



Dear University Leader,

The Key Role of Materials, Minerals & Mining in Modern Society

The evidence that our society's current demands exceed the ability of our planet to meet them is all around us. Sustainable social, environmental and economic development is still very much dependent on natural resources and their responsible use.

From our homes and transport systems to mobile devices, healthcare and clean energy technologies necessary to reach Net Zero, materials and minerals are the building blocks of modern society. Global demand for these resources continues to rise, and moving to decouple economies from reliance upon virgin resource use and towards a more circular economy will be crucial for our long-term security.

In the short- to medium-term however, this will not be sufficient. As extraction of resources will continue to play a role in meeting society's demands, it is vital that it is done in a responsible way that considers environmental, carbon and social impacts.

This will only be possible if we can supply enough people who have the required skills, education and training with access to pathways into the industry and awareness of the employment opportunities.

CMA(UK), IOM3, IQ, MAUK, MPA, and MPQC aim to raise the standards and professional competence in materials, minerals and mining, support the industries in driving environmental, social and governance (ESG) best practice, and promote the role and positive impacts of these sectors.

Demand for talented individuals equipped with the knowledge and skills to ensure materials and minerals are managed responsibly is increasing. However, there are significant skills gaps across the materials and minerals value chains that risk the ability of the UK to meet the demand required to sustain modern society. Recognising this, the UK Government has committed to work with industry and careers services across the UK to bolster the talent pipeline and build the skills required. For example, through the Critical Minerals Intelligence Centre, it will carry out a programme of public engagement on the importance of minerals.

More and more people are becoming aware of the underpinning role of materials, minerals and mining in reaching Net Zero and in our everyday lives. Updated perceptions alongside an increased awareness of the need for well-trained individuals to

ensure this is carried out in a responsible manner, and the associated quality employment opportunities available, will support demand for high-quality education and training.

At the same time, however, misinformation and misunderstanding about mining and quarrying can influence decision-making and actions that are inconsistent with the desire to increase sustainability and address the climate crisis. The demand for metals and minerals required to reach Net Zero and for modern life must be met responsibly across the globe. Practices must be improved and carried out with good ESG standards. Pathways for individuals with the right values, skills and education to access these roles and opportunities are required for this to happen.

As a collective, we are therefore contacting you and your fellow university leaders to provide evidence-based information to support informed decision making and highlight the developing trends and growing drive for a high-quality education and training pipeline for a skilled, responsible and sustainable workforce. Please find this information with links to relevant resources enclosed. Please do get in touch with us, care of rachel.stonehouse@iom3.org if you have any questions or wish to follow up on any of this.

Yours Sincerely,



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The Key Role of Materials, Minerals & Mining in Modern Society

Materials and minerals underpin all economies, provide the building blocks of modern society and technology, and are fundamental for the transition to a low-carbon, resilient, and resource-efficient society. They are essential raw materials for a range of industries and technologies from automotive to aerospace, medical devices to renewable energy infrastructure.

Responsible sourcing, management, and use of materials and resources is therefore essential to facilitate social progress, enable decarbonisation, and protect and enhance our natural environment.

With a growing and developing global population, evolving technologies, and the move to clean energy required to reach Net Zero, the demand for materials and minerals will only increase.^{1,2} Lithium, graphite and cobalt are needed for electric vehicle (EV) batteries, rare earth elements for magnets used in renewable technologies, copper and aluminium for electrical wiring, and steel and concrete for wind turbine towers.

Moving to decouple economies from primary extraction and resource use, and towards a more circular economy where materials are kept in circulation at their highest value for as long as possible, will play an important part in meeting this demand - but in the short-to medium-term, it will not be sufficient.³

Since extraction of resources will continue to play a role in meeting the demand, it is therefore vital that it is done in a responsible manner that considers environmental, carbon and social impacts. This will require a workforce who are equipped with the proper skills, values, training, and access to employment opportunities.

*The Talent Gap: Critical Skills for Critical Materials*⁴ recently published by IOM3 highlights the significant and growing skills gaps along the minerals value chains, as well as the limited education and training provision available. It reports that the lack of access to skilled professionals is a significant and growing risk facing the sector and UK economy.

Recognising this risk, the UK Government has set out an ambition in the *UK Critical Minerals Strategy*⁵ to 'rebuild UK skills in mining and minerals', and committed to working with UK industry and careers services across the UK to do so. In addition, the Department for Business and Trade has committed to modernising perceptions of mining, and through the UK Critical Minerals Intelligence Centre (CMIC) will carry out a programme of public engagement on the importance of critical minerals.⁶

The CBI Minerals Group also updated their UK Minerals Strategy⁷ last year, which sets out the need to maintain a robust skills pipeline across the associated disciplines, and confirms the commitment of the sector to support this through the promotion of career opportunities.

In a similar vein, the Critical Minerals Association (UK)'s Perception & Engagement Working Group aims to raise awareness of the importance of critical minerals to society,

and promotes the talent pipeline into mining and critical minerals by highlighting to young people the various career pathways and opportunities that exist in the value chain. As a result of their engagement with stakeholders in the past 3 years, the Working Group published a paper on 'A Talent Pipeline' (April 2022)⁸ detailing how the UK Government can ensure there are sufficient skills in geology, engineering, and metallurgy to mitigate against an aging workforce.

The significance of materials and minerals and the need to ensure they are responsibly managed is gaining focus across government departments including the Department for Business and Trade (DBT), Department for Environment, Food & Rural Affairs (Defra), Ministry of Defence (MOD), Department for Transport (DfT) and Department for Energy Security and Net Zero (DESNZ).

Updated perceptions and a wider public understanding of the role of materials, minerals and mining in everyday life, as well as an increased awareness of the need for well-trained individuals to ensure this is carried out in a responsible manner, will support demand for high-quality education and training.

¹ In May 2020, the World Bank published *Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition*. It estimates that in order to have enough metals and minerals to meet the Paris climate change target by 2050, global production will need to increase in some cases by up to five-fold.

[\[https://www.worldbank.org/en/news/press-release/2020/05/11/mineral-production-to-soar-as-demand-for-clean-energy-increases\]](https://www.worldbank.org/en/news/press-release/2020/05/11/mineral-production-to-soar-as-demand-for-clean-energy-increases)

² In May 2021, the International Energy Agency published *The Role of Critical Minerals in Clean Energy Transitions*. It estimated that the overall demand for minerals for clean energy is on track to double by 2040 in any case, and to quadruple if the world is to meet its Paris targets.

[\[https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions\]](https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions)

³ The common estimate is that 5% of lithium-ion batteries are recycled, but not all the useful material is captured even then with current technologies. As an analogy, although each year the world recycles about 630 million tonnes (more than 95%) of end-of-life iron and steel, globally we still produce almost 2 billion tonnes because demand is growing. The same will be true for many of the metals and minerals crucial to the transition.

[\[https://worldsteel.org/\]](https://worldsteel.org/)

⁴ In July 2023, IOM3 published *The talent gap: critical skills for critical materials* following a series of engagement with key stakeholders. It highlights the significant and growing skills gaps along the minerals value chains and limited education and training provision available.

[\[https://www.iom3.org/resource/iom3-submits-report-on-critical-minerals-value-chain-skills-gaps-to-uk-government.html\]](https://www.iom3.org/resource/iom3-submits-report-on-critical-minerals-value-chain-skills-gaps-to-uk-government.html)

⁵ In July 2022, the UK Government published *Resilience for the Future: The UK's critical minerals strategy*. This highlights the need to 'Rebuild our skills in mining and minerals'. It notes that of all mining and mineral processing engineers registered with the Engineering Council, 80% are over the age of 50 and nearly 40% are over the age of 66. It states that the number of university students studying geology in the UK nearly halved between 2014 and 2019. It goes on to commit to 'Work with UK industry and careers services across the UK to deliver schools outreach on the

importance of critical minerals and modernise perceptions of mining.'

[<https://www.gov.uk/government/publications/uk-critical-mineral-strategy/resilience-for-the-future-the-uks-critical-minerals-strategy>]

⁶ In March 2023, the UK Government published Critical Minerals Refresh: Delivering Resilience in a Changing Global Environment reemphasising the importance of skills and public engagement with a commitment to 'work with IOM3 to investigate skills required to support development of domestic critical mineral supply chains' and for 'The Critical Minerals Intelligence Centre to begin a programme of public engagement on the importance of critical minerals'

[<https://www.gov.uk/government/publications/uk-critical-mineral-strategy/critical-minerals-refresh-delivering-resilience-in-a-changing-global-environment-published-13-march-2023>]

⁷ In October 2022 the CBI Minerals Group updated the UK Minerals Strategy with the intent of ensuring that the UK demand for minerals and minerals products could be met for the next 25 years. [[UK Minerals Strategy 2022.pdf \(mineralproducts.org\)](#)]

⁸ In April 2022 the Critical Minerals Association (UK)'s Perception & Engagement Working Group published a paper on 'A Talent Pipeline' detailing how the UK Government can ensure there are sufficient skills in geology, engineering, and metallurgy to mitigate against an aging workforce.

[https://www.criticalmineral.org/files/ugd/5caeff_bd9bacf412724f01b7b5a43882e1a69b.pdf]