular tools into biodiversity monitoring programmes.



DNA collected from water, sediment or insect samples generates rapid biodiversity data alongside existing workflows at all stages of the project lifecycle (from exploration / baselining to closure / restoration). This enables projects to manage biodiversity risk, track progress towards goals such as 'net positive impact', no net loss' of biodiversity and inform ESG frameworks and all stages of the mitigation hierarchy. DNA-based monitoring provides biodiversity data at unprecedented scales, enabling data-driven decision making and accurate reporting at project and portfolio levels.

A new partnership with Anglo American will see eDNA being applied at twelve pilot projects across their global business units. These span ten countries and a range of ecoregions (marine, terrestrial, arctic, desert), including Woodsmith project in the UK. These projects demonstrate how eDNA methods can be applied to different stages of project life cycles and the mitigation hierarchy. Data generated from these pilots will lay the foundations for repeat and long-term monitoring, with opportunities to expand across the supply chain from extraction to transportation of materials. Meanwhile, focused barcoding efforts will help to build the local genetic reference libraries, strengthening regional capacity for monitoring and research.

**The Anglo American eDNA projects will demonstrate the core benefits of DNA-based monitoring, including:**

- Accurate, repeatable, efficient sampling;
- Reduced costs and timeframes;
- Reduced HSE risks and early risk identification and mitigation;
- Big data that can feed into predictive modelling;
- Build barcoding datasets that will serve as a legacy of baseline data for the project sites;
- Skills transfer and upskilling to staff, facilitating learning in consortia;
- Opportunities for community monitoring, co-engaged learning / outreach and citizen science.

"[eDNA technologies have] got huge applicability. If we think about early on in the discovery and exploration phase, where our knowledge is limited about the potential biodiversity risk in the area that we might be looking to explore, it's a critical component to that. When a mine is in full operation, it will become a key part of the ongoing monitoring and evaluation in terms of our biodiversity performance."

Warwick Mostert | Biodiversity Principal | Anglo American.



## 4.H | DIGBEE: ESG DISCLOSURE

Digbee and Satarla partnered in 2020 to build and launch Digbee ESG. Digbee ESG is an ESG disclosure platform for the mining industry.

A future-looking, right-sized set of frameworks, aligned to the key global standards and accepted by leading stakeholders which hugely simplifies ESG disclosure for mining companies, encourages management action and assists boards in meeting their ESG obligations. Satarla used their knowledge of what good practice ESG looks like within mining projects and operations, and married that with the most applicable expectations as set by the myriad of international standards, frameworks and guidelines.

**The benefits of the Digbee ESG tool:**

- A rigorous ESG expert driven manual scoring process is applied to mining company's submissions;
- The process involves a set of easy-to-understand questions that focus on true action and impact regarding ESG in mining;
- Efficiency of disclosure for management is improved while rewarding them for the action taken both on the ground and in the boardroom by addressing greenwashing head-on;
- It enables opportunities and threats to be identified with credit being given for proactive action being taken in areas of ESG risk that will not be realised for many years;

- The online disclosure is made public after a maximum of 13 months, during which time companies have the opportunity to improve on their ESG;
- The online platform provides mining companies with a digital presence, thus giving a means for capital providers, insurers, local stakeholders, and others to track and assess mining companies through credible scores.

Digbee works with global stakeholders such as Blackrock, Newton, BMO, Willis Towers, Sibanye Stillwater and many others to fulfil the needs required by capital markets and insurers for a standardised solution to provide a means to compare companies, foster transparency, and open a meaningful dialogue.

By bringing together investors, mining companies, local stakeholders, insurers, and others with a single, credible and standardised means to disclose and track ESG, Digbee ESG will help catalyse access to new and growing pools of capital, ultimately facilitating the development of new critical metals and assisting in the world's transition to a low carbon economy.



## 4.1 | TIRUPATI GRAPHITE: MINIMISING WASTE

Tirupati Graphite is developing into a fully integrated flake graphite and graphene company providing end-to-end solutions for all applications of the materials.

Graphite's use in green technologies includes: fuel cells, solar panels, electric vehicles, insulation, lubricants and thermal magnets.

Tirupati Graphite has adopted a four-point concept across its business to be able to deliver graphite as sustainably as possible:

### Sustainable Mining:

- Free-dig mining of ore eliminates need for blasting up to 40-50m depth, reducing the fleet requirement and hence the energy consumption.
- Overburden material is utilised in land reclamation. The land is then being provided to locals for agriculture.

### Primary Processing:

- Reduced waste by developing a new technology that extracts the waste as a by-product (construction sand) in step one of processing. This has decreased the energy requirement and the number of necessary processing steps. The by-product can be a substitute to riverbed sand, saving environment damage to some extent. The remaining waste is clay which is being used for social development like brick making;
- The water in the circuit is being treated in the tailings dam and reused;
- A hydropower plant is being set up to meet 100% of Tirupati Graphite's processing energy requirements from renewable sources. Further studies are being done for wind and solar energy;
- Recoveries in the processing of ore are very important and the company has >85% recovery of graphite from ore.



### Downstream Processing:

- Tirupati has developed a new purification technology that is zero-waste and does not use the commonly used chemical – hydrofluoric acid, as is currently used in processing in China.

### Research & Development for advanced materials & processes:

- The successful product development of a graphene aluminium composite that has electrical conductivity similar to copper, thermal conductivity greater than copper but density similar to aluminium – hence presenting large emission reduction opportunity in weight sensitive applications of copper.



# 5. Appendix A: Proposed ESG Rating System Considerations & Example

Factors the CMA proposes be considered in the development of the rating system include:

- Not having a pass or fail rating but rather a scale that enables the maturity of the organisation's ESG performance to be shown against agreed criteria with the specific aim of encouraging continuous improvement;
- Assessing an organisation's ESG status using existing performance measures (such as the industry, national and international standards outlined on p.60), with equivalencies drawn to highlight UK's expectations of maturity (refer to an example below);
- Developing new criteria for those areas that are not currently well regulated (either by government, financial markets, the supply chain or the industry itself);
- Broad recognition that the ESG criteria included in the Phase 1 rating system for a mining company may be different to that of a manufacturer or of a recycling business eventually developed in Phase 2 - regardless of this there would be strong linkages to industry organisations, regulatory frameworks and supply chain expectations;
- Being flexible with the rating, with the multi-stakeholder forum determining if the system should be singular, covering all aspects of ESG with a single rating score or perhaps be sub-divided into three components of E, S and G, each with their own rating scale;
- Aiming to facilitate the rating of each of the different parties along the supply chain to be included in any future mineral 'passport or mark' to facilitate transparency throughout the value chain and through to the consumer;
- Designing the system to evaluate performance with respect to ESG outcomes or impact achieved by the organisation, rather than being perceived as a 'tick box' exercise.

**Other concepts that might be considered in the development of such a rating system could include:**

- Cognisance of the CARE analysis approach<sup>25</sup> used by the International Institute of Sustainable Development and International Governmental Forum on Mining, Minerals, Metals and Sustainable Development to identify the most appropriate existing standards, guidelines or frameworks required to support the rating criteria. **CARE stands for:**
  - **Coverage** (content or issues captured in the document);
  - **Assurance** (level of verification required ranging from self-assessment through to third party validation);
  - **Responsiveness** (inclusion of indicators supporting continuous improvement, adaptation and capacity building) and;
  - **Engagement** (how diverse is the establishing group and how were stakeholder views incorporated into the development of the document).
- Incorporation of two ratings per component, one that relates to current performance and one that reflects the potential optimal performance (similar to the EPC system) such that there is an incentive for continuous improvement.



**Example of a Rating System**

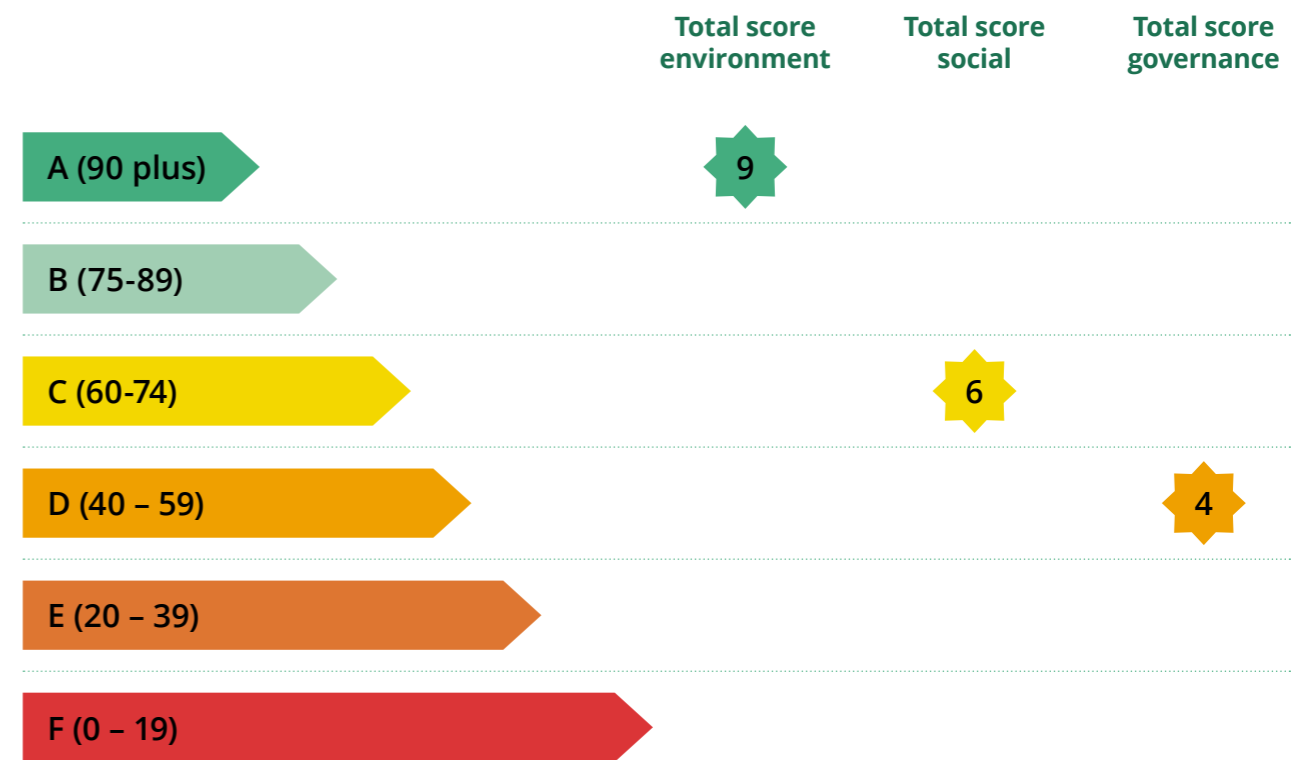
An initial concept for how the rating system might work is based on the EPC scheme used by the UK housing industry. Several criteria would be identified under each of the E, S and G headings (example below). The identification of criteria may be based on some of the more widely recognised standards being used by industries along the minerals and metals value chain and/or linked through to the UN's Sustainable Development Goals.

A company wishing to receive a rating would be scored against of each of the identified criteria. Scoring may be a single pass / fail score or be determined on a sliding score for different levels of assessed performance. The scores for each of the criteria would then be totalled to give an overall performance rating score, and this in turn could be linked to a colour-coded banding similar to that used for EPCs.

As an example, under the environmental component there is likely to be a criterion related to mine closure. In this case the ICMM Closure Maturity Framework could be an existing tool to evaluate the level of performance. The framework provides four levels of maturity ranging from nascent through to leading practice. A company or asset could be evaluated against the framework and depending on their maturity level would be assigned a score.

This might equate to scores, for example, of 2 for nascent, 5 for basic, 10 for aligned to good practice and 20 for leading practice. Another possible example under the governance heading might relate to payments to government. So if a company publishes payments to government in accordance with the Extractive Industries Transparency Initiative they might get a score of 10 but if they do not then the score is zero, so unlike closure above, which is a sliding scale, this is a straight yes/no criterion.

**EXAMPLE ESG RATING SYSTEM**



<sup>25</sup>The International Institute for Sustainable Development (IISD) has an international research project known as the State of Sustainability Initiatives (SSI) to improve the effectiveness of voluntary sustainability standards and raise awareness of their potential to foster sustainable production and consumption. The research aims to analyse the strengths and limitations, and assess how voluntary sustainability standards contribute to sustainable development, using their bespoke CARE analysis. <https://www.iisd.org/system/files/publications/igf-ssi-review-extractive-economy.pdf>



# 6. Appendix B: Alignment of Blueprint with UN SDGs

UK Blueprint	How are these addressed by the UK Blueprint?	SDGs					
<b>UK LEADERSHIP ON ESG IN THE CRITICAL MINERALS SECTOR</b>							
<b>Statement of commitment from the UK Government</b>	Provide support for secure, responsibly sourced, domestic supply chain of critical minerals (Cu, Li, Pb, W) to unlock: <ul style="list-style-type: none"> <li>• affordable and clean energy;</li> <li>• sustainable consumption and production patterns;</li> <li>• sustained, inclusive and sustainable economic growth; and</li> <li>• employment opportunities.</li> </ul>						
<b>Responsible supply chain ESG rating system</b>	Protect, restore and promote sustainable use of terrestrial ecosystems and halt biodiversity loss and conserve oceans through tracking and promoting sustainable production including: <ul style="list-style-type: none"> <li>• making human settlements safe, resilient and sustainable;</li> <li>• promoting well-being for all ages; and</li> <li>• providing modern energy for all.</li> </ul>						
<b>ENABLING RESPONSIBLE INVESTMENT IN UK CRITICAL MINERALS</b>							
<b>Access to capital, responsible sourcing, and innovation</b>	Promote and invest in responsible sourcing and innovation to: support sustainable economic growth; <ul style="list-style-type: none"> <li>• maintain our world leading centres of discovery;</li> <li>• ensure sustainable consumption and production patterns; and</li> <li>• promote peace, justice and strong institutions.</li> </ul>						
<b>Supporting a talent pipeline</b>	Support education at all levels to facilitate a future diverse talent pipeline of high-calibre experts that would: <ul style="list-style-type: none"> <li>• ensure inclusive and equitable quality education around the topics of sustainability, green energy and responsible consumerism.</li> <li>• promote lifelong learning opportunities for all;</li> <li>• support future employment in the sustainable resource sector both within the UK and internationally;</li> <li>• foster innovation;</li> <li>• reduce inequality within and among countries; and achieve gender equality and empower all women and girls.</li> </ul>						
<b>Streamlining planning and permitting</b>	Facilitate planning and permitting within the critical minerals sector to: boost sustainable economic growth; <ul style="list-style-type: none"> <li>• create new employment opportunities;</li> <li>• make the UK inclusive and sustainable; and</li> <li>• build effective, accountable and inclusive institutions at all levels.</li> </ul>						
<b>DRIVING COLLABORATION</b> Central coordinating body Multi-stakeholder forum International collaboration	Collective promote peaceful, just and strong institutions whilst creating partnerships for the goals through active collaboration across the central coordinating body, multi-stakeholder forum and international collaborative bodies.						

# 7. Appendix C: Standards & Frameworks

Please note that this is an illustration of the standards, frameworks and legislations – it is not an exhaustive list.

Type	Name	Organisation	Topic	Location	Description	ESG Work
Voluntary Standards/ Frameworks	EITI (Extractive Industries Transparency Initiative)	Multi-stakeholder organisation	Transparency & Accountability	International	The EITI is the global standard to promote the open and accountable management of oil, gas and mineral resources. As a multi-stakeholder organisation, the EITI builds trust between governments, companies and civil society.	The EITI requires the disclosure of information along the extractive industry value chain, from licensing to extraction, to how revenue makes its way through to government, to how it contributes to the economy and wider society.
	ICMM (The International Council on Mining and Metals)	Mining Association	Environmental, Social and Governance	International (London-based)	The International Council on Mining and Metals is an international organisation dedicated to a safe, fair and sustainable mining and metals industry. As a membership commitment, every ICMM company member adheres to our Mining Principles, which incorporate comprehensive environmental, social and governance requirements, robust site-level validation of performance expectations and credible assurance of corporate sustainability reports with annual disclosure.	<ul style="list-style-type: none"> <li>A) ICMM Mining Principles - ICMM's Mining Principles define good practice environmental, social and governance requirements for the mining and metals industry through a comprehensive set of performance expectations.</li> <li>B) Global Industry Standard on Tailings Management</li> <li>C) Equivalency benchmarks comparing mining principles to other standards</li> <li>D) Connection to SDG goals</li> <li>E) Guidance on water reporting</li> <li>F) Guidance biodiversity (mitigation hierarchy)</li> <li>G) Principles for Climate Change Policy Design</li> <li>H) Integrated Mine Closure</li> <li>I) The cost of carbon pricing: competitiveness implications for the mining and metals industry</li> <li>J) Community development toolkit</li> <li>K) Voluntary principles on security &amp; human rights</li> <li>L) Integrating human rights due diligence into corporate risk management processes</li> </ul>
	OECD (Organisation for Economic Co-operation and Development)	Inter-governmental organisation	Conflict minerals, Environmental, Social and Governance	International (France-based)	The Organisation for Economic Co-operation and Development (OECD) is an international organisation that works to build better policies for better lives. Together with governments, policy makers and citizens, the OECD works on establishing evidence-based international standards and finding solutions to a range of social, economic and environmental challenges.	<ul style="list-style-type: none"> <li>A) OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas</li> <li>B) Investment governance and the integration of environmental, social and governance factors</li> </ul>
	IRMA (The Initiative for Responsible Mining Assurance)	Coalition of non-government organizations, mining companies, businesses that purchase minerals and metals for resale in other products, affected communities, and trade unions	Social responsibility, environmental responsibility, business integrity and planning for positive legacies.	International (Australia-based)	IRMA offers independent third-party verification and certification against a comprehensive standard for all mined materials that provides 'one-stop coverage' of the full range of issues related to the impacts of industrial-scale mines.	<ul style="list-style-type: none"> <li>A) Standard for responsible mining</li> <li>B) Certification</li> </ul>

Type	Name	Organisation	Topic	Location	Description	ESG Work
Voluntary Standards/ Frameworks	IFC (International Finance Corporation)	Global development institution	Investor ESG Risk Management Framework, Environmental, Social and Governance	International	IFC, a member of the World Bank Group, advances economic development and improves the lives of people by encouraging the growth of the private sector in developing countries.	Performance Standards - IFC's Environmental and Social Performance Standards define IFC clients' responsibilities for managing their environmental and social risks. The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP) and are referred to in the World Bank's Environmental and Social Framework and in IFC's Performance Standards.
	The Equator Principles (EPs)	International organisation	Finance risk	International	The Equator Principles is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision making.	The EPs have greatly increased the attention and focus on social/ community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market.
	Responsible Minerals Initiative	Industry coalition	Conflict minerals	International	Founded in 2008 by members of the Responsible Business Alliance and the Global e-Sustainability Initiative. RMI Mission: Provide companies with the tools and resources to make sourcing decisions that improve regulatory compliance and support responsible sourcing from conflict-affected and high-risk areas.	A) Responsible Minerals Assurance Process B) Theory of Change C) Conflict minerals reporting template
	The UN Guiding Principles Reporting Framework	Intergovernmental organisation	Human rights	International	The UN Guiding Principles Reporting Framework is the world's first comprehensive guidance for companies to report on how they respect human rights.	The UNGP Reporting Framework is a short series of smart questions to which any company should have answers, both to know whether it is doing business with respect for human rights, and to show others the progress it is making. The Reporting Framework is supported by two kinds of guidance: implementation guidance for companies that are reporting, and assurance guidance for internal auditors and external assurance providers.
	Carbon Trust Standards	International organisation	Carbon emissions & environmental impact	International	Advises businesses, governments and the public sector on strategy, risks and opportunities, target-setting, carbon reduction plans and transitioning to a low carbon world. In 2001, it was set up as a company limited by guarantee by the UK government in order to accelerate the UK's move to a low carbon economy by helping business and the public sector cut their carbon emissions and help drive low carbon innovation.	The Carbon Trust Standard helps organisations develop and communicate their leadership in carbon, water and waste management.



Type	Name	Organisation	Topic	Location	Description	ESG Work
Voluntary Standards/ Frameworks	Greenhouse Gas Protocol	A joint initiative of World Resources Institute and WBCSD	Carbon emissions & environmental impact	International	The Greenhouse Gas Protocol provides standards, guidance, tools and training for business and government to measure and manage climate-warming emissions. The Greenhouse Gas Protocol establishes comprehensive global standardised frameworks to measure and manage greenhouse gas (GHG) emissions from private and public sector operations, value chains and mitigation actions.	Greenhouse Gas Protocol offers the following resources: <ul style="list-style-type: none"> <li>• Corporate Standard</li> <li>• Scope 2</li> <li>• Scope 3 Standard</li> <li>• GHG Protocol for Cities</li> <li>• Project Protocol</li> <li>• Mitigation Goals Standards</li> <li>• Product Life Cycle Standard</li> <li>• Policy and Action Standard</li> <li>• Guidance</li> <li>• Calculation Tools</li> <li>• Online Training</li> <li>• Review Service</li> </ul> These resources culminate in a protocol that is accessible to all entities looking to reduce emissions and help achieve the goals of the Paris Agreement.
	CDP	Non-profit charity	Carbon emissions and environmental impact	UK/USA/Germany	CDP is a charity that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.	CDP runs the global environmental disclosure system. Each year CDP supports thousands of companies, cities, states and regions to measure and manage their risks and opportunities on climate change, water security and deforestation. We do so at the request of their investors, purchasers and city stakeholders.
	TCFD (Task force on Climate-Related Financial Disclosures)	International organisation	Climate-related disclosures, market transparency and stability	International	The TCFD was set up to develop recommendations for more effective climate-related disclosures that could promote more informed investment, credit, and insurance underwriting decisions. In turn, it would enable stakeholders to better understand the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risks.	In 2017, the TCFD released climate-related financial disclosure recommendations designed to help companies provide better information to support informed capital allocations. As this occurs, companies' and investors' understanding of the financial implications associated with climate change will grow, leading to investment into environmentally sustainable and resilient solutions, opportunities and business models.



Type	Name	Organisation	Topic	Location	Description	ESG Work
Voluntary Standards/ Frameworks	SASB (Sustainability Accounting Standards Board)	Independent non-profit organisation	Industry specific Environmental, Social and Governance disclosure standards	USA	The SASB sets standards to guide the disclosure of financially material sustainability information by companies to their investors. SASB Standards identify the subset of environmental, social, and governance (ESG) issues most relevant to financial performance in each of 77 industries. SASB also provides education and other resources that advance the use and understanding of its Standards.	In 2018, the SASB published a set of 77 Industry Standards, providing a complete set of globally applicable industry-specific standards that identify the minimal set of sustainability topics and their associated metrics for the typical company in an industry. These standards cover issues relating to five dimensions of sustainability: Environmental; Social Capital; Human Capital; Business Model and Innovation; Leadership and Governance.
	GRI (Global Reporting Initiative)	Non-profit organisation	Transparency and responsibility surrounding sustainability impacts on the economy, environment, and society	International (Secretariat headquartered in Amsterdam)	The GRI Standards help organizations understand their outward impacts: on the economy, environment, and society. This increases accountability and enhances transparency with their contribution to sustainable development.	The GRI developed a set of standards, that consist of Universal Standards and Topic Standards. Organisations can either use the GRI Standards to prepare a sustainability report in accordance with the Standards, or they can use selected Standards, or parts of their content, to report information for specific users or purposes, such as reporting their climate change impacts for their investors and consumers.
	GISTM (The Global Industry Standard on Tailings Management)	International organisation	Tailings management	International	The International Council on Mining and Metals (ICMM), the United Nations Environment Programme (UNEP) and the Principles for Responsible Investment (PRI) co-convened the Global Tailings Review to establish an international standard for the safer management of tailings storage facilities. The resulting Global Industry Standard on Tailings Management was developed through an independent process chaired by Dr Bruno Oberle with the support of a multi-disciplinary Expert Panel and input from a multi-stakeholder Advisory Group. It involved extensive public consultation with affected communities, government representatives, investors, multilateral organisations and mining industry stakeholders.	Strengthening current practices in the mining industry by integrating social, environmental, local economic and technical considerations, the standard covers the entire tailings facility lifecycle – from site selection, design and construction, through management and monitoring, to closure and post-closure. The standard also establishes clear expectations around global transparency and disclosure requirements, helping to improve understanding by interested stakeholders.
Equivalency/ benchmarking	London Metals Exchange	Financial Exchange	Carbon emissions measurement	London-based (Hong Kong owned, international remit)	The London Metal Exchange is the world centre for the trading of industrial metals – the majority of all non-ferrous metal futures business is transacted on our platforms. In 2020, 155 million lots were traded at the LME equating to \$11.6 trillion and 3.5 billion tonnes notional with a market open interest (MOI) high of 2 million lots. The LME has laid out its proposed way forward to make metals the cornerstone of a sustainable future, following three core principles: maintaining a broad scope; supporting voluntary disclosure of data; and providing the necessary tools for change. These principles reflect the LME's belief that the market has not yet fully coalesced around a centralised set of demands or priorities in respect of sustainability. As a result, the LME aims to build consensus through market-led and voluntary transparency, providing a number of tools and services to facilitate solutions related to sustainability in its most expansive sense.	LME to launch new contracts to support recycled, scrap and electric vehicle (EV) industries in transition to sustainable economy Plans to introduce LMEpassport, a digital register that enables a voluntary market-wide sustainable aluminium labelling programme Plans to launch a spot trading platform for price discovery and trading of low carbon aluminium for interested buyers and sellers

Type	Name	Organisation	Topic	Location	Description	ESG Work
Equivalency/ benchmarking	ASI (Aluminium Stewardship Initiative)	Non-profit organisation	Standards setting and certification for those involved in the aluminium value chain	International (headquartered in Australia)	The Aluminium Stewardship Initiative (ASI) is a global non-profit standards setting and certification organisation. They bring together producers, users and stakeholders in the aluminium value chain with a commitment to maximise the contribution of aluminium to a sustainable society. Working together, they aim to collaboratively foster responsible production, sourcing and stewardship of aluminium.	Each year the ASI Board updates its strategic plan that frames ASI's activities under four key goals: effective governance, credible program, growing membership, and financial resilience. In addition to listing strategies and objectives for each goal, it identifies several performance indicators in order to gauge implementation progress.
	ICA (The Copper Mark, International Copper Association)	Multi-stakeholder organisation founded and developed by the ICA	Verifying responsible production of copper	International (ICA headquartered in Washington)	The Copper Mark provides an efficient system to independently verify responsible production of copper that is recognized as credible by key stakeholders. With The Copper Mark, participants can increase the value delivered to customers and their consumers, improve the lives of colleagues and neighbours, and strengthen the communities in which they operate.	The Copper Mark recognises organizations committed to responsible operating practices in regard to the environment, employees, local communities and governance. The Copper Mark offers assurance against the following standards: 1. The Copper Mark Criteria for Responsible Production. The Copper Mark uses the Risk Readiness Assessment (RRA) of the Responsible Minerals Initiative (RMI) as the basis for evaluating Participants' performance, including the RRA-Copper Mark Criteria Guide of February 2020. 2.The Joint Due Diligence Standard for Copper, Lead, Nickel and Zinc of February 2021.
	TSM (Towards Sustainable Mining)	Sustainability programme	Environment and social impacts	Canada	The Mining Association of Canada's Towards Sustainable Mining (TSM) standard is a globally recognized sustainability program that supports mining companies in managing key environmental and social risks.	TSM was the first mining sustainability standard in the world to require site-level assessments as mandatory for all companies that are members of implementing associations. Through TSM, eight critical aspects of social and environmental performance are evaluated, independently validated, and publicly reported against 30 distinct performance indicators.
	RPMG (Responsible Gold Mining Principles) World Gold Council	International organisation	Environmental, social and governance	International (headquartered in UK)	The Responsible Gold Mining Principles (RGMPS) is a new framework that sets out clear expectations for consumers, investors and the downstream gold supply chain as to what constitutes responsible gold mining. Prior to the development of the Responsible Gold Mining Principles, there was no single coherent framework that defined responsible gold mining.	The Responsible Gold Mining Principles addresses key environmental, social and governance issues for the gold mining sector. Companies implementing the Responsible Gold Mining Principles will be required to obtain external assurance from a third party, independent assurance provider. This will provide further confidence to purchasers of gold that the gold they buy is responsibly mined and sourced. To support a consistent approach to assurance, they have developed an Assurance Framework. Assurance takes place at both a site and corporate level and assesses both processes and performance.



Type	Name	Organisation	Topic	Location	Description	ESG Work
Monitoring ESG Performance	Responsible Mining Foundation	Independent research organisation	Transparency & Accountability, Environmental, Social and Governance	International (Switzerland-based)	The Responsible Mining Foundation is an independent research organisation based in Switzerland. The Foundation encourages continuous improvement in responsible extractives by highlighting leading practice and transparently assessing the policies and practices of companies in extractives value chains on economic, environmental, social and governance issues.	The Responsible Mining Index (RMI) Report is a biennial assessment of large globally dispersed mining companies' policies and practices on economic development, business conduct, lifecycle management, community wellbeing, working conditions and environmental responsibility – with gender and human rights issues integrated throughout the report.
	EPRM (European Partnership for Responsible Materials)	Multi-stakeholder partnership	Conflict minerals, Artisanal mining	Europe-based (Projects in Africa & Latin America)	The EPRM is an accompanying measure to the EU Conflict Minerals Regulation. Since the legislation alone is not enough to make a real change 'on the ground', the EPRM is supporting mine sites in CAHRAs. The aim of this support is to enable more mines to comply with the standards required under the OECD Due Diligence Guidance.	<p><b>1. Supporting mine sites Responsible production</b> Artisanal and small-scale mines (ASM) are supported to produce more responsibly and are enabled to get access to formal markets at local and international levels.</p> <p><b>2. Supporting companies Responsible sourcing</b> Mid- and downstream actors are supported to improve their due diligence practices to source 3TG responsibly (e.g. through capacity building and cross-sectoral learning).</p> <p><b>3. Linking production and sourcing</b> Improved/solid linkages are created between supply chain actors in order to stimulate trade from ASMs in CAHRAs</p>
UK Legislation	Clean Air Act 1954	Governments of the United Kingdom	Air pollution reduction	UK	The Clean Air Act 1954 was an Act of the Parliament of the United Kingdom enacted principally in response to London's Great Smog of 1952. It was sponsored by the Ministry of Housing and Local Government in England and the Department of Health for Scotland, and was in effect until 1993.	<p>The Act introduced a number of measures to reduce air pollution. Primary among them was the mandated movement toward smokeless fuels, especially in high-population 'smoke control areas' to reduce smoke pollution and sulphur dioxide from household fires. The Act also included measures that reduced the emission of gasses, grit, and dust from chimneys and smoke-stacks.</p> <p>The Act was a significant milestone in the development of a legal framework to protect the environment. It was modified by later enactments, including the Clean Air Act 1968.</p>

Type	Name	Organisation	Topic	Location	Description	ESG Work
UK Legislation	The Energy Savings Opportunities Scheme (ESOS) Regulations 2014	Governments of the United Kingdom	Energy efficiency assessment	UK	ESOS is a mandatory energy assessment scheme for organisations in the UK that meet the qualification criteria. The Environment Agency is the UK scheme administrator.	Organisations that qualify for ESOS must carry out ESOS assessments every 4 years. These assessments are audits of the energy used by their buildings, industrial processes, and transport to identify cost-effective energy saving measures.
	Streamlined Energy and Carbon Reporting (SECR) Framework	Governments of the United Kingdom	UK energy use and carbon emissions	UK	Large UK companies are required to report publicly on their UK energy use and carbon emissions within their Directors' Report. This new requirement has been implemented by the Department for Business, Energy and Industrial Strategy (BEIS).	Under this legislation, the following needs to be reported: <ul style="list-style-type: none"> <li>• Direct emissions (from transport and combustion of natural gas)</li> <li>• Indirect emissions (electricity purchased and used for operations)</li> <li>• Other indirect emissions (energy use and related emissions from business travel in rental cars or employee-owned vehicles, where the company purchases the fuel)</li> <li>• Intensity metric for year-on-year (e.g., Tonnes of CO<sub>2</sub>e per FTE)</li> <li>• Supporting narrative (calculation methodologies, action taken to reduce emissions)</li> <li>• Voluntary disclosures</li> </ul> This allows companies and organisations to gain an increased awareness of energy costs, reduce their environmental impact, and increase transparency for stakeholders.
	Environmental Permitting Regulations	Governments of the United Kingdom	Permitting structure for activities that may cause harm to human health and environment	UK	The aim of the Environmental Permitting (England and Wales) Regulations 2016 (the EP Regulations) is to streamline the legislative system for industrial and waste installations into a single permitting structure for those activities which have the potential to cause harm to human health or the environment.	The permitting system aims to protect the environment, encourage best practice in the operation of regulated facilities and minimise the regulatory administrative burden to operators while fully implementing the requirements of EU legislation.
	IED (Industrial Emissions Directive)	European Commission	Industrial activity emissions	European Union	Industrial production processes account for a considerable share of the overall pollution in Europe due to their emissions of air pollutants, discharges of wastewater and the generation of waste. The IED was adopted on 24 November 2010. It is based on a Commission proposal recasting 7 previously existing directives (including in particular the IPPC Directive) following an extensive review of the policy.	The IED aims to achieve a high level of protection of human health and the environment as a whole by reducing harmful industrial emissions across the EU, in particular through better application of Best Available Techniques (BAT). The IED is based on several pillars, in particular: an integrated approach, the use of best-available techniques, flexibility, inspections and public participation.



Type	Name	Organisation	Topic	Location	Description	ESG Work
UK Legislation	Extractive Wastes Directive	European Commission	Waste from extractive industries	European Union	The Extractive Wastes Directive aims to prevent or reduce any adverse effects on the environment due to the management of mining waste. All operations managing extractive waste are required to produce and implement a Waste Management Plan before a permit can be granted. The Environment Agency is the Competent Authority in the UK.	Properly managing mining waste ensures the long-term stability of disposal facilities. It prevents or minimises water and soil pollution arising from acid or alkaline drainage, the leaching of heavy metals, and reduces the risk of tailings accidents that can have disastrous consequences and a lasting impact on human health, the economy and the environment.
	Landfill Directive	European Commission	Landfill management	European Union	Implemented in July 2001, the Landfill Directive aims to prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, and on the global environment, including the greenhouse effect, as well as any resulting risk to human health, from the landfilling of waste, during the whole life-cycle of the landfill.	Permitted landfill waste must adhere to a standard waste acceptance procedure which outlines that: <ul style="list-style-type: none"> <li>Waste must be treated before being landfilled.</li> <li>Hazardous waste within the meaning of the Directive must be assigned to a hazardous waste landfill.</li> <li>Landfills for non-hazardous waste must be used for municipal waste and for non-hazardous waste.</li> <li>Landfill sites for inert waste must be used only for inert waste.</li> <li>Criteria for the acceptance of waste at each landfill class must be adopted by the Commission in accordance with the general principles of Annex II.</li> </ul> By following this procedure and regulating landfills, negative environmental impacts from landfill waste are reduced.
	Large Combustion Plant Directive	European Commission	Limitation of emissions of certain pollutants from large combustion plants	European Union	Member states of the European Union were required to legislatively limit flue gas emissions from combustion plants with a thermal capacity of 50 MW or greater. The directive applied to fossil-fuel power stations, and other large thermal plants such as petroleum refineries and steelworks. The directive specified emission limits for sulphur dioxide, nitrogen oxides, and dust.	Combustion plants built after 1987 had to comply with specific emissions limits. From 2007, plants built earlier than that could either opt to comply with the emissions limits, or 'opt out'. Plants which opted out were limited to a maximum of 20,000 hours of further operation, and had to close completely by the end of 2015. This legislation worked to combat acidification, eutrophication and ground-level ozone as part of the overall strategy to reduce air pollution.



Type	Name	Organisation	Topic	Location	Description	ESG Work
UK Legislation	Medium Combustion Plant Directive	European Commission	Limitation of emissions of certain pollutants from medium combustion plants	European Union	The MCPD was proposed as part of the Clean Air Policy Package in 2013. This directive regulates pollutant emissions from the combustion of fuels in plants with a rated thermal input equal to or greater than 1 Megawatt thermal (MWth) and less than 50 MWth.	The MCPD regulates emissions of SO <sub>2</sub> , NO <sub>x</sub> and dust to air. It aims to reduce those emissions and the resultant risks to human health and the environment. It also requires monitoring of carbon monoxide (CO) emissions. Member States are required to report to the Commission in 2021, 2026 and 2031 on various aspects of emissions from MCPs.
	Emissions Trading Scheme	Governments of the United Kingdom	Carbon emissions	UK	A UK Emissions Trading Scheme (UK ETS) replaced the UK's participation in the EU ETS on 1 January 2021. The 4 governments of the UK established the scheme to increase the climate ambition of the UK's carbon pricing policy, while protecting the competitiveness of UK businesses. The UK ETS applies to energy intensive industries, the power generation sector and aviation.	Emissions trading schemes work on the 'cap and trade' principle, where a cap is set on the total amount of certain greenhouse gases that can be emitted by sectors covered by the scheme. This limits the total amount of carbon that can be emitted and, as it decreases over time, will make a significant contribution to how we meet the UK's Net Zero 2050 target and other legally binding carbon reduction commitments.  Within this cap, participants receive free allowances and / or buy emission allowances at auction or on the secondary market which they can trade with other participants as needed. Failure to comply with an ETS permit and obligations under this Order may lead to significant civil penalties being applied.

# 8. References & Sources

**Brunch, M. & Jones S.,**

'What rules of origin requirements mean for UK-EU trade'.

EY. 2021. [https://www.ey.com/en\\_uk/law/state-aid-uk-subsidies-control](https://www.ey.com/en_uk/law/state-aid-uk-subsidies-control)

**EITI,**

'What We Do', 2021.

<https://eiti.org>

**Gro Harlem Brundtland,**

'Report of the World Commission on Environment and Development: Our Common Future', paragraph 27, 1987.

**ICMM,**

'Member Requirements', 2021.

<https://www.icmm.com>

**IRMA,**

'Standard', 2021.

<https://responsiblemining.net/what-we-do/standard/>

**Rainforest Trust,**

'BMW Group, Tetra Pak and Schüco International Express Concerns About Sourcing Aluminium from Ghana's Irreplaceable Atewa Forest', 2021.

**SMMT,**

'UK Automotive', 2021.

<https://www.smmt.co.uk/industry-topics/uk-automotive/>

**The Mining Association of Canada,**

'Towards Sustainable Mining', 2021.

<https://mining.ca/towards-sustainable-mining/>

**The Motley Fool,**

'Does ESG Investing Produce Better Stock Returns?', 2019.

Arabesque Asset Management.

**The World Bank,**

'Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition', 2020.

**Travers Smith,**

'EU Conflict Minerals Regulation', 2020.

<https://www.traverssmith.com/knowledge/knowledge-container/eu-conflict-minerals-regulation/>

**Trytten, L.,**

'ESG Considerations – Where Should the “Next Nickel” be Sourced?', 2021.

Trytten Consulting Services.

**United Nations,**

'Sustainable Development Goals', 2021.

<https://sdgs.un.org/goals>



# Critical Minerals Association



[www.criticalmineral.org](http://www.criticalmineral.org)



@CMA\_Minerals



Critical Minerals Association

Company No. 12419306