



Briefing Report

Minerals & Materials



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This year, Innovation Zero is introducing new forums to its event, and we wanted to make sure we were fully informed on the latest trends and topics so we can deliver the best content possible to our audience.

If you trace back the supply chain of any industry upstream, you find the metals, minerals and materials which comprise the end product or its constituent parts. Whether it's the minerals which make up EV batteries and solar panels, or the metals and materials which make up wind turbines, all of the products and technologies which are needed to take us to net zero are highly dependent on this critical supply.

The subject of minerals and materials has risen higher and higher on individual's and businesses' net zero agendas in recent years as the mandating of reducing scope 3 emissions has come into force.

What are Scope 3 Emissions?

- Scope 3 encompasses emissions that are not produced by the company itself and are not the result of activities from assets owned or controlled by them, but by those that it's indirectly responsible for up and down its value chain.

As companies are now being encouraged to disclose their scope 2 and 3 emissions – [see the Task Force on Climate-Related Financial Disclosures' recommendations](#) – and with their credit scores are now being impacted as such by ratings agencies such as [Moody's](#) and [Fitch](#), they are now having to turn their attention to decarbonising their entire supply chain; not just the GHG output of their end products or operations.

Sadly, mining operations are rife with environmental issues, and there is a huge amount of work to be done in order to decarbonise the sourcing, harvesting and global transportation of these minerals and materials.

Critical Mineral Strategy

Firstly, however, we need to address the key challenge of supply.

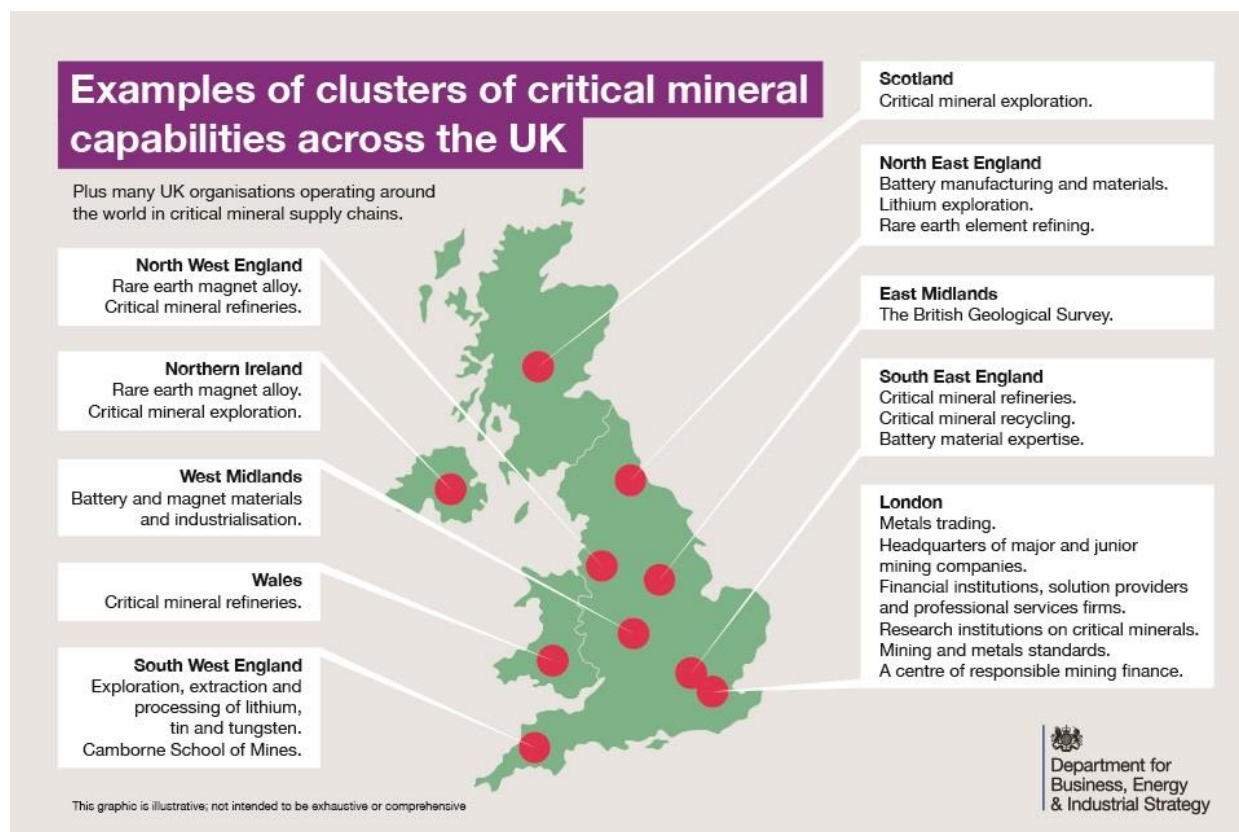
[The Rocky Mountain Institute](#) assures that **there are enough minerals to meet today and tomorrow's EV needs**. The problem is that the upstream portion of the supply chain is unprepared to meet this demand. Global demand for electric vehicle battery minerals is projected to increase by between [6 and 13 times by 2040 under stated policies](#), which exceeds the rate at which new primary and secondary sources are currently being developed.

Today, although there are enough minerals, **there are not enough operating mines**. Many worry that we won't extract these minerals quickly enough to meet rising demand, which could lead to rising prices for consumers and slow EV adoption.

In March 2023, the UK Government published an updated version of its policy paper entitled, "[Resilience for the Future: The UK's Critical Minerals Strategy](#)" to address these problems.

One such problem is the fact that an uncertain and unsteady supply has implications for national security. As the paper notes, "the market is volatile and distorted, and **China is the dominant player**. This creates a situation where UK jobs and industries rely on minerals vulnerable to market shocks, geopolitical events and logistical disruptions, at a time when global demand for these minerals is rising faster than ever."

How does the UK plan to tackle this challenge? Firstly, through **boosting domestic production**. For decades, the UK and other Western nations have been outsourcing their mining operations abroad – often to countries with poor environmental and human rights records, as this report will detail further below. As part of a wider industrial regeneration plan, the government seeks to create an enabling environment for companies to develop critical mineral capabilities in UK, including exploration, extraction, refining, materials manufacturing, recovery and recycling. These industries will create new employment opportunities and contribute a financial boost to local economies across the country.



Source: Resilience for the Future

The UK is also working with allied ethically-responsible nations overseas including Australia (see the [Critical Minerals Joint Working Group](#)), Canada, the US, and South Korea, participating in initiatives such as the [Minerals Security Partnership](#). It is also turning its attention to the seabed, as discussed in our [Oceans & Water Report](#) – something causing consternation from environmentalists.

Innovation Zero will be opening its Minerals & Materials forum with a session on Delivering Critical Mineral Resilience, featuring a select panel of renowned experts, including Vice-Chairs of the All Party Parliamentary Group on Critical Minerals Baroness Lindsay Northover and Alexander Stafford MP.

It will also play a key role in *Infrastructure Zero*, in the session, “Securing Supply – Energy Sources, Critical Minerals, and Skilled Labour” in which panellists will ask what measures are required and being taken to ensure a reliable and resilience supply of raw materials, suppliers, and labour, and how supply is being planned to match future demand.

Improving the ESG of Mining

As mentioned above, a huge number of metals and minerals need mining in order to go into a typical EV battery. These include lithium, nickel, cobalt, manganese, and graphite. For solar panels, we require copper, silicon, indium, lead, tellurium, gallium, aluminium and selenium. Many of these are mined in nations with poor human rights records and little-to-no environmental regulations. In 2020, the Democratic Republic of Congo (DRC) was [the world's largest cobalt miner with a production of 95,000 tons](#), or nearly 41% of the world's cobalt.

The country also boasts some of the highest quality copper reserves globally, with some of the mines estimated to contain grades above 3 percent, significantly higher than the global average of 0.6 – 0.8 percent. However, the DRC ranked 179 out of 191 countries and territories worldwide on the [2021 Human Development Index](#), and in 2018, over 70% of Congolese, about 60 million people, lived on less than \$1.90 a day. Moreover, its mining practices have huge environmental impacts, including biodiversity loss and social disruption due to land use change, water depletion and pollution, waste related contamination, and air pollution.

There are now international movements underway to promote a sustainable transition in the DRC, including a major two-year [Post-Conflict Environmental Assessment](#) by the United Nations Environment Programme (UNEP). Key recommendations include:

- Engaging in a **'green economy' transition** whereby sustainable reconstruction in the DRC includes capitalising on the DRC's emerging social economy to generate 'green jobs'.
- **Diversifying energy sources** as a basis for restarting economic activity. The DRC has a hydropower potential of 100,000 megawatts – or 13% of the world's hydropower potential – which could meet domestic needs and generate export revenue from the sale of electricity.
- Overcoming the considerable environmental liabilities of a century of mining – with immediate action to remediate mining pollution 'hotspots' in Katanga – by **introducing a new, modern mining approach** and formalising the artisanal mining sector to introduce better environmental and occupational health standards.

By catalysing and coordinating action from international business and policy leaders, we can ensure mining operations at home and overseas employ [more sustainable practices](#); shutting down illegal mines, reusing mining waste, and using eco-friendly equipment.

Innovation Zero will cover these topics in its two “Deep Dives”; the first in batteries, the second in solar panels, where there is a huge economic opportunity thanks to reuse and recycling. **90% of solar panels go to landfill, and nearly 78 million tons of solar panel waste is predicted to be generated by the top 5 countries by 2050. The value of solar panel materials, if recovered, could exceed \$15bn by 2050.**



Advancing a Circular Economy

What is “The Circular Economy”?

- An economic system based on the **reuse and regeneration of materials or products**, especially as a means of continuing production in a sustainable or environmentally friendly way. The notion of a circular economy has gained traction, with many companies looking to operate in a way which minimises waste.

Circular practices are being adopted across many of the sectors covered at *Innovation Zero*, including the Built Environment, Industry, and Energy, and circular economists like [Elin Bergman](#) and [Vojtech Vosecky](#) are rising to become among the most influential voices in sustainability. By building purpose-built recycling facilities, shifting towards circular design, and harnessing Industry 4.0 technology, the development and optimisation of circularity can be ever-improved.

The theme of circularity will appear across *Innovation Zero*, including a dedicated session in our Minerals & Materials Forum, where experts and circularity innovators will discuss how businesses can create waste-free closed loop supply chains. As mentioned above in the case of solar panels, the economic benefit of recovering the value of otherwise wasted materials could be enormous.

Of course, using less would mean reusing less. Speaking with the Innovation Zero team over the summer, Rethink Global Director [Catherine Weetman](#) noted how recycling only creates more problems, as a lot of energy and logistics is involved in getting everything back into the right place. **Production and consumption accounts for more than half of GHG and biodiversity loss**, and consumption is going to have to go down. Products that used to last decades now only last years, such as washing machines which, as they are now operated by microchips instead of analogue dials, now last ten years instead of forty-fifty.

Reuse and recycling are key components of the sustainable transition, but we also need to recalibrate our thought towards the reduction of production and consumption.

Alternative Materials

Another way in which industries are reducing their carbon footprint is by turning to alternative materials, many of which we hope to showcase at *Innovation Zero*. One such example is the use of straw as a building material. Historically mocked as a feeble material – one which the big bad wolf would easily blow down – [research over recent years](#) has demonstrated its energy efficiency, fire safety, durability and weather-resilience. While straw has been used to create housing in Africa since the Palaeolithic Era, it's seeing a modern renaissance with the rise in the popularity of straw bale construction. This affordable and sustainable means of the building is being discovered by modern builders and homeowners across the globe, with some standout landmarks assisting its rise to prominence.



[Source: Alternatives to common building materials](#)

The major hurdles that stand in the way of its expansion and acceleration are mortgages and insurance, despite straw builds being “safe as houses”. There is hope on the horizon, with the aptly-named [Ecology Building Society](#) offering insurance and mortgages for wood and straw builds, but greater education on the materials’ efficacies is needed in order to deregulate the space and convince consumers and investors alike to spend money on straw.

This is not the only example; as previous reports have touched upon, alternative materials in packaging is also a booming industry. By bringing policy, business and finance together in conjunction with the innovators – *Innovation Zero’s* raison d’être – we can reach net zero and bring with it the added benefits of stimulated economies, job growth, and climate resilience.

Conclusions

Following the research we conducted with our team of advisors, we have developed agenda content which will unpack how we decarbonise and diversify our supply of critical minerals and raw materials, and boost the circular economy. With deep-dive sessions into lithium-ion batteries and solar panels, and with unique case study showcases on sustainable materials, these sessions will be invaluable no matter which sector you hail from. As mentioned above, the entire supply chain is now under microscope and we must mitigate our emissions at every level, so the content here is highly valuable for everyone.

Early confirmed speakers to our Minerals & Materials Forum include:

- The Rt Hon Baroness Lindsay Northover, Vice Chair, All Party Parliamentary Group Critical Minerals
- Alexander Stafford MP, Vice Chair, All Party Parliamentary Group Critical Minerals
- Chris Whyte, Circular Economy Specialist and Founding Director, ACEN Foundation
- Christian van Maaren, Founder, Excess Materials Exchange
- Connor Bryant, Co-Founder, Rubbish Ideas & The Rubbish Project
- Cypren Edmunds, President, European StrawBale Building Association
- Simon Popple, Renowned Gold Expert and Managing Director, Brookville Capital
- Andrew Zemek, Special Adviser – Battery & Special Metals, CPM Group
- Helen Waters, Head of Electric Battery Recycling, EMR

We hope to bring people together, break down siloes, drive the conversations forward, and ultimately resolve some of the key challenges raised here, thus pushing the needle towards net zero even further. We look forward to seeing you there.