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Mining our way to net zero

Geoscientists are on the frontline of resource discovery, but also the responsible recovery of these resources and the design of a sustainable post-mining legacy, argues Richard Herrington

RICHARD HERRINGTON, Head of Earth Sciences at the Natural History Museum, London, is optimistic that we can achieve the UK's decarbonisation goals, but we must secure the materials we need for the mitigating technologies in a timely fashion. The rapidity of the energy transition means that mining new resources of commodities like lithium, graphite and cobalt, as well as traditional metals like copper, aluminium and iron for infrastructure, is inevitable.

Mining projects should be designed with re-use of the site in mind

"Any delay in their supply could mean that we won't be able to build the electric vehicles, wind turbines and solar panels fast enough to hit the net-zero target in 2050. What the COVID pandemic has taught us is that supply chains for the things that we deem to be essential must be secured in advance. For the energy transition, metals and minerals are essential and geoscientists are key players to give us the expanded choice of supply that we need, thus securing sources for our industries."

"Very often the geoscientist is the first person on the ground representing the company investigating the mineral potential, so there is a great responsibility on the shoulders of that scientist"

Effective communication

Effective communication of the essential role for mining in our greener future is critical.

"I think the public knows that science and technology are providing the answers to the net-zero challenges, but only a minority recognise that mining is part of the answer, too. There is the further challenge of where mining should take place. Done in the wrong places and by the wrong methods, mining could cause more problems than it is seeking to solve. We should develop mines where there is a positive impact to both the planet and its ecosystem, as well as the people involved. In some cases that might mean bringing mining 'back home' to old mining camps – Cornwall is a good example where mining could be an agent for good, but there are areas of potential in the UK and Europe where the mineral potential has not yet fully been evaluated.

"Very often, the geoscientist is the first person on the ground representing the company investigating the mineral potential, so there is a great responsibility on the shoulders of that scientist. We must make sure they are equipped to do things properly from the beginning of the project and broker a positive relationship between all the stakeholders from day one."

Revised approach

Richard believes a new approach to mining is needed.

"A powerful book by Michael Braungart and William McDonough, entitled *Cradle to Cradle: Re-making the way we make things*, explores the idea that all things should be manufactured with the end-of-life re-use and re-purposing in mind from the start. I firmly believe that we should apply this philosophy to mining, which is a part of the manufacturing supply chain. Historically mining was viewed as a 'cradle-to-grave' business, often with a devastated site left as a legacy. Mining is a necessary 'intervention' to recover the minerals we need for a sustainable future, but we should design a mine in a 'cradle-to-cradle' fashion, so that the old mine site is left as a positive asset – maybe a solar or wind farm, a geo-park, a biodiversity oasis – in addition to delivering an economic and social benefit.

"Researchers at the Natural History Museum are developing methods and metrics that objectively measure biodiversity change due to human impacts, as well as investigating lower-impact mining techniques. I would love to see this tool applied to mining projects so that regulators can decide which projects have better eco-credentials. This may help when comparing the merits of mining in new frontiers, such as when considering deep-ocean mining, where we need to be able to quantify biodiversity impacts and compare those to the impact of comparable terrestrial mining operations for the critical metals we need."

RICHARD HERRINGTON

Professor Richard Herrington is Head of the Earth Sciences Department at the Natural History Museum, London, UK. He is also part of the NERC-funded LiFT project, which aims to understand how we can best source lithium resources for energy storage solutions, as well as the EU consortium project, CROCODILE, that looks at sourcing cobalt from European secondary supply.