

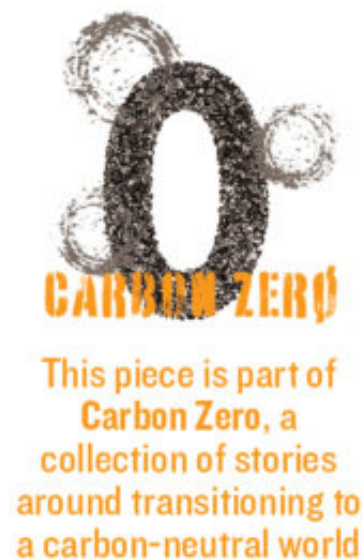
Cobalt is critical to the renewable energy transition. How can we minimize its social and environmental cost?



May 14, 2020 —

Its name conjures an image of vivid deep blues. But when cobalt is dug out of the ground in ore form, there's barely a hint of the rich hue it lends its name to. In the Democratic Republic of the Congo, which produces more than half of the world's supply, it takes the form of heterogenite, a dull brownish mineral that could easily be mistaken for small clods of dirt.

But people die for this mineral. Children suffer for it.



Livelihoods, educations, neighborhoods, [environments](#) and personal safety are sacrificed for it.

That's because cobalt is hot property. It's used in medicine for imaging, cancer radiotherapy and sterilizing medical equipment. It's in the rechargeable batteries in smartphones and laptops. And it's a component of the [lithium ion batteries](#) that power electric vehicles and [store energy from solar](#), wind and other renewable sources, giving it an essential role in the transition from fossil fuels to green energy. [One report](#) forecasts that global demand for cobalt will increase 60% above 2017 levels by 2025, with batteries projected to make up more than half of that use.

As interest in cobalt has grown, so has interest in ensuring that it's ethically produced, minimizing harm to the people who mine it and the environment from which it's removed.

Issues Abound

Some 60% of the world's cobalt supply comes from the Democratic Republic of Congo (DRC), where nearly three-quarters of [citizens live in extreme poverty](#).

Around one-fifth of cobalt mined in the DRC comes from small-scale artisanal mines. People, including children [as young as 7 years old](#), work in hazardous conditions without gloves to protect them from contact dermatitis, breathing cobalt-laden dust that is associated with a [potentially fatal lung disease](#). Miners work in unsafe tunnels that are liable to collapse and bury them, all in settings that are prone to violence and sexual exploitation.

"There's a whole range of human rights violations connected to cobalt mining in the DRC, generally stemming from the fact that it's just a very

poorly regulated activity by the Congolese government,” says Mark Dummett, head of business, security and human rights at Amnesty International.



As demand for electric vehicles grows, so does demand for cobalt, a key ingredient in lithium ion batteries. Photo courtesy of pxfuel

Most cobalt extraction in the DRC takes place in larger industrial mines. Dummett says these come with their own issues, such as pollution. Unfortunately, there's very little information on — or assessment of — the environmental impact of these bigger cobalt mines.

Nazmul Huda, senior lecturer in mechanical engineering at Macquarie University in Sydney, recently co-authored a [life-cycle analysis](#) of the environmental and human health impacts of cobalt production from raw material to purified end product. He and his co-authors found it difficult to draw conclusions about cobalt mining in the DRC because there simply wasn't enough research done on it.

Instead, they looked at cobalt mining in Australia, where cobalt is removed

as a byproduct of copper and nickel extraction. Even though mining in Australia is highly regulated, Huda and colleagues found that this method of cobalt extraction comes with a hefty environmental price tag — mainly because of the greenhouse gas emissions generated by the fossil fuels used in the process.

“We have the mining equipment, we have heavy machinery that are used in creating the open mine or underground mining process, then there’s the electricity used in the entire production chain, and then we have the blasting process,” Huda says. “From what I can see, it’s not sustainable for longer term.”

Due Diligence

Outside the DRC, the social and environmental issues associated with cobalt mining have been largely unknown for some time. However, increasing demand for cobalt to underpin the energy transition has brought them to international attention.

That’s why there’s now renewed focus from end users, such as tech companies and consumers, on the cobalt supply chain, with some of the biggest tech companies in the world encouraged to do their due diligence on the cobalt they include in their products and make sure that they are able to trace that cobalt through the entire supply chain and ensure it is responsibly sourced. The consequences of not doing so became very clear in December last year when some of those tech firms — Apple, Alphabet (Google), Dell, Microsoft and Tesla — were the subject of a [lawsuit alleging](#) they aided and abetted in the death and injury of children working to mine cobalt that has ended up in their products.



The planet's most important stories — delivered to your inbox

Be the first to hear about important new environmental stories. Sign up now to receive our newsletter.

Amnesty International has published [two major reports on human rights and environmental issues associated with cobalt mining](#) and launched an initiative that challenged the electric vehicle industry to produce a battery with a completely clean human rights record for all its components. And the Business & Human Rights Resource Centre, an international nongovernmental organization, has developed an online tool called the [Transition Minerals Tracker](#) to keep close tabs on human rights allegations associated with minerals such as cobalt that are key in the transition to renewable energy and a low carbon economy.

“We launched this tool so it can be used by investors but also companies at the end of the supply chain to just understand who are the actors at the top, what are their policies and, hopefully, could they engage with them to change some of these things,” says Stephanie Regalia, natural resources research assistant at the center.

At the Responsible Business Alliance, the Responsible Minerals Initiative is helping companies understand and improve the social and environmental performance of their cobalt supply chains. The alliance recently teamed up with [RCS Global Group](#), a company that specializes in responsible sourcing

of materials, to expand assessment, monitoring and improvement of artisanal and small-scale cobalt mining practices in the DRC. The aim is to increase the transparency of the supply chain, with the hope that this will lead to safer, less exploitative practices in those mines.

Alliance vice president Leah Butler says the world can draw on past experience with tungsten, tin, tantalum and gold — the so-called [3TG conflict minerals](#) — to avoid the same mistakes with cobalt.

“Companies can get clarity on where they’re sourcing cobalt from, and with that knowledge we can work on improving the practices of those sources.”
– Leah Butler “From 3TG we know that this can be done,” she says.

“Companies can get clarity on where they’re sourcing cobalt from, and with that knowledge we can work on improving the practices of those sources.”

And it is generating change. Butler says the Responsible Business Alliance now has over 50% of globally identified cobalt refiners — the companies buying and processing cobalt from small-scale and artisanal mines — in its program, largely because of customer demand for ethical and sustainable products, investor expectations of responsible sourcing, and global interest in the social and environmental costs of minerals. The programs help refiners to assess baseline conditions in the mines they source cobalt from and work with those mines to improve conditions, for example by implementing zero-tolerance policies around child and forced labor.

But have these commitments made a difference on the ground in the DRC? Dummett says there are positive signs of change. A school mentioned in Amnesty International’s first report on cobalt, an institution that seeks out children from mine sites and provides free education in a nation that otherwise cannot offer it, has since received sizable donations that have enabled it to open up at least five new schools, teaching thousands of

children rescued from the mines.

According to Dummett, the Congolese government has introduced some important initiatives to address the issues with artisanal mines, such as the creation of "model mines" where heavy machinery is brought in to remove the top layer of soil and exposed the heterogenite, reducing the need for miners to hand-dig precarious tunnels. Such mines, he says, are also closed off to ensure children do not enter.

"These are examples of how companies and the government are looking for ways to make artisanal mining safe and responsible and fair," Dummett says. "Maybe they haven't got there yet, but they're heading in the right direction."

Another government initiative, he says, is to create official areas where artisanal mining can take place, which lends the mines a legitimacy that makes it easier for miners to form cooperatives, borrow money and bring in bigger equipment to make mining safer.

Recycle or Replace

Another avenue being explored to reduce adverse impacts of cobalt extraction is [improved recycling](#), which would reduce the need for mining in the first place. In February 2019, the U.S. Department of Energy invested in a pilot plant called the [ReCell Center](#) to explore cost-effective ways to reclaim the lithium and cobalt from lithium ion batteries. At about the same time, it launched a US\$5.5 million prize for solutions to collecting, storing and transporting discarded lithium ion batteries. Meanwhile, the U.K. has its own battery recycling initiative called [Reuse & Recycling of Lithium-ion Batteries, or ReLiB](#), focused on recovery of valuable materials like cobalt from these batteries.



A new pilot plant operated by Sumitomo Metal Mining Co., Ltd., is testing a process for recovering and recycling cobalt from lithium ion batteries. Photo courtesy of Sumitomo Metal Mining

A Japanese company, Sumitomo Metal Mining Co., Ltd., [recently announced](#) it had developed a method for melting down spent electric vehicle batteries and recovering the cobalt. However, the company acknowledges that it will take some time before large amounts of used batteries will become available for recycling.

What about doing away with cobalt altogether, as Tesla [recently announced](#) it was planning to do? Regalia says that when a mineral becomes ethically tarnished, there's the temptation to exclude it from the supply chain and look for an alternative. But their research has found that no transition mineral is perfect; lithium, manganese, nickel and zinc are all associated with human rights violations.

And to shun cobalt altogether would also mean denying a valuable source of income to people who need it more than many, Dummett argues.

“Artisanal mining is also a lifeline for millions of the world’s poorest people,

[so] we don't want to see it outlawed," he says. "There are ways in which it can be done responsibly and fairly and safely, without children, and that's what we'd like to see."

The human cost of cobalt mining — once a problem largely hidden from end-users of the mineral— has now been highlighted more broadly, and the eyes of the world, especially consumers, are open. This gives Regalia cause for hope, but she says there is still a long way to go.

"Right now we do have to acknowledge that the realities are still very much alive, in that environmental, human rights concerns are still very much present in the DRC," she says. "It's a situation that's been noticed. It's not a situation that's been solved yet."