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Cobalt: The Blood Diamond inside NEV Batteries

The year 2021 has been exceptional for the new energy vehicle (NEV) sector as penetration rates broke double-digit in major markets and traditional carmakers finally accepted the inevitable trend of NEV transition. Thanks to the increasing popularity of Tesla, global consumers have widely embraced the environmental benefits of NEVs in battling climate change. However, as NEVs become increasingly popular among ESG-conscious consumers, the negative environmental and social impact of producing NEVs, in particular the mining and processing of raw materials found in NEV batteries, have been largely overlooked and remains mostly unknown to the public.

Among the list of metals needed to make NEV batteries, cobalt is arguably the hardest to come by. As an important cathode material in Lion-ion batteries, otherwise known as NCM batteries, cobalt plays a critical role in improving the life and energy density of batteries by keeping the battery structure stable as they are being continuously charged and discharged.

Besides its use in batteries, cobalt has also become a strategic metal for making alloys for jet and gas turbine blades and magnetic steel. Due to cobalt's effectiveness in addressing the range anxiety of NEV drivers, NCM batteries have been the preferred choice of higher-end NEVs such as Tesla Model S and Model X, significantly outpacing its alternative lithium iron phosphate (LFP) batteries until 2021.

However, the flaw of this sought-after mineral is rather obvious as over half of the world's known cobalt reserves are located in the Democratic Republic of Congo (DRC), and the country is currently producing over 70% of the global supply annually. As a country that is constantly plagued by corruption and frequent wars, mining of cobalt in Congo has entailed a series of social issues, turning the metal into "the blood diamond of batteries".

Country	2020 Production (ton)	Cobalt Reserves (MT)
Democratic Republic of Congo	95,000	3,600,000
Australia	5,700	1,400,000
Cuba	3,600	500,000
Philippines	4,700	260,000
Russia	6,300	250,000
Canada	3,200	220,000
Madagascar	700	100,000
China	2,300	80,000
United States	600	53,000
Papua New Guinea	2,800	51,000
South Africa	1,800	40,000
Morocco	1,900	14,000
Others	6,400	560,000

Source: USGS, 2020

Decades of kleptocracy, civil war, and ethnic violence has forced more than 85% of Congolese to find jobs within the unregulated sector. As mining of cobalt and copper became lucrative, there are today about 12 million artisanal miners working in cobalt mines in Congo, contributing to 30% of the country's cobalt production¹. Artisanal miners work in hazardous conditions even without gloves to protect them from contact dermatitis. They breath in cobalt-laden dust that is associated with potentially fatal lung diseases, and they put themselves at risk in unsafe tunnels that are prone to collapse.

Poverty-driven child labour is another widespread issue as UNICEF reported that 40,000 young children directly engage in the country's mining activities². Unfortunately, this whole range of human rights violations connected to cobalt mining has been largely overlooked by the Congolese government, directly causing thousands of fatalities and injuries every year.

And yet, the Congolese government has done very little to improve the status quo so far. After winning the 2019 election, President Felix Tshisekedi has promised to convert the

¹ [The future of artisanal mining in the DRC - Mining Technology \(mining-technology.com\)](https://www.mining-technology.com/news/artisanal-mining-drc/)

² [Child labour | UNICEF-en Democratic Republic of the Congo](https://www.unicef.org/drc/stories/child-labour-democratic-republic-congo)

DRC's vast mineral wealth into tangible benefits for its citizens by creating the Entreprise Générale du Cobalt (EGC) under Gécamines, a state-owned commodity mining company. By design, EGC holds the monopoly power for the purchase, treatment, transformation, sale, and export of cobalt extracted by artisanal miners or artisanal mining companies in the DRC, potentially allowing the agency to formalise the artisanal mining sector. However, criticisms have been raised concerning the government scheme and its chairman, Albert Yuma Mulimbi, a long-time power broker who many believe to be corrupt, many arguing that nothing substantial has been done to improve mining conditions other than spending money on new buildings. The Carter Center, a global non-profit organisation established by former U.S. President Jimmy Carter, estimated that between 2011 and 2014 alone some \$750 million vanished from the Gécamines' book, insinuating Mr Mulimbi's corrupt behaviours³.

As a result of systematic corruption⁴ and vast inequality, the blooming of cobalt mining has not helped improve the living or working conditions for Congolese miners as profits generated from the strategic metal never reach the local communities.

During the past decade, Chinese mining companies have acquired substantial mining assets in the DRC that were once owned by their American counterparts, creating new issues within the formal mining sector. With China Molybdenum's acquisition of the world's largest undeveloped cobalt and copper project - Kisanfu in 2020, 15 of the 19 cobalt-producing mines in Congo are now owned or financed by Chinese companies.

Since the takeover, employees at various mines have experienced a relaxation of safety codes and a shift to more aggressive management styles. According to the New York Times, Chinese managers, while excellent in improving efficiencies, are more likely to push miners to engage in risky operations, an extreme departure from their American predecessors' "zero tolerance" for safety violations⁵. The conflict between mining companies and trespassers who attempt to steal cobalt also intensified as China Molybdenum hired the military to guard their premises, resulting in a series of death tragedies and riots⁶.

³[Hunt for the 'Blood Diamond of Batteries' Impedes Green Energy Push - The New York Times \(nytimes.com\)](#)

⁴ The DRC ranks 170 out of 180 in the Corruption Perceptions Index

⁵ [A Power Struggle Over Cobalt Rattles the Clean Energy Revolution - The New York Times \(nytimes.com\)](#)

⁶ [Congo deploys army to protect China Moly's copper mine from illegal miners | Reuters](#)

The hidden cost of extensive cobalt mining in the DRC goes well beyond negative social and economic consequences, as it also directly impacts the environment and human health. In addition to the commonly known adverse environmental impact of water pollution, soil contamination and biodiversity loss that are closely associated with mining activities, what is less understood are the health risks posed by cobalt mining.

The DRC does not only hold abundant reserves of cobalt and copper but also uranium. As the level of cobalt mining activities increases, scientists have recorded worrying levels of radioactivity in some mining areas⁷. Due to the scattered nature of artisanal mining and limited environmental-health research conducted in the area, the real implications of radioactive leakage induced by cobalt mining remain largely unknown scientifically but could potentially lead to unbearable health impacts on its impoverished residents for generations to come.

Human rights violation, corruption, extreme poverty, social unrest and environmental degradation both inside and outside cobalt mines in Congo has led battery makers to re-evaluate the supply chain risk of relying on a highly unstable country for critical supply. While some companies decided to boycott the use of Congo-origin cobalt, others have taken more [proactive steps](#) to address social issues associated with the mineral.

The significant uptake in LFP battery adoption in 2021 also partially reflects carmakers' concerns over the supply and reputational risks associated with NCM batteries. However, boycotting is hardly a viable solution in the long-term as price collapse may further trigger social conflicts in DRC's ramshackle economy. For responsible consumers and investors, the most effective tool for addressing social and environmental issues remains active engagement and stewardship, i.e. urging companies to make real changes on the ground and to extract minerals in a greener rather than "bloody" manner.

⁷ [The environmental impact of cobalt mining - The Washington Post](#)

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