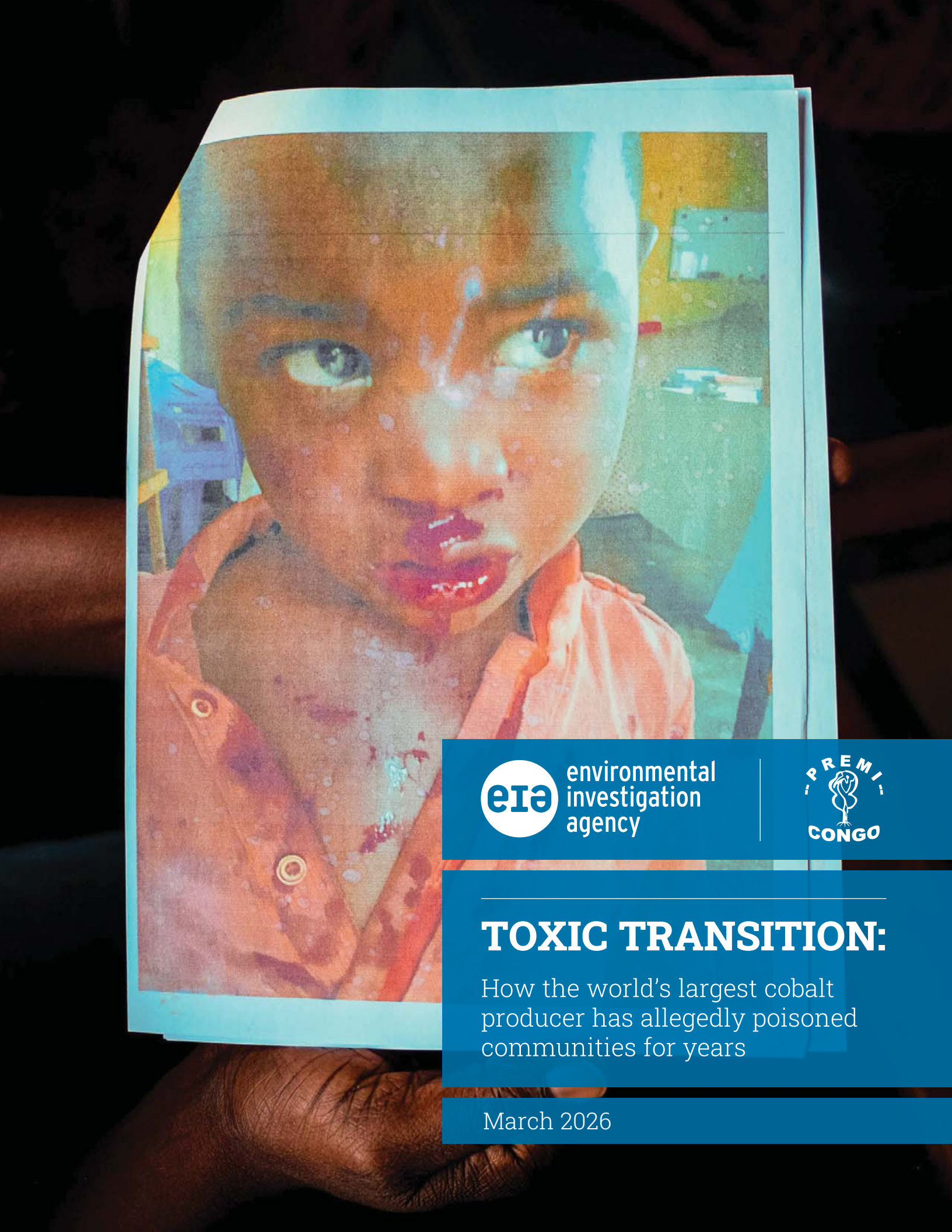

environmental investigation agency

PREMI CONGO

TOXIC TRANSITION:

How the world's largest cobalt producer has allegedly poisoned communities for years

March 2026


Credit: Streetsfilm

CONTENTS

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ABOUT EIA

The Environmental Investigation Agency US (EIA) is an award-winning nonprofit, internationally renowned for its use of pioneering innovative investigative techniques. For over three decades, EIA has exposed environmental crimes around the world, amplified frontline voices, and made the emergence of more equitable and sustainable management of the world's natural resources possible. Our organization has confronted the world's most pressing environmental problems, instigated systematic changes in global markets, supported communities' resistances, and promoted precautionary policies that protect the natural world from oppressive, neo-colonialist, and unfair exploitation.

ABOUT PREMICONGO

PremiCongo is an environmental non-profit organization, based in Lubumbashi, Democratic Republic of the Congo (DRC). PremiCongo's mission is to improve local communities' livelihoods in the Miombo ecosystem in DRC, by supporting sustainable resource management. PremiCongo prioritizes the defense of local communities' rights and raising awareness about the environmental problems they are the victims of.

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EXECUTIVE SUMMARY

The Environmental Investigation Agency US (EIA)'s investigation into cobalt mining in the Democratic Republic of the Congo (DRC) exposes the toxic underbelly of the world's energy transition and offers pragmatic recommendations to correct its course.

EIA's breakthrough 3+ year investigation connects large-scale analysis of medical records, independent air pollution monitoring, geospatial intelligence, interviews with dozens of affected community members, and corporate insiders' knowledge to document a severe public health crisis apparently caused by the world's largest cobalt producer. The investigation ties the rapid growth of the world's largest cobalt producer and the booming production of electric vehicles (EVs) by some of the world's largest car manufacturers to what appears to be air pollution spanning multiple years, impacting dozens of families and workers.

The last few years have seen dramatic growth in the production and sale of EVs, as well as in the lithium-ion batteries needed to power these vehicles. As a consequence, demand is surging for critical minerals like cobalt, which these batteries rely on. Almost half the cobalt in the world is currently produced by a Chinese company called CMOC Group Ltd (CMOC; formerly China Molybdenum Co., Ltd.) through its mining operations in DRC, where the group controls two of the world's largest copper-cobalt mines: the Tenke Fungurume mine and the Kisanfu mine.

CMOC's mining operations have expanded rapidly over the past five years to meet the growing international demand for cobalt hydroxide, with astonishing 100+% year on year production growth. In order to dominate the world's cobalt hydroxide production, CMOC built in 2023 one of the largest copper-cobalt processing complexes in Africa - about the size of 500 soccer fields - right next to Fungurume, a mining town in Lualaba province in southeast DRC. This colossal processing facility is known as the "30k plant" because it is capable of processing 30,000 tons of copper-cobalt mixed ore every day.

The problem is that thousands of people live within a few kilometers of the cobalt mine and its massive processing plant.

In 2023 and 2024, communities and local civil society groups sounded the alarm about severe health issues, including severe nosebleeds, coughing up blood, and maternal issues, including stillbirth, that they attributed to the operations of CMOC's new processing plant. In its public statement, CMOC, via its subsidiary Tenke Fungurume Mining (TFM), denied the allegations of

environmental pollution, its adverse impact on the population, and any connection to its activities.

EIA's conclusions differ from TFM's public statement. According to EIA's findings, the expansion of CMOC's processing capacity at the Tenke Fungurume mine – and in particular the 30k plant – is at the heart of the public health crisis that has allegedly harmed nearby communities and the workers who labor in the facility.

More than 1,200 health records obtained and analyzed by EIA investigators – as well as independent medical experts – show that since 2023, doctors and nurses near the mine have treated a growing flow of patients for coughing up blood and severe respiratory illnesses like pneumonia and bronchitis. The data also reveal how the health crisis has persisted, spread across the populations and likely even worsened, affecting the more vulnerable individuals first before touching a broader proportion of the residents. The progression from a child-dominated pattern in 2022, to a mixed-age profile in 2023, and finally to an adult- and adolescent-weighted distribution in 2024, strongly supports the hypothesis of a worsening environmental exposure over time.

To understand the possible cause of the health crisis near TFM's facility, EIA commissioned independent air monitoring of the area from September 2024 to January 2025. The results indicated levels of sulfur dioxide (SO2) – a toxic gas produced during the processing of copper-cobalt ore – well in excess of international standards. According to the United Nations Office for Disaster Risk Reduction (UNDRR), SO2 exposure can affect the respiratory system and lung function, with the inflammation of the respiratory tract causing coughing, mucus secretion, aggravation of asthma and chronic bronchitis. There is also strong evidence to suggest that SO2 is associated with an increased rate of infant deaths.

EIA investigators also spoke to multiple TFM workers who described the dire reality of SO2 pollution at TFM. One former TFM worker explained that periodic off-gassing of SO2 at TFM was "not a secret," and that management regularly off-gassed SO2 when levels of the gas grew too high. Multiple workers further alleged to EIA that machines would not stop when the SO2 alarm sounded because, as one worker explained, "it would take too long to restart them." The worker told EIA that they had seen three sub-contractors who had not been wearing proper PPE pass out due to a buildup of SO2. The alleged SO2 pollution by TFM would appear to contradict the "right to breathe air that is not harmful to [one's] health," enshrined in Congolese law.

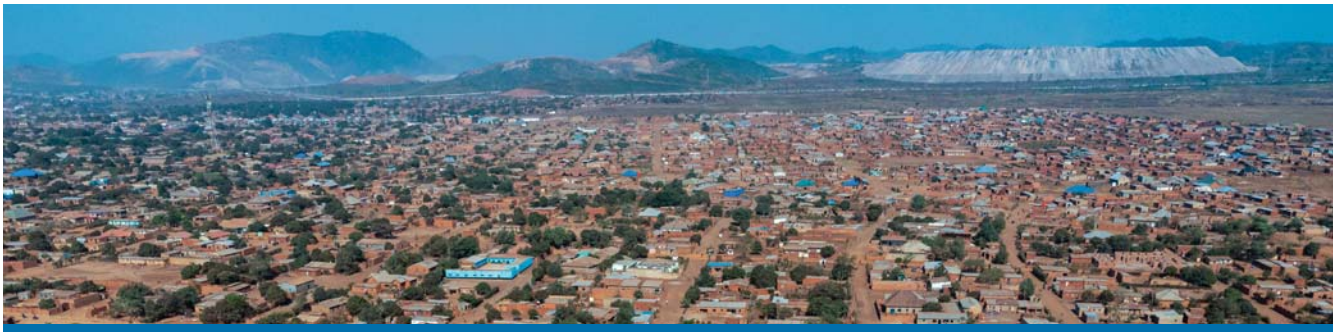
In response to EIA's findings, TFM explained that company monitoring data collected during late 2024 and early 2025 indicate that ambient SO2 concentrations remained within applicable regulatory limits. The company stated that "Allegations suggesting a direct causal link between TFM's expansion and health impacts in Mano Mapia are not supported by the monitoring data and assessments available to TFM." The company clarified that their policy obligates any person on site to halt unsafe work, prohibits resumption until hazards are controlled, and strictly bars retaliation. The company also stated that supervisors are required to enforce evacuations when alarms activate or thresholds are reached. TFM's full response is available on EIA's web page for this report.

Most of the cobalt hydroxide produced at the Tenke Fungurume mine goes to China or Europe, where lithium ion battery cells are manufactured. EIA's supply chain and shipment analysis indicate that cobalt hydroxide produced at TFM is being used by some of the largest automakers, including BMW, Mercedes-Benz, Stellantis (Peugeot's parent company), and Volkswagen.

None of the automakers named in this report denied indirectly sourcing cobalt from TFM for their EVs production. Mercedes-Benz explained that they had initiated a dialogue with TFM based on EIA's findings, and that "Mercedes-Benz subsequently conducted outreach through relevant standard setting initiatives and its own supply chain," but that their review "did not indicate shortcomings related to SO2 emissions." BMW Group stated that "If there are any indications of possible violations in our supply chains, we investigate these indications." Stellantis confirmed their sourcing relationship with TFM and stated that a third-party auditing partner had identified reports about "serious illness linked to pollution in the Manomapia area." The company explained that it "continue[s] to follow up with TFM to understand the progress of mitigation efforts." At the time of writing, Volkswagen had not responded to EIA's findings. The full responses from these automakers are available on the EIA web page for this report.

In June 2024, TFM became the first mine in Africa and the first Chinese-owned mine in the world to receive the Copper Mark, an environmental, social, and governance (ESG) standard that includes specific criteria on relocation, labor conditions, and pollution. EIA's findings contradict the audit statements and conclusions regarding air pollution. EIA's investigation calls into question the reliability of the auditing process and the credibility of the standard, as TFM was assessed to "fully meet" 100% of the 31 applicable criteria as of July 2025. Responding to EIA's findings, the Copper Mark indicated that pollution concerns were taken into account in the initial audit. The Copper Mark further explained that "[o]nly after implementing corrective actions specifically related to these issues was the site able to achieve a rating of 'fully meets.'"

At the time of writing, TFM is being assessed by the Initiative for Responsible Mining Assurance (IRMA) standard, which covers a broad swathe of ESG issues, including worker health and safety, human rights, and environmental protection. EIA's investigation raises major questions about TFM's adherence to the IRMA standard, and EIA looks forward to having information made publicly available regarding the first phase of the auditing process and its conclusions.



EIA recommends:

To the DRC government:

- Investigate the alleged violation of Congolese laws and regulations related to citizens' health, environmental pollution, and relocation.
- With the support of multilateral organizations, make the multifaceted environmental and public health crisis caused by copper-cobalt mining in Haut Katanga and Lualaba provinces a national policy priority, and implement interministerial programs to remediate, control, and prevent it.
- Establish a world-leading, government-mandated and civil society-led independent monitoring program for the mining sector, building on lessons learned from a decade of independent forest monitoring, to be piloted in Lualaba province.

To CMOC:

- Immediately establish a transparent and multipartite process of reparation for the alleged harm being done to dozens of residents and workers due to SO2 pollution.
- Suspend TFM's "30k plant" operation until any needed preventive SO2 neutralization systems are in place, adapted continuous emissions monitoring is operating, and a qualified independent third party can reliably guarantee that SO2 emissions respect DRC laws on environmental rights and international standards.
- Proactively disclose TFM's SO2 monitoring data through a publicly accessible platform, including daily measurements from on-site monitoring systems.

To CMOC's clients:

- Immediately inform CMOC that, as of May 1st 2026, cobalt hydroxide purchase will be conditional on the guarantee by a qualified independent third party that TFM's SO2 emissions respect DRC laws on environmental rights and international standards.

To BMW, Mercedes-Benz, Stellantis, and Volkswagen:

- Do not purchase cobalt-containing products that risk being indirectly sourced from TFM until solid evidence shows that the 30k plant's emissions respect DRC laws and international standards.
- Support a regional community- and civil society-led SO2 monitoring program that would allow residents near copper-cobalt mines to collect science-backed information about air quality and make it publicly available.
- Establish the "new normal" regarding energy transition supply chain transparency by publicly disclosing all available information regarding cobalt sourcing up to the mine of origin.
- Join a multi-stakeholder body to accompany the IRMA auditing process at TFM, alongside representatives from local communities and civil society organizations, provincial and federal government, and international non-governmental organizations.

To IRMA:

- Establish an independent multi-stakeholder body - with full access to audit information, the associated corrective measures, and their implementation by TFM - to accompany the IRMA auditing process, with representation of local communities and civil society organizations, provincial and federal government, automakers, and international non-governmental organizations.

Credit: Herman Kambala/Arete/EIA

1. CMOC'S FAST AND FURIOUS GROWTH

1.1 More Cobalt For More EVs

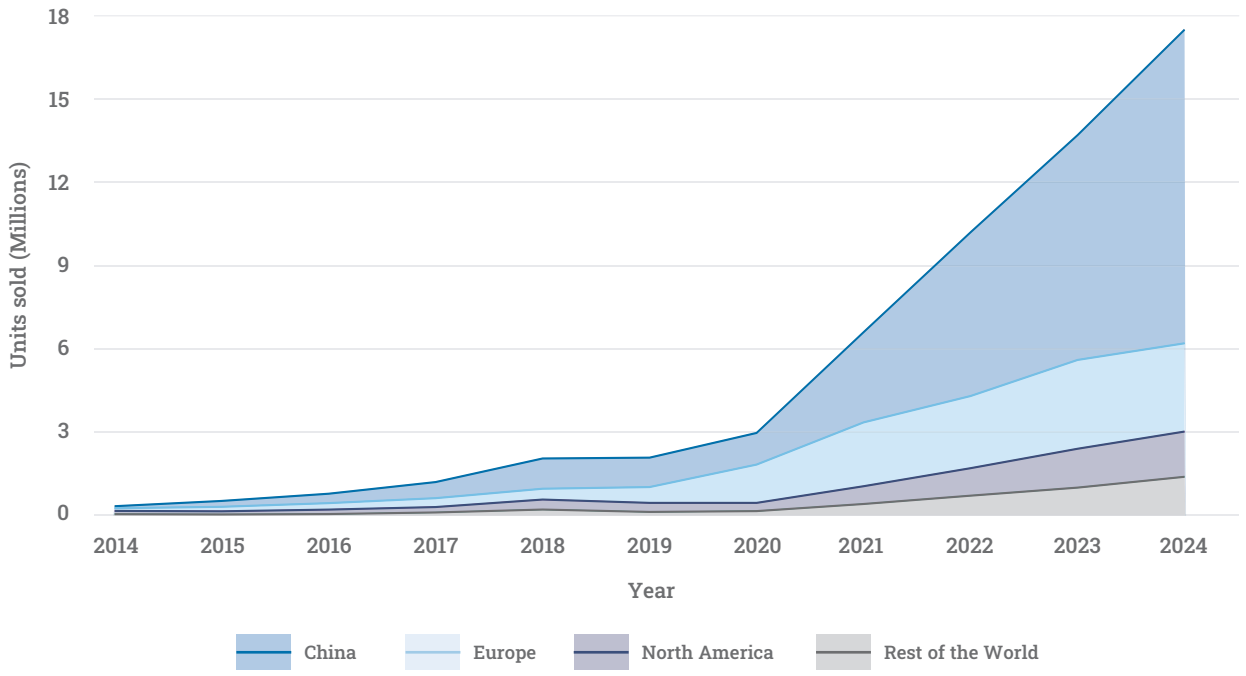
The global sale of electric vehicles (EVs) is booming. In 2024, EV sales were more than five times higher than in 2020, hitting 17.5 million units across all vehicle classes (Figure 1). This figure rose to more than 18.5 million units as of November 2025 – a 21% increase on the previous year.[1] China drives the bulk of EV demand,[2] with Europe and North America following.[3]

This dramatic increase in the sale of EVs has led to a boom in the production of the lithium-ion batteries that are needed to power these vehicles. As a result, demand for critical minerals like cobalt, which are used to make lithium batteries, is surging. In 2024, global demand for cobalt exceeded 200,000 tons for the first time, driven largely by EV sales (Figure 2).[5]

For the Democratic Republic of Congo (DRC), which accounts for more than 70% of the world's cobalt, rising demand for cobalt has had serious impacts. The southeastern provinces of Lualaba and Haut-Katanga – where DRC's cobalt is primarily coming from – have been particularly impacted.[7]

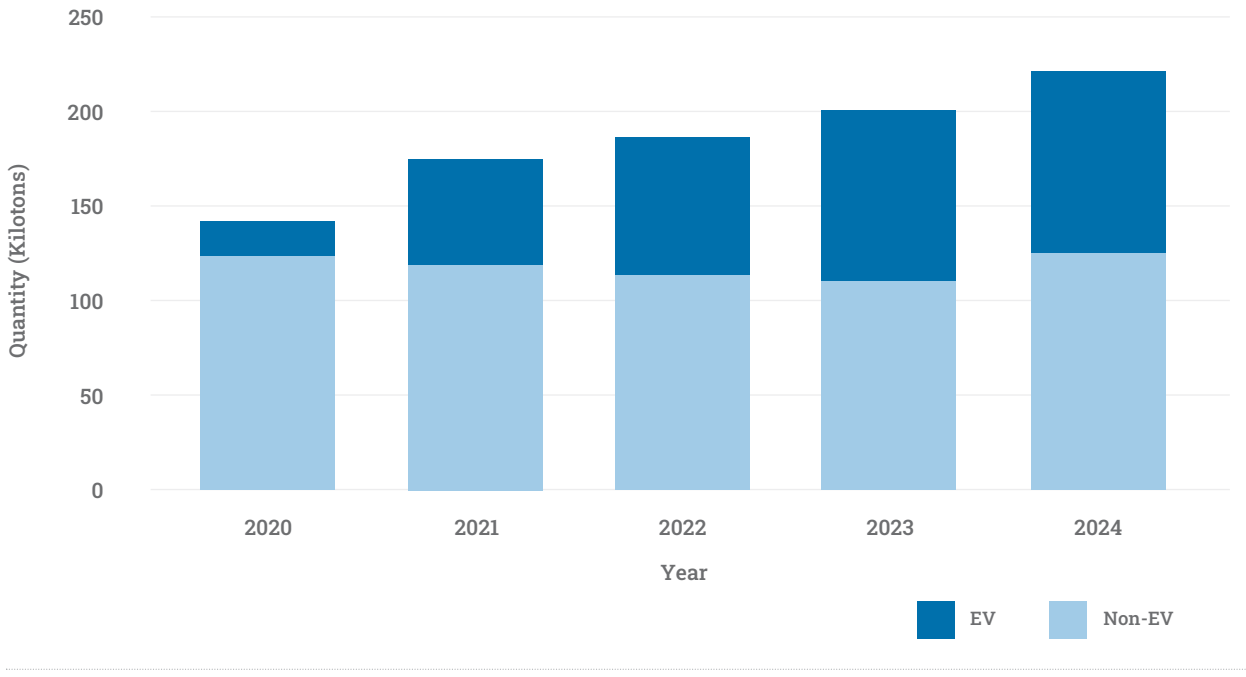
1.2 How CMOC Became the World's Largest Cobalt Producer

As the demand for cobalt ramped up, the Chinese group CMOC Group Limited (CMOC) seized the opportunity to meet the demand and soon became the world's leading cobalt producer. In 2020, CMOC accounted for about 10% of global cobalt production, a figure that grew to 40% in 2024 (Figure 3). The year on year growth of CMOC's production has been astonishing: +173% from 2022 to 2023 and +106% from 2023 to 2024. As of 2023, CMOC surpassed commodities giant Glencore as the world's largest producer of mined cobalt.[8] The rapid expansion of CMOC's cobalt mining capacity is at the heart of the public health crisis harming communities in the DRC.



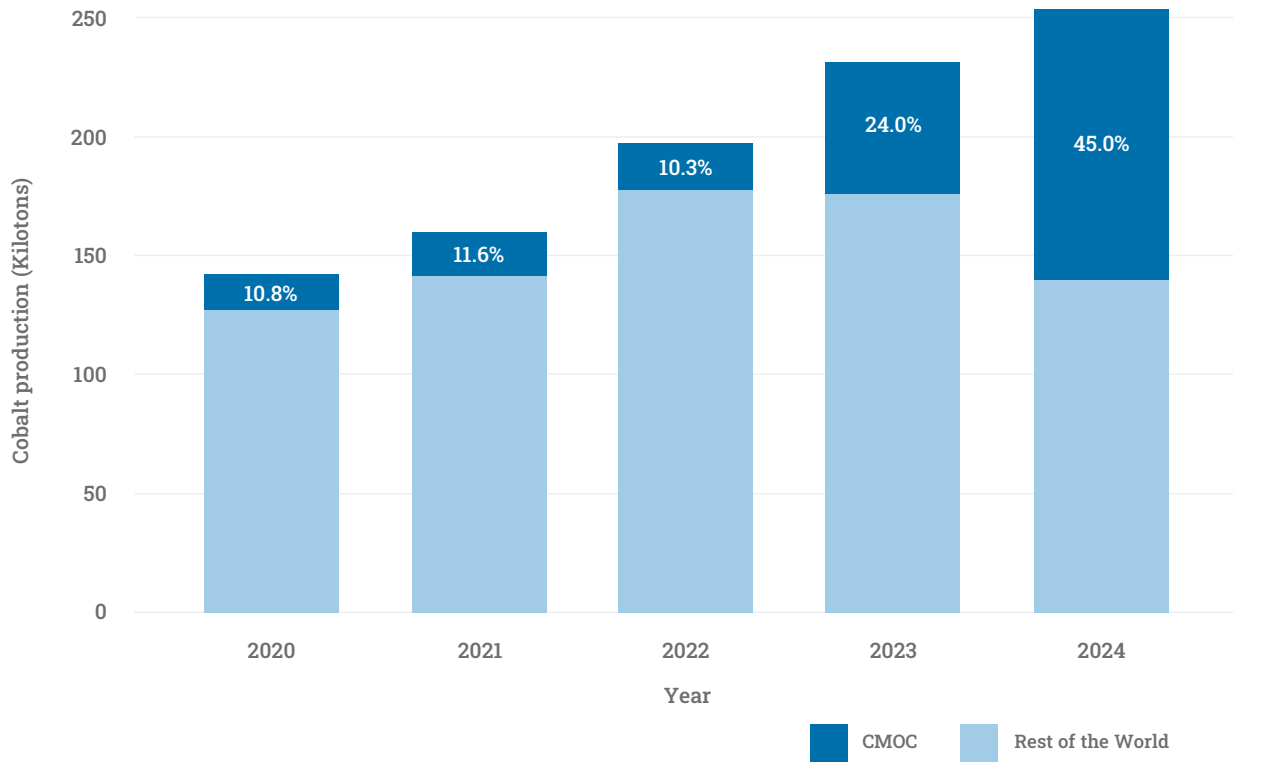
Source: EIA based on data from the International Energy Agency (IEA).[4] The dataset and methodology for this figure are available from EIA upon request.

Figure 1
Annual EV sales by region



Source: EIA based on data from the Cobalt Institute, Adamas Intelligence, Reuters.[6] The dataset and methodology for this figure are available from EIA upon request.

Figure 2
Global demand for cobalt from 2020 to 2024



Source: EIA based on CMOC and industry reports.[9] The dataset and methodology for this figure are available from EIA upon request.

Figure 3
Evolution of CMOC's share of global cobalt production between 2020 and 2024

CMOC's fast-paced growth is anchored in a series of strategic deals (cf. Annex 1) that allowed it to acquire an 80% stake in Tenke Fungurume Mining S.A. (TFM) - the company that owns and runs the Tenke Fungurume mine, which is one of the largest copper-cobalt mines in the world. These deals were primarily backed by Chinese banks and increasingly by U.S. pension funds (Box 1).

CMOC's expansion into DRC's copper-cobalt mining continued after the Tenke Fungurume mine deal. Leveraging CMOC's majority ownership of the mine's assets and foreseen synergies between mining and processing operations, CMOC acquired a 95% stake in the adjacent Kisanfu copper-cobalt mining operation (later named KFM) in December 2020.[15] CMOC's acquisition of majority ownership of both mining operations, which are located only 33 kilometers apart, was a key step in consolidating its position as a major – and then leading – cobalt producer. It was also an essential step in reassuring automakers about DRC's capacity to meet the rapidly growing global demand for cobalt, as the company explained in July 2022:

"Accelerating the development of the rich resources of copper and cobalt mines in the DRC is conducive to satisfying the growing demand for cobalt metal from the new energy industry and maintaining a healthy and sustainable development of the new energy value chain. The cobalt market has been in tight balance on strong demand for new energy metals as the EV market grows rapidly. The industry has concerns over long-term clean and reliable cobalt supply.[...] **CMOC indicates that the construction of the KFM project and the expansion of TFM's production can partially meet the growing demand for cobalt metal from the EV sector and relieve the concerns of battery and automobile manufacturers about the shortage of cobalt metal supply [emphasis added]**."[16]

1.3 TFM's Hydrometallurgical Processing Complex Expansion

Today, TFM's mining concessions cover about 1,500 square kilometers in Lualaba Province, with multiple active open pits, several processing plants, a lime plant, and a series of waste dumps (Figure 4). At the time of writing, the most recent information in DRC's mining cadaster indicates that TFM holds six active exploitation permits (123, 159, 4728, 4729, 9707, and 9708) for the company's copper-cobalt mine.[17]

Ore at TFM's sites is extracted via surface mining techniques, otherwise known as open-pit operations

BOX 1.

CMOC AND THE U.S. PENSION FUNDS

CMOC is a sprawling Chinese mining-and-trading hybrid, owner of the world's third largest metal trader (IXM), operator of giant copper-cobalt assets in the DRC (Tenke Fungurume mine and Kisanfu mine), and one of the world's largest cobalt refiners.[10] The group is privately controlled by Cathay Fortune Corporation, owned by the billionaire Yu Yong.[11] CMOC was ranked 138 on the 2025 China Fortune 500.[12]

CMOC is publicly listed on the Shanghai and Hong Kong Stock Exchanges. As CMOC's production and market share have grown in recent years, its shareholder base, which was primarily Chinese initially, has internationalized.[13] Now, major U.S. financial groups, including JP Morgan and BlackRock, are among CMOC's shareholders, each of them holding approximately 1% of CMOC's total share capital. This broadening of CMOC's shareholder base has been vital to CMOC's financial strategy as it supports market liquidity and makes future equity financing easier.

Major U.S. pension funds, insurers, and asset managers have invested, via BlackRock exchange-traded funds (ETFs) – issued under the brand name iShares – into CMOC. These investors include the State of New Jersey Common Pension Fund, the New York State Common Retirement Fund, the Retirement Systems of Alabama, and Prudential Financial.[14]

Source: Adapted from Jacqueline Zimmerman and Katherine Walsh, Tenke Fungurume Copper-Cobalt Mine: Chinese Financing for Transition Minerals (AidData, February 2025).

Figure 4
Layout of Tenke Fungurume mining site

Figure 5
TFM's surface mining operations

Figure 6
Cobalt hydroxide belt at TFM

Figure 7
TFM's copper-cobalt processing facility

(Figure 5).The extraction and separation of copper and cobalt from the ore relies on an agitated leaching process, which involves crushing ore, mixing it with sulfuric acid, and then agitating the mixture to dissolve the copper and cobalt. This process is then followed by solvent extraction and electrowinning to produce high-purity copper cathode and cobalt hydroxide (Figure 6).[18] The process is performed in several hydrometallurgical plants located on-site (Figure 7).

In 2023, in order to meet the growing demand for cobalt, CMOC expanded TFM's production capacity by commissioning a new hydrometallurgical plant next to the town of Fugurume. The new plant (Figure 8), which is commonly referred to as "30k" or the "30k plant" – has a daily processing capacity of 30,000 tons, allowing TFM to double its daily copper-cobalt ore processing capacity (from 27,000 tons to 57,000 tons).[19] According to TFM, the expansion included a new leaching section and an extension of the cobalt plant where cobalt concentrate is processed into cobalt hydroxide in a series of purification phases.[20] The new plant has allowed TFM to significantly increase its production, making CMOC the world's largest cobalt producer in the same year the plant opened. Production increased so dramatically that it created a glut in the global supply of cobalt, causing the price of cobalt to fall dramatically, and leading the DRC's government to impose a cobalt export ban from February to October 2025 (Box 2). As shown in Figure 9, when the new plant was built its perimeter walls were only a few meters from residential homes and agricultural lands (the situation has since changed due to the displacement of the residents - see section 2.5). The 30k plant itself is still nowadays located a few kilometers from thousands of homes in Fungurume town.

BOX 2.

TFM: FROM FAST TO OVER PRODUCTION

In April 2018, cobalt prices reached an all-time high of US$100,000 per ton.[21] As prices spiked, investors and companies – fearing an expected supply shortage and an ongoing trade dispute between the U.S. and China – purchased large quantities of cobalt, creating the so-called "cobalt rush" that drove prices even higher.[22] Cobalt prices then crashed in 2018 and, after briefly recovering in 2022, have remained below US$50,000 per ton since January 2023, due to oversupply, slower-than-forecast EV sales growth and an increase in the production of batteries that require less cobalt.[23] According to industry analysts, contracting demand combined with CMOC's aggressive expansion of its production capacity - and the company's decision not to deviate despite strong market signals - resulted in a global oversupply of cobalt in 2024 and 2025, sending prices plummeting to close to US$30,000 per ton in 2024 and under US$20,000 per ton in 2025.[24]

Aiming to boost the price of cobalt,[25] the DRC government banned the export of cobalt in February 2025 for four months, and then extended the ban to September 2025, before instituting annual export quotas.[26]

Because cobalt is a byproduct of copper production, CMOC has continued to produce and even increase its cobalt production, stockpiling the mineral because of the ban.[27] In June 2025, CMOC's trading arm, IXM, was forced to declare force majeure on deliveries of cobalt from DRC because it could no longer deliver on its contractual obligations.[28]

Despite the ban, CMOC produced more cobalt in the first half of 2025 than ever, with a reported 13% year-on-year rise in the production of the mineral.[29]

Figure 8
Aerial view of the 30k plant

Figure 9
Satellite view of communities' proximity to TFM's walls and the 30k copper-cobalt processing plant

Credit: Herman Kambala/Arete/EIA

2. POISONED AIR AND PROVEN PUBLIC HEALTH CRISIS

2.1 The Alleged Harm: "This death was caused by air pollution"

In 2023, reports began to emerge of people seeking medical help for serious illnesses in the area just beyond the walls of the new 30k TFM plant, in the Manomapia neighborhood of the town of Fungurume. These reports emerged shortly after the 30k plant was built (Figure 10) and when its ore processing operations began less than 500 meters from the edge of the neighborhood. Throughout 2023, residents started to complain about serious health problems, including itchy eyes, nosebleeds, persistent coughs, headaches, chest pains, and even haemoptysis (coughing up blood),[30] according to local activists who spoke with EIA investigators. Multiple families shared pictures and videos of symptoms they associate with the mine's proximity to their homes (Figure 11 and report cover).

Many affected families described a foul smell that caused dizziness and seemed to come from the new plant. A Congolese environmental activist who visited Manomapia in June 2024 told EIA that they had experienced the effects of the gas first-hand: "Upon arriving in the neighborhood in the evening, we were immediately overwhelmed by the nauseating smell from the 30k plant. It caused a sour taste in the mouth and a feeling of suffocation in the chest."

More than 100 people in the small community sought medical treatment from mid-2023 to February 2024, according to multiple media and civil society sources.[31] The local civil society organization Afrewatch publicly alleged that air pollution was associated with 11 deaths in the community.[32] The gas appeared to have a particularly severe effect on children and pregnant women. Firsthand testimony collected from Manomapia residents paints an even more troubling picture. One mother interviewed by EIA in February 2024 believed that her baby had been killed by the gas coming from the TFM processing complex (Figure 12). According to her statement to investigators:

"My 6-month-old baby started with a fever. Then he developed a severe cough that only lasted two days. He coughed so hard he couldn't breathe. I thought it might have been bronchitis. Meanwhile, his condition deteriorated by the hour. We took him to the hospital where they had an X-ray. The results were very worrying. The doctor told us that the baby's lungs were being attacked by acid particles. The hospital put him on medication, and I had hope that my baby would wake up. But the nurses knew my baby wouldn't survive because all his organs were already under attack. One evening, he started vomiting red blood. He vomited more than three times, and then he died. That's when I realized that this death was caused by air pollution. I'm not alone in this situation. Other neighbors have also lost their children…. We're dying here because of the acid coming from the TFM plant. My baby's death leaves a deep wound in my heart."[33]

Over half a dozen residents told EIA that the pollution particularly affected children in the community.[34] Many in the Manomapia community reported severe nosebleeds and other alarming symptoms such as coughing up blood. One resident interviewed in February 2024 described a debilitating range of symptoms:

"It all starts when the factory releases the acid into the air. After inhaling, I get headaches and my head becomes

Source: EIA. Includes material © 2025 Planet Labs Germany GmbH. All rights reserved

Figure 10
Satellite view of development of 30k plant from September 2021 to April 2024

very heavy. Breathing becomes difficult, my heart beats very fast. Sometimes, I feel pain in my heart as if I'm being stabbed. My throat becomes very dry to the point where I have difficulty swallowing saliva. Sometimes, this polluted air stings my eyes. They start to tickle. The organ that was most affected was my nose. As soon as I feel a tingling in my nose, it's over. Blood flows from my nose in large quantities and in lumps [...] The children, on the other hand, vomit blood [...] It's very complicated for us [...] This is my son; he's sick [...] on his nose, there are still traces of blood. When he starts to bleed, I panic because the blood flows like from a faucet."[35]

Another Manomapia woman (Figure 12) told EIA in June 2024 that she had lost a baby that had been born with a severe deformity and that her doctors believed this was linked to mining pollution. One community worker in Manomapia, interviewed as part of EIA's investigation and who wished to remain anonymous for fear of reprisal, claimed that they noticed an increase in the number of miscarriages and an increase in the number of births with congenital malformations in the area since the factory had opened.

In response to EIA's findings, TFM stated: "Allegations suggesting a direct causal link between TFM's expansion and health impacts in Mano Mapia are not supported by the monitoring data and assessments available to TFM." TFM's full response is available on EIA's web page for this report.

2.2 Medical Records Analysis: A Public Health Crisis in Manomapia

EIA's investigation confirms the existence of a persistent and unresolved public health crisis, caused by air pollution, affecting the neighborhoods of Fungurume located near the 30k plant.

EIA investigators obtained access to over 1,200 medical records, covering the period 2022-2024, related to individuals seeking medical assistance in areas of Fungurume near the 30k plant.

Medical records (Figure 13) reviewed by EIA investigators and analyzed by independent public health experts show a dramatic increase in the number of patients seeking medical treatment for symptoms linked to air pollution, including respiratory complaints, nosebleeds, coughing up blood, and eye irritation in 2023 (Figure 14). The data also reveal how the health crisis has persisted, affecting more vulnerable individuals first before touching a broader proportion of the residents as the age profile of health impacts shifted over time. According to an independent public health expert who reviewed the data, the progression from a child-dominated pattern in 2022, to a mixed-age profile in 2023, and finally to an adult- and adolescent-weighted distribution in 2024, strongly supports the hypothesis of a worsening environmental exposure over time.

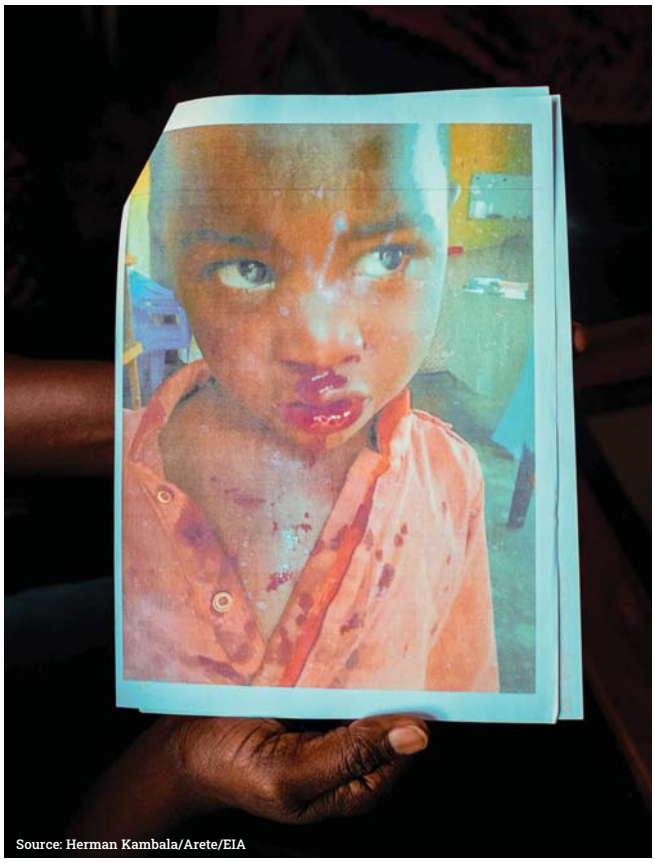

Source: Herman Kambala/Arete/EIA

Figure 11
Symptoms of community members near 30k include nosebleeds, persistent coughs, headaches, chest pains, and coughing up blood


Source: Herman Kambala/Arete/EIA

Figure 12
Sifa Manegabe gave birth to a baby with a congenital malformation who passed away

Public health workers in Fungurume who spoke with EIA similarly described a dramatic increase in the frequency and severity of respiratory and other symptoms from 2023 onwards. One medical worker explained to EIA investigators:

"The frequency of cases became much worse. In the neighborhoods around us everyone was complaining about the same problems. Within the clinic, we received a lot of people coming to us to get care for these cases. What we experienced in 2023, 2024, was completely different from other years."

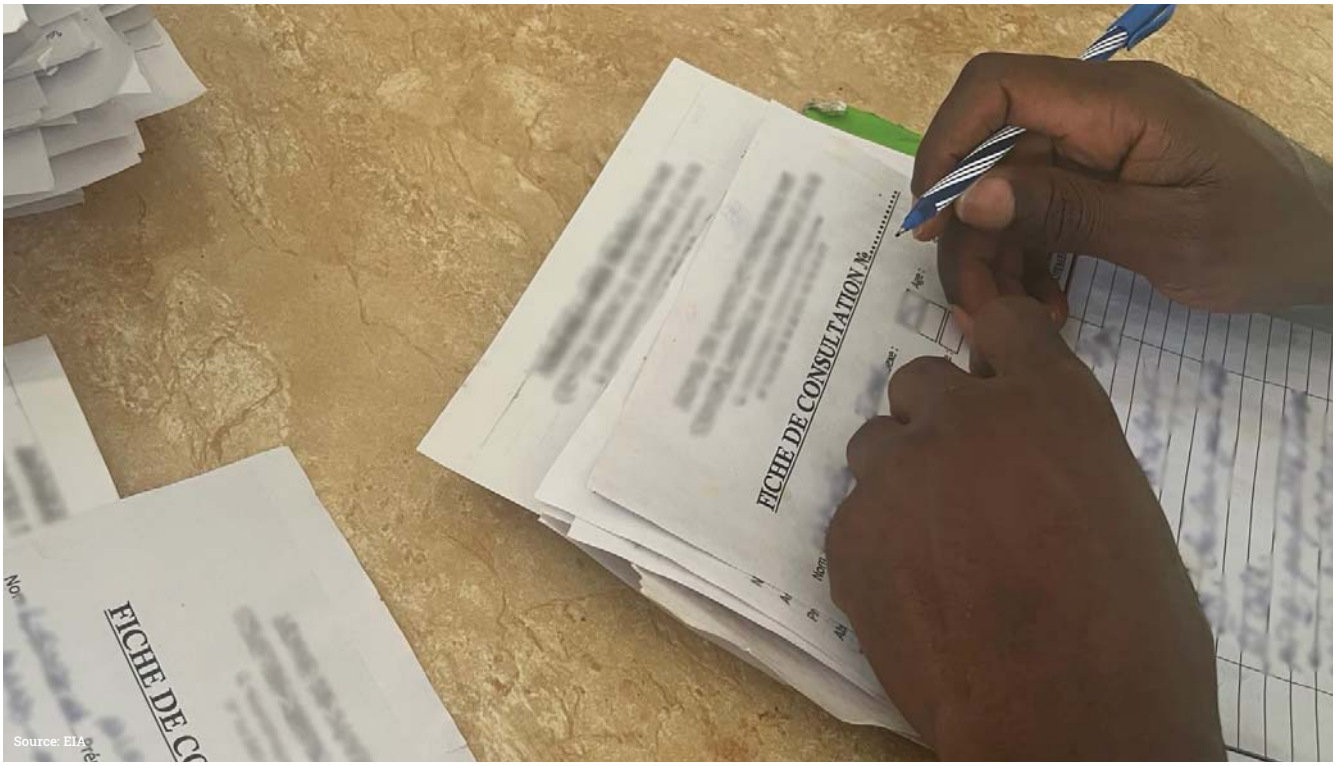
Health professionals working in the area similarly described a significant increase in patients coughing blood and presenting with serious respiratory infections like pneumonia and bronchitis. One health worker explained to EIA: "From 2020 to 2022, we didn't have these cases…but by 2023, 2024, it became normal. You would get cases of nosebleed, miscarriages before three months. Every month you would get ten cases of miscarriage or vomiting blood."

The health crisis experienced by Manomapia residents in 2023-2024 - driven by air pollution - happened at the same time as the rapid expansion of TFM's processing capacity in 2023. In particular, the increase in patients documented by medical data from Fungurume residents took place when TFM was testing and commissioning the new 30k plant.

EIA consulted multiple toxicology experts familiar with copper-cobalt ore processing. These experts said high levels of Sulphur dioxide (SO2) were the likely cause of the health problems suffered by residents living next to the mine. SO2 is highly toxic, especially to the respiratory system. Short-term exposure and high concentrations can cause severe symptoms. According to the United Nations Office for Disaster Risk Reduction (UNDRR), SO2 exposure "can affect the respiratory system and lung function and can cause irritation of the eyes. Inflammation of the respiratory tract causes coughing, mucus secretion, aggravation of asthma and chronic bronchitis and makes people more prone to infections of the respiratory tract. Hospital admissions for cardiac disease and mortality increase on days with higher SO2 levels."[36] There is also strong evidence to suggest that SO2 is associated with an increased rate of infant deaths.[37] SO2 is commonly used in industrial copper-cobalt ore processing, including by TFM at the 30k plant (cf. Box 3).

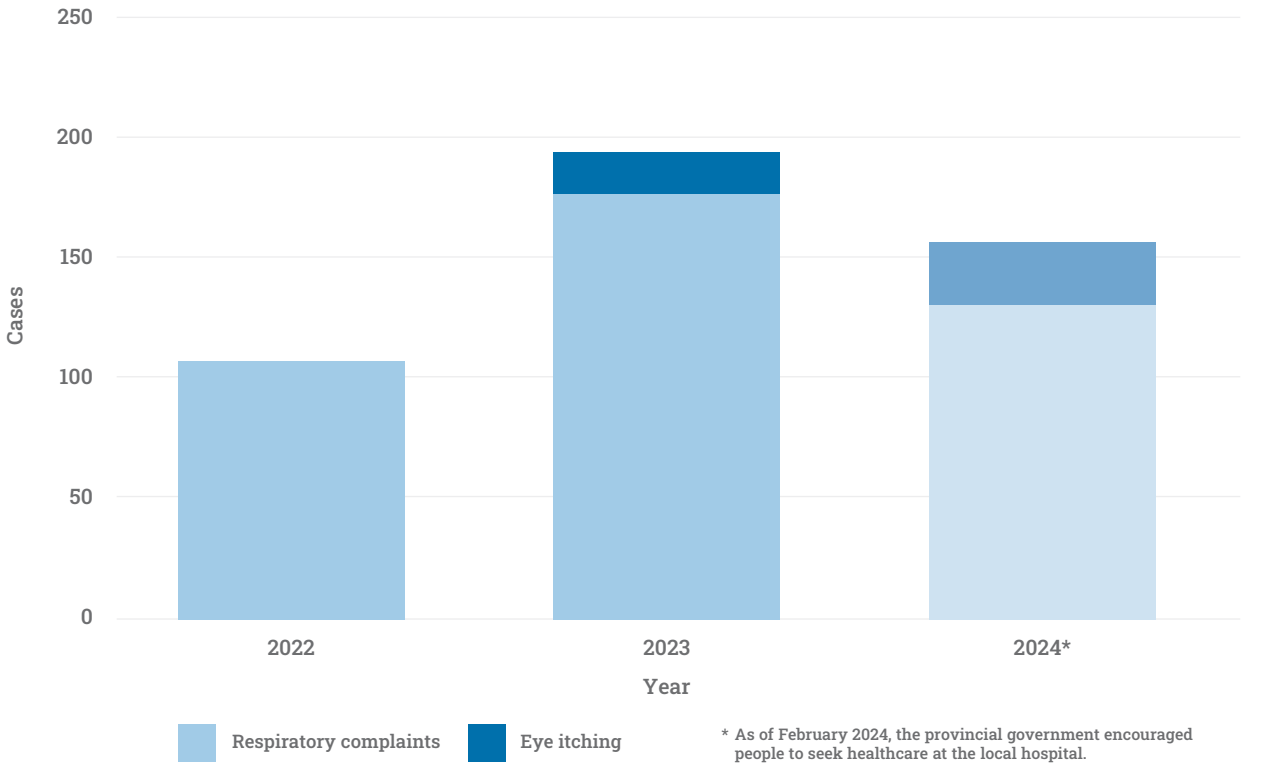
2.3 "Bound to Fail" Air Monitoring and TFM's Shifting Public Stance

In early 2024, a group of Manomapia residents sent TFM's community liaison team a complaint regarding alleged air pollution from TFM's new plant.[39] In response, TFM announced in May 2024 that it had commissioned Skyside, a South African emissions and ambient air quality testing company, to conduct an independent evaluation, and stated that:



Source: EIA

Figure 13
Medical records from patients seeking medical support in Manomapia



Source: EIA, based on unpublished and confidential medical data

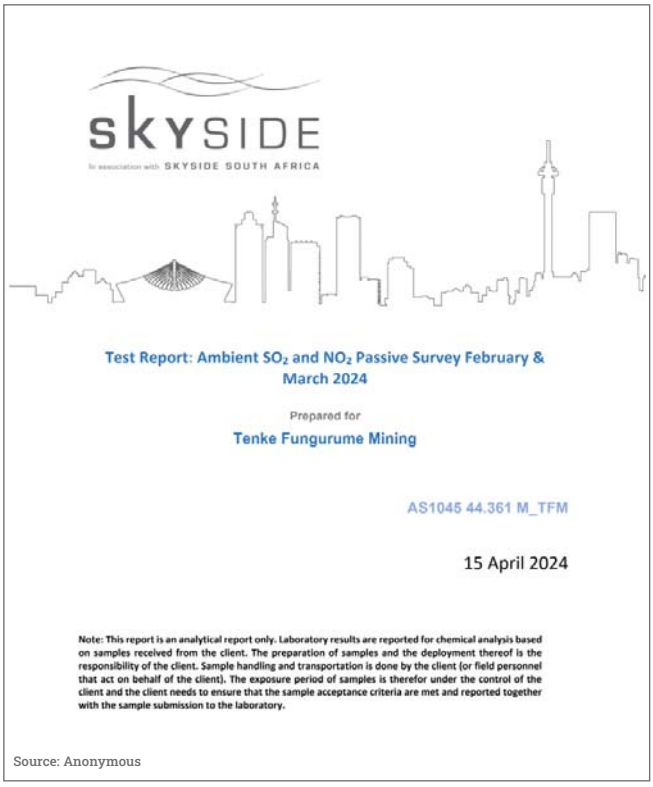
Figure 14
Documented respiratory complaints and eye itching at a Fungurume clinic, 2022-2024

BOX 3.

SO2 AT THE TENKE FUNGURUME'S HYDROMETALLURGICAL PROCESS

SO2 is an essential reagent in the hydrometallurgical process, with uses at multiple stages of the process:[38]

- **Copper and cobalt leaching:** SO2 is mixed with sulfuric acid and other reagents in agitated leach tanks to facilitate the dissolution of copper and cobalt from the ore. This mixture helps to efficiently break down ore minerals so the metal can be recovered.
- **Reduction of cobalt:** SO2 is specifically used to reduce cobalt from its trivalent (Co3+) to its divalent (Co2+) state during leaching, enhancing the recovery of cobalt into solution for subsequent precipitation and purification.
- **Sulphuric acid plant feedstock:** The site houses large sulfuric acid plants where SO2 is a principal feedstock. The generated sulfuric acid is then cycled back into the leaching process, ensuring a self-sustaining reagent supply.
- **Manganese removal:** SO2, diluted with air, is used for the precipitation of manganese dioxide (MnO2), assisting in the removal of manganese impurities from process liquors.
- **Process Expansion:** Multiple sulfur dioxide burners allow for increased SO2 addition as throughput rises, supporting higher production rates and expanded cobalt recovery.



skySIDE

In association with SKYSIDE SOUTH AFRICA

Test Report: Ambient SO_2 and NO_2 Passive Survey February & March 2024

Prepared for

Tenke Fungurume Mining

AS1045 44.361 M_TFM

15 April 2024

Note: This report is an analytical report only. Laboratory results are reported for chemical analysis based on samples received from the client. The preparation of samples and the deployment thereof is the responsibility of the client. Sample handling and transportation is done by the client (or field personnel that act on behalf of the client). The exposure period of samples is therefor under the control of the client and the client needs to ensure that the sample acceptance criteria are met and reported together with the sample submission to the laboratory.

Source: Anonymous

Figure 15
Skyside study commissioned by TFM

Source: Anonymous, shared with EIA

Figure 16
Fumes emanating from TFM's operation seen from Manomapia

"[t]he methods used for these samples have been validated and are widely used in Europe, guaranteeing accurate and reliable analysis. The results of these studies, finalized on April 15, confirm that the emission levels of the 30K plant are strictly in compliance with IFC (International Finance Corporation)[40] standards."[41]

The results of the Skyside study appear to support TFM's claim that the company effectively managed their emissions of industrial pollutants like SO2. However, according to experts, the study – obtained by EIA (Figure 15) – presents serious methodological flaws. Notably, the report used a "passive sampling" methodology that presents the mean levels of these gases over a period of several weeks, but fails to account for the episodic nature of peaks of SO2 emissions (Figure 16). As Dr. Benoit Nemery, Professor emeritus in the Department of Public Health and Primary Care at KU Leuven, Belgium, explained to EIA:

"Making continuous measurements over a month was really nonsensical because it appears that the emissions of SO2 are so episodic. Some days there are no emissions, some days there are emissions that lead to high air levels of SO2 for a few hours. But if you average it out, these temporary peaks don't weigh enough to affect the averaged final result. And that's a real problem, because high peaks in themselves would have a considerable toxic impact."

Another independent expert consulted by EIA, who wished to remain anonymous due to fear of reprisal, further explained:

"This passive sensor measurement strategy is not suitable for this type of case. To be clear, it is bound to fail when SO2 emissions are not continuous but intermittent or episodic, as is frequently the case at industrial copper-cobalt processing facilities, including those at TFM."

The serious doubts about the reliability of the third party air monitoring protocols, and therefore the IFC noncompliance results, were further compounded by TFM shifting its public stance regarding its responsibility for the public health crisis in Manomapia. While the company initially denied the existence of any pollution and any corporate responsibility (cf. above), it acknowledged its role in spikes of SO2 in its 2024 Environmental and Social Governance Report, released in October 2025:

"During the commissioning phase, unstable sulfur dioxide scrubbers at our new sulfuric acid plant caused spikes in sulfur dioxide emissions, triggering collective complaints from neighboring residents [emphasis added]. In response, our technical team implemented a comprehensive range of technical measures to improve the performance and stability of the new machinery, reducing pollution at source."[42]

The company also stated in the same document that "[s]ince May 2024, we have not received any further complaints related to air quality." As presented in the following section, EIA's findings indicate that SO2 pollution has apparently persisted well after May 2024.

In response to EIA's conclusions, TFM recognized that mining and processing activities can generate air emissions, and that nearby communities may be concerned about potential impacts. The company clarified that both passive sampling at "sensitive and receptive areas" and active monitoring "at relevant process control points," are being deployed. According to the company, all monitoring data collected in late 2024 and early 2025 indicate the absence of pollution, with SO2 concentration remaining within the applicable regulatory limit. TFM also claims that no complaints from communities were received from late 2024 to early 2025. The company's full response is available on EIA's web page for this report.

2.4 Ground-Truthing Air Pollution: Counter-Testing and Insider Knowledge

EIA commissioned an independent expert (Figure 17) to carry out air quality testing between September 2024 and January 2025.[43] The expert placed gas detectors in several locations within the Manomapia neighborhood.

The results were markedly different from those presented in the Skyside report that TFM commissioned.

The study supported by EIA found that on several occasions SO2 levels were far above thresholds for air quality established by the World Health Organization (WHO) and the South African government's National Ambient Air Quality (NAAQS) standards (cf. Annex 2 and Figure 18). For instance, on September 28 2024, SO2 levels measured in Manomapia remained above 0.7 ppm for approximately 40 minutes. The WHO and South African NAAQS guidelines state that levels should not exceed 0.191 ppm for more than 10 minutes. Further measurements of SO2 levels in excess of 0.5 ppm were also measured in the Manomapia community, in December 2024 and January 2025. In December 2024, the levels stayed above 0.5 ppm for several hours, despite WHO guidelines stating that levels should not exceed 0.191 ppm for more than 10 minutes.

Notably, the independent study supported by EIA is conservative by design. Most of the testing took place in the middle of the rainy season, when heavy precipitation reduces the amount of gas that the detectors can pick up. The levels of SO2 to which the community is exposed during dry weather would likely be significantly higher. The independent expert who carried out the study explained to EIA investigators:

Figure 17
Material used for the SO2 sampling

Source: EIA

Figure 18
EIA measurements of SO2 levels in 30k vicinity

"Analysis of the temporal and spatial profiles of SO2 concentrations, marked by peaks observed during nighttime working hours and a gradient oriented toward industrial infrastructure, suggests compatibility with industrial emissions, but does not allow for definitive attribution in the absence of a more comprehensive dispersion study."

Multiple community members, civil society representatives, and health experts told EIA that they believe pollution from the 30k plant continued to affect parts of Fungurume close to the 30k plant as of December 2025.

EIA investigators also spoke to multiple TFM workers who described the dire reality of SO2 pollution at TFM. One former TFM worker explained that periodic off-gassing of SO2 at TFM was "not a secret," and that management regularly off-gassed SO2 when levels of the gas grew too high. Multiple workers further alleged to

EIA that machines would not stop when the SO2 alarm sounded, because, as one worker explained, "it would take too long to restart them." The worker told EIA that they had seen three sub-contractors who had not been wearing proper PPE pass out due to a buildup of SO2. Most workers are evacuated when the SO2 alarm sounds, another source told EIA. However, operators responsible for the continued functioning of their machines stay at their stations despite the presence of dangerous SO2 buildups for fear of reprisal from their superiors, the source said.

Exceeding the WHO and South African NAAQS thresholds for safe SO2 levels in Manomapia, as measured by the independent expert supported by EIA, would contravene Congolese law. Article 47 of DRC's law on the Fundamental Principles Relating to Environmental Protection states that "[e]veryone has the right to breathe air that is not harmful to their health. Any emission into the air that could cause discomfort to the population or harm the environment or health is prohibited."[44]

In response to EIA's findings, TFM explained that the company "upholds the principle that all work must be conducted safely or not at all. Our Stop Work Authority (SWA) policy authorizes and obligates any person onsite to halt unsafe work, prohibits resumption until hazards are controlled, and strictly bars retaliation." TFM also clarified that respiratory equipment is provided "in line with relevant industrial and regulatory standards," and denied having any records of workers losing consciousness due to SO2 exposure while unprotected. The company also stated that supervisors are required to enforce evacuations when alarms activate or thresholds are reached.

2.5 Displacing Families: When the Solution Becomes the Problem

As a consequence of the public outrage against TFM's alleged responsibility in the Manomapia community health crisis, TFM supported the creation of a buffer zone around the 30k plant. It also relocated the families living in the area, while publicly disputing the health crisis claims. In May 2024, the company explained:

"Despite these [air quality monitoring] results proving conformity, TFM chose to relocate approximately 1,500 families from the Mano-Mapia neighborhood. This operation was carried out to preserve social peace and maintain good relations, highlighting the dilemma faced by mining companies under pressure from public opinion, with few other options available."

In a public statement from January 2025 regarding the displacement of Manomapia residents, TFM further detailed:

"To promote social harmony and meet the community's expectations, TFM chose to join the Special Commission established at the initiative of the provincial authorities, despite the lack of scientific evidence on the communities' complaints, who created a no-go zone between the 30K plant and the Mano Mapia block.[…] The compensation and compensation scale are approved by the Special Commission, taking into account not only the standards of the Mining Code and the Mining Regulations, but also, and above all, current local market prices. The minutes and documents relating to these decisions were signed by all stakeholders to ensure transparency. The compensation amount per household covers the cost of goods, compensation for loss of economic activity, and also includes additional allowances that TFM has voluntarily added."[45]

The displacement of the families living in the Manomapia neighborhood represents the third wave of displacement triggered by the development of the Tenke Fungurume mine since 2022 (Box 4). In total, according to EIA research, more than 12,000 people have been displaced. EIA's investigation reveals that the relocation of residents that took place because of the construction of the 30k plant may have fallen far short of DRC law, which clearly defines how relocation should take place (Annex 3). As a displaced father of a family explained: "we have nowhere to go."

TFM has failed to provide displaced residents with any alternative land or accommodation, according to EIA interviews with relocated community members (Figure 19). Instead, residents told investigators they were given a small cash compensation and expected to find alternative housing themselves. Given the pressure on land created by the mining boom and by previous waves of relocations (see above) to make way for new mines, finding alternative land to live on in the area was almost impossible, sources who spoke with EIA said. One man told EIA, "If we have to die from acids, then so be it, because we have nowhere to go."

In response to EIA's findings, TFM stated their commitment to meeting international standards regarding relocation, and added: "In the absence of evidence demonstrating a causal link between health impacts and industrial activities, TFM nonetheless supported relocation initiatives in Manomapia and Kabombwa in the interest of social stability, community well-being, and the prevention of potential tensions."

All of the individuals interviewed told EIA that the amount they received was inadequate to purchase any comparable plot of land or house in the nearby area. One resident told EIA:

"For my house, all I received was something like US$2,760, for a five-room house made of durable materials. When I received this money, I was totally devastated. My wife and all the people in my house were all distressed because you can no longer find a house of this price here in Fungurume today since the commune is developing […] finding a house at $2,000-3,000 in the surrounding area is almost impossible."

BOX 4.

TFM'S GROWTH FOOTPRINT: 12,000 PEOPLE DISPLACED IN 3 YEARS

EIA's investigation has identified three waves of displacement associated with TFM's operations. The first wave of displacement took place in 2024, after local civil society members blamed 11 deaths and several illnesses from 2020 to 2022 on TFM for polluting the air and water in the village of Kabombwa, in the northeastern part of the mining operation near TFM's lime factory, which was constructed and commissioned in 2020.[46] In 2024, the village of Kabombwa was abandoned and destroyed, and its approximately 3,000 inhabitants displaced.[47] Local civil society and community members claimed at the time that TFM's lime plant was the source of the pollution.[48] In a statement published in 2025, TFM claimed to have supported the relocation process, which was led by the provincial government, and denied any responsibility for the pollution.[49]

Two other relocations of local residents took place at the same time, both of which were connected to the expansion of TFM's ore processing capacity, and notably the 30k plant in the southeastern part of the mine. Between July 2022 and September 2023, TFM displaced 4,498 inhabitants from Kalweji village to clear space for the construction of its vast new mixed-ore processing complex (Figure 24), according to EIA's findings. A civil society letter addressed to the President of the DRC and reviewed by EIA alleges that TFM had already begun construction on the facility before the company had compensated any residents of Kalweji.

From April 2024 to January 2025, the company displaced a third wave of inhabitants - this time in the Manomapia neighborhood - as concerns mounted about the impact of the pollution coming from the plant.[50] EIA estimates that TFM relocated about 5,000 people during this wave.[51]

Figure 19
Houses demolished in Manomapia to prevent residents from returning

Figure 20
One of the last homes remaining from the third displacement wave

Another woman said: "I had already built a two-room house, well plastered inside and out, with paving and toilets, but they gave me $4,000. With my $4,000 in hand, I realized that the minimum price for plots was $10,000." In general, according to EIA's findings, people who lost plots or houses received around US$3,000 to $4,000.

While people who received cash generally received far below the cost of a similar property, other Manomapia residents fared even worse. According to EIA's investigation, TFM apparently determined that about half of the plots that the company needed to clear to make way for the expansion of the plant were agricultural fields rather than plots for residential housing. This allowed the company to pay far less in compensation because agricultural plots receive a lower relocation rate than residential plots. One man told EIA that he had purchased his land for just over US$2,700 in 2014, which, taking into account inflation, would have been worth about $8,300 in 2024 by conservative estimates.[52] But TFM, which classified the land as an agricultural field, offered him US$60 in compensation for it.

Community members also told EIA that TFM asked them to agree to the relocation and to sign documents governing their relocation before the company had told them how much compensation they would receive (Figure 20). One community member said: "They told us to go and sign first and that we would see the amount later, and we signed without knowing how much the amount was. When they called us for the withdrawal [of the compensation amount], we found that the money was totally insignificant." They also told EIA investigators that the company kept the only copy of the signed contract.

In response to EIA's research, TFM explained that the compensation rates offered to residents were "based on annual market studies, reviewed and approved by the committee, and documented through signed meeting records." The company clarified that the company continues to address specific unresolved cases. TFM's full response is available on EIA's web page for this report.

3. THIRD PARTIES AUDITING CMOC AT A CROSSROADS

3.1 Copper Mark

In June 2024, Tenke Fungurume became the first mine in Africa and the first Chinese-owned mine in the world to receive the Copper Mark, an environmental, social, and governance (ESG) standard that includes specific criteria on relocation, labor conditions, and pollution. The Copper Mark was created in 2019 by the International Copper Association,[53] a global trade organization for the copper industry. Since its inception, the standard has grown to encompass other minerals, notably molybdenum, nickel, and zinc, that are often mined with copper.[54] Companies that undergo Copper Mark audits and meet the requirements of the standard receive the Copper Mark.[55]

The Copper Mark provides standards for pollution against which mining operations can be evaluated. Criterion 33 of the Copper Mark commits companies to "[a]void, minimize, rectify, and compensate for adverse impacts on human health and the environment caused by pollution from the introduction of poisonous and harmful substances,"[56] including sulfur oxides. Despite being awarded the Copper Mark in June 2024,[57] the initial audit raised serious concerns about the risk of pollution at TFM:

"TFM has gone through rapid expansions over the last three years and there is limited evidence that the site has considered its total scope of these expanded operations to evaluate and assess the risk to pollution of (a) air quality (b) water quality and (c) land/soil quality in the context of its ecosystem setting and its community presence.

There is insufficient evidence that mine expansion planning and implementation has fully accounted for the need for changes to pollution management to ensure impacts are maintained at an acceptable level."[58]
In Copper Mark's follow-up assessment from July 2025, auditors said TFM had addressed concerns about air pollution because "Potential pollution impacts of the whole operation, including recent expansions, are now included in modeling. This includes air, water and land pollution." EIA's findings, which show unsafe levels of SO2 after the date of this audit, call into question the validity of the air pollution modeling mentioned in the assessment.

More broadly, the fact that TFM received the Copper Mark in June 2024 even though the auditor acknowledged that there was insufficient evidence of proper pollution monitoring and mitigation at the mine casts doubt on the reliability of the Copper Mark standard as an assessment of environmental and social performance. It is especially worrying that TFM received the Copper Mark at a time when local communities had publicly voiced concerns about the emerging public health crisis and its link to pollution from the mine as recently as February 2024.

Responding to EIA's findings, the Copper Mark indicated that pollution concerns were taken into account in the initial audit. As a result, the pollution criterion (Criterion 20) was rated "partially meets." The Copper Mark further explained that "[o]nly after implementing corrective actions specifically related to these issues was the site able to achieve a rating of 'fully meets.'" The Copper Mark's full statement is available on the EIA web page for this report.

3.2 Initiative for Responsible Mining Assurance

At the time of writing, TFM is being assessed against the Initiative for Responsible Mining Assurance (IRMA) standard, which covers worker health and safety, human rights, and environmental protection. IRMA was formed in 2006 by a coalition of civil society organizations, downstream purchasers, mining companies, labor unions, and impacted communities.[59] Representatives from each of these sectors, as well as representatives from the finance and investment sectors, sit on IRMA's board and make key governance decisions about the standard.[60] IRMA is widely considered to be the most exacting voluntary standard in the mining sector.[61]

When it comes to air pollution mitigation requirements, IRMA is more specific, stating that both new and existing mines "shall comply with the European Union's Air Quality Standards,"[62] which provide strict limits on concentrations of pollutants over specific durations. EIA's findings indicate evidence of emissions well above the EU Numeric Air Quality Standards used by IRMA (cf. above and Annex 2), suggesting that TFM's operations are a far cry from meeting voluntary standards on air pollution. EIA's investigation raises major questions about TFM's adherence to the IRMA standard, and EIA looks forward to having information made publicly available regarding the first phase of the auditing process and its conclusions.

In response to EIA's conclusions, IRMA explained that: "IRMA does not directly audit mine sites, assess levels of conformity, or determine achievement levels; these functions are performed by independent, third-party auditors. Consequently, IRMA is not in a position to comment on the performance of individual sites or specific findings in the absence of a finalized audit report." IRMA's full response is available on EIA's web page for this report.

Source: EIA

4. FROM MINING TO AUTOMAKING: THE SUPPLY CHAIN NEXUS

A supply chain analysis conducted by EIA reveals how cobalt from the Tenke Fungurume mine ends up in the electric vehicles of some of the world's biggest car manufacturers, including BMW, Mercedes-Benz, Peugeot, and Volkswagen. This analysis, coupled with EIA's investigation into pollution from the mine, connects these companies to the public health crisis harming communities next to the mine.

Based on EIA's shipment-level analysis of cobalt flows from CMOC's subsidiary TFM (January 2023-August 2025), at least 67% of TFM's cobalt hydroxide goes to China and at least 4% goes to Europe (principally Finland at about 2.6% and Switzerland at about 1.5%). The rest flows to regional transit hubs in Tanzania, Eswatini, South Africa, and Hong Kong from where cobalt is redirected to its final unknown destination (Figure 20).

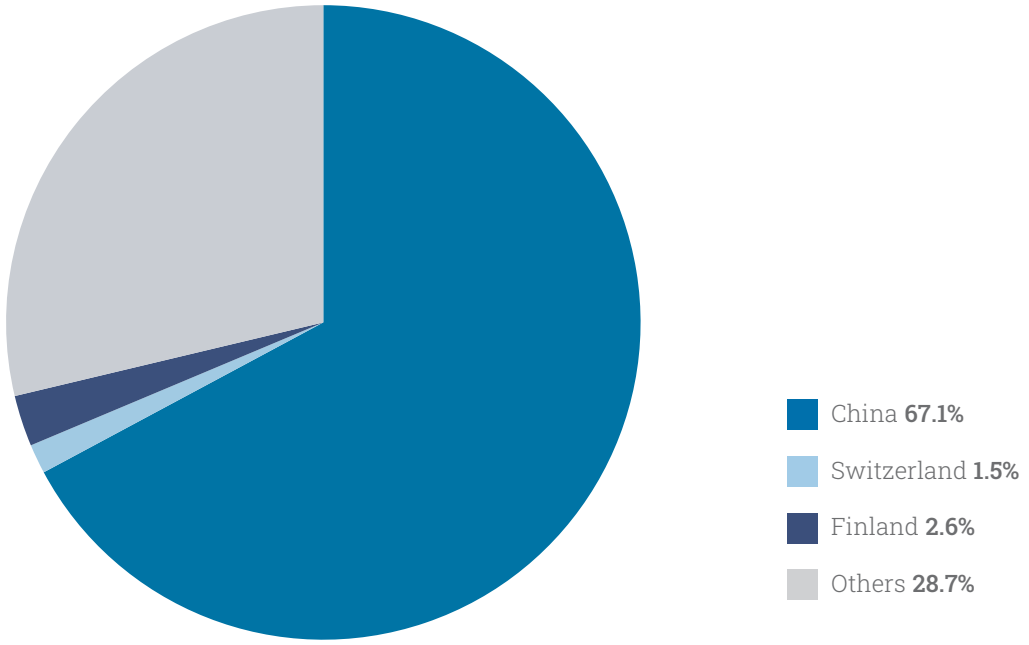
4.1 CMOC-China Connection

China dominates battery manufacturing. Chinese firms produce over three-quarters of the world's batteries and more than 80% of cathode active materials (CAMs),[63] which are crucial components in lithium-ion batteries, determining a battery's performance, safety, and lifespan. Chinese firms also produce more than 90% of anode active materials, which are essential for charging and discharging batteries.[64]

In 2021, CMOC signed a "comprehensive strategic cooperation" agreement with Contemporary Amperex Technology Co., Ltd. (CATL), China's leading electric-vehicle battery maker and one of the largest lithium-ion battery manufacturers in the world.[65] The agreement explicitly mentions the Kisanfu mine and not the Tenke Fungurume mine. However, in 2022, CATL also became a major indirect shareholder in CMOC,[66] the majority owner and operator of the mining and processing facilities at the Kisanfu and Tenke Fungurume mines. Under the agreement, CATL secured upstream access to CMOC's DRC cobalt portfolio.[67] EIA's analysis of trade data indicates that CMOC – like most mining groups – seemingly aggregates cobalt production from its two DRC operations for sale into long-term contracts. It is therefore highly likely that CATL is directly or indirectly sourcing cobalt hydroxide produced at TFM for use in EV batteries and battery components.

At the time of writing, EIA has not received any comments nor response from CATL regarding EIA's findings.

CATL's production and sourcing seemingly connects cobalt hydroxide sourced from TFM and CMOC with European companies that manufacture Nickel Manganese Cobalt (NMC) batteries. CATL operates several battery plants outside China, including in Germany.[68] European manufacturers buy a substantial share of their EV battery cells from Chinese producers,



Source: EIA analysis based on data from Sayari Analytics

Figure 21
CMOC's direct cobalt export from January 2023 to August 2025

including CATL,[69] and Europe is one of CATL's key export and investment regions.[70] Volkswagen Group, BMW, Mercedes-Benz, Stellantis, Volvo/Polestar and Renault–Nissan use CATL cells in multiple current EV models or have signed long-term supply and gigafactory agreements in Europe and China.[71] Volkswagen and CATL have a sourcing relationship dating back to at least 2018,[72] with Volkswagen having certified CATL's German production facility in 2024,[73] and signed an MOU for development and sourcing in February 2025.[74] CATL and BMW also signed an MOU for sourcing battery cells that took effect in 2025 for the latter's new Neue Klasse EV series, which use a modified NMC chemistry.[75] CATL and Mercedes-Benz also have a longstanding sourcing relationship for battery products across the latter's portfolio,[76] indicating that Mercedes-Benz is likely sourcing cobalt-containing battery cells and technologies from CATL. Stellantis and CATL have also developed a joint venture to build an LFP production facility in Spain.[77]

None of the automakers named in this report denied indirectly sourcing cobalt from TFM for their EVs production. Mercedes-Benz stated that they had initiated a dialogue with TFM based on EIA's findings, and that "Mercedes-Benz subsequently conducted outreach through relevant standard setting initiatives and its own supply chain," but that their review "did not indicate shortcomings related to SO2 emissions." BMW Group stated that "If there are any indications of possible violations in our supply chains, we investigate these indications." Stellantis confirmed their sourcing relationship with TFM and explained that a third-party auditing partner identified "serious illness linked to pollution in Manomapia." The company also explained they will "continue to follow up with TFM to understand the progress of mitigation efforts." At the time of writing, EIA has not received any comment from Volkswagen regarding EIA's findings. The full responses to the findings of this report from these automakers are available on the EIA web page for this report.

4.2 CMOC-Europe Connection

To reduce reliance on imports of lithium-battery components from Asia,[78] the European Union (EU) has set ambitious targets designed to increase capacity to extract, process and manufacture batteries within the EU.[79] While the EU's domestic EV battery production capacity has increased significantly since 2024,[80] accompanying measures like the EU Corporate Sustainability Due Diligence Directive (CSDDD) designed to guarantee responsible sourcing of critical raw materials have been weakened and delayed (Box 5).[81]

Few companies typify the EU's approach better than the Belgium-based technology company Umicore. The company owns Europe's largest cobalt refinery, in Kokkola, Finland - one of the world's largest refineries outside China.[85] It produces a range of materials and products used in batteries, car emission controls, and specialized industrial tools at dozens of production sites

BOX 5.

DERAILED DUE DILIGENCE

In December 2025, the European Parliament and the Council reached a provisional political agreement on amendments to the CSDDD. The deal substantially narrows the directive's scope by limiting the core CSDDD requirements (identifying, preventing, mitigating and accounting for adverse human-rights and environmental impacts in own operations, subsidiaries and value chains) to "very large companies" and removing the obligation to adopt climate transition plans.[82] Member states will need to transpose the revised directive by mid-2028, with corporate compliance obligations starting from mid-2029.[83]

Several heads of state have taken strong public stances against the due diligence "burdens" that the CSDDD would cause European businesses, including French president Emmanuel Macron and German chancellor Friedrich Merz.[84]

This is especially troubling because EIA's investigation reveals that European companies, in particular French and German, at the center of the EU's strategy to create a domestic battery industry are indirectly sourcing cobalt from the DRC's Tenke Fungurume mine, which is linked to a series of alleged negative impacts on the environment and neighboring populations.

on six continents.[86] In a sign of the company's importance to the EU's battery and raw minerals strategy, Umicore obtained a €350 million loan from the European Investment Bank in February 2024,[87] to finance the company's research and development activities in Europe, including at its refining facility in Finland.[88]

Umicore has built an integrated supply chain that allows the company to handle everything in-house – from the refining of raw materials directly sourced from producer countries, to making advanced products, to recycling them at the end of their life. In addition to owning Europe's largest cobalt refinery, Umicore also produces cathode precursors for its battery cathode materials factory in Nysa, Poland – Europe's first cathode active materials gigafactory for electric vehicle batteries.[89]

EIA's analysis of trade data and reporting indicates that Umicore is directly sourcing some of its cobalt hydroxide from TFM in DRC.[90] Umicore announced that it had struck a "long-term supply agreement" with CMOC in January, 2020.[91] At the time, the role of TFM as a major direct supplier of cobalt hydroxide to Umicore was confirmed by a leading industry publication: "While some of the Glencore hydroxide units will find their way into Kokkola [Umicore's Finland-based refinery], China Molybdenum (CMOC) will continue to supply material from the Tenke copper-cobalt mine in the Democratic Republic of the Congo into Kokkola as well."[92] A well-placed source with knowledge of Umicore's operations confirmed to EIA investigators that a supply agreement between CMOC and Umicore was still in effect as of July 2025, and that CMOC's subsidiary, TFM, is the principal source of the cobalt hydroxide covered by this agreement.

EIA's analysis of cobalt hydroxide trade data from Africa from January 2023 to January 2025 confirms that Umicore continues to source cobalt for the EV market from TFM. EIA analysts were able to identify several shipments of cobalt hydroxide from IXM – a trading subsidiary of the Chinese mining company CMOC – to Umicore's factories in Finland and Belgium. These shipments totaled 2,000+ tons of cobalt hydroxide from February 2024 to January 2025. Over the same period, EIA analysts identified more than 2,200 tons of cobalt hydroxide that TFM shipped to an unknown entity in Finland. No publicly available information indicates that CMOC is supplying any other manufacturing partner in Finland other than Umicore. It is therefore highly likely that CMOC supplied a minimum of 4,200 tons of cobalt hydroxide to Umicore from February 2024 to January 2025. This represents around one-fifth of Kokkola's 21,000-ton-per-year permitted cobalt-refining capacity as authorized in April 2024 (cf. footnote for further detail).[93]

Umicore has also struck a series of strategic partnerships with major European automakers over the supply of products that contain cobalt, allowing the company to increase its dominance of Europe's materials technology sector (cf Annex 4). As detailed in the Annex 4, through the Umicore connection, cobalt hydroxide produced at the Tenke Fungurume mine has likely been used by BMW, Mercedes-Benz, Stellantis (Peugeot's parent company), and Volkswagen.

In response to EIA's findings, Umicore explained that the company has engaged with TFM consistently over the years on a range of topics, including the issue of air pollution and displacement. Umicore further explained that "Some NGOs raised these concerns with us before and we have discussed them transparently with both TFM and the NGOs involved…To date, we have not been able to establish a clear, evidence-based causal link between TFM's operations and specific health or environmental impacts." Umicore's full response is available on EIA's web page for this report.

CONCLUSION AND RECOMMENDATIONS

EIA's findings indicate that the source of the public health crisis affecting Fungurume since 2023 is likely TFM's release of sulfur dioxide, or SO2, at levels that far exceed international standards.

Peak SO2 concentrations are widely known to cause health impacts consistent with what residents have described and documented, including nosebleeds, coughing up blood, and serious respiratory illness. The provisions in DRC law that state citizens have the right to a healthy environment and the right to breathe air that is not harmful are seemingly not being met. EIA's investigation reveals that multiple automakers, including BMW, Mercedes-Benz, Peugeot and Volkswagen, have apparently indirectly sourced cobalt from TFM for use in EVs, the rapid expansion of which has caused a series of public health, social and environmental crises in DRC.

In this context, EIA recommends:

To the DRC government:

- Investigate the alleged violation of Congolese laws and regulations related to citizens' health, environmental pollution, and relocation.
- With the support of multilateral organizations, make the multifaceted environmental and public health crisis caused by copper-cobalt mining in Haut Katanga and Lualaba provinces a national policy priority, and implement interministerial programs to remediate, control, and prevent it.
- Establish a world-leading, government-mandated and civil society-led independent monitoring program for the mining sector, building on lessons learned from a decade of independent forest monitoring, to be piloted in Lualaba province.

To CMOC:

- Immediately establish a transparent and multipartite process of reparation for the alleged harm being done to dozens of residents and workers due to SO2 pollution.
- Suspend TFM's "30k plant" operation until any needed preventive SO2 neutralization systems are in place, adapted continuous emissions monitoring is operating, and a qualified independent third party can reliably guarantee that SO2 emissions respect DRC laws on environmental rights and international standards.
- Proactively disclose TFM's SO2 monitoring data through a publicly accessible platform, including daily measurements from on-site monitoring systems.

To CMOC's clients:

- Immediately inform CMOC that, as of May 1st 2026, cobalt hydroxide purchase will be conditional on the guarantee by a qualified independent third party that TFM's SO2 emissions respect DRC laws on environmental rights and international standards.

To BMW, Mercedes-Benz, Stellantis, and Volkswagen:

- Do not purchase cobalt-containing products that risk being indirectly sourced from TFM until solid evidence shows that the 30k plant's emissions respect DRC laws and international standards.
- Support a regional community- and civil society-led SO2 monitoring program that would allow residents near copper-cobalt mines to collect science-backed information about air quality and make it publicly available.
- Establish the "new normal" regarding energy transition supply chain transparency by publicly disclosing all available information regarding cobalt sourcing up to the mine of origin.
- Join a multi-stakeholder body to accompany the IRMA auditing process at TFM, alongside representatives from local communities and civil society organizations, provincial and federal government, and international non-governmental organizations.

To IRMA:

- Establish an independent multi-stakeholder body - with full access to audit information, the associated corrective measures, and their implementation by TFM - to accompany the IRMA auditing process, with representation of local communities and civil society organizations, provincial and federal government, automakers, and international non-governmental organizations.

Source: Herman Kambala/Arete/EIA

ANNEX 1: The Deals Behind CMOC's Growth in DRC

The Tenke Fungurume mine in DRC's Lualaba Province is one of the world's largest copper and cobalt mines. In 2016, the U.S. mining company Freeport-McMoRan ran into major financial trouble and decided to sell part of their assets in the DRC,[94] allowing CMOC to acquire a controlling interest in Tenke Fungurume Mining S.A. (TFM), the corporate entity that owns and runs the operations at the Tenke Fungurume copper-cobalt mine.[95] Separately in the same year, an affiliate of BHR Partners – a private Chinese equity firm of which Hunter Biden, the son of then-U.S. Vice President Joe Biden, was a founding board member – acquired a minority stake in TFM for $1.14 billion.[96] A year later in 2017, CMOC entered into a cooperation agreement that gave it control over BHR's stake. By 2019, CMOC had acquired BHR's holdings entirely, raising its total ownership of TFM to 80%.[97] Between 2016 and 2017, Chinese banks extended CMOC a total of US$2.68 billion of credit to acquire the mining operation.[98]

ANNEX 2: Air Quality Guidelines and SO2 Exposure

Both the WHO and the South African government have established air quality guidelines for exposure to air particles and pollutants that are harmful to human health, including PM2.5, PM10, NO2, and SO2. These guidelines provide a threshold for the maximum recommended exposure to these particles and pollutants for a particular time period, against which air quality can be evaluated.

While the TFM-commissioned report uses the South African NAAQS, which were last updated in 2009, the independent study commissioned by EIA uses the WHO guidelines. IRMA uses the European Union Numeric Air Quality Standards. The WHO guidelines are broadly considered the gold standard against which to accurately and ethically measure exposure. As a 2022 paper notes, "the new WHO global air quality guidelines are informed by the best available scientific evidence covering a vast number of research papers published until September 2018, and appraised by experts and stakeholders in the field of air quality."[99]

Table 1: **WHO Air Quality guideline (AQG) and South African National Ambient Air Quality Standard (NAAQS) for SO2 exposure**

Exposure Duration	WHO AQG[100] (approximate equivalent PPM at 1 atmosphere and 25°C)	South African NAAQS[101] (approximate equivalent PPM at 1 atmosphere and 25°C)	European Union Numeric Air Quality Standards[102] (approximate equivalent PPM at 1 atmosphere and 25°C)
10-minute	500µg/m³ (0.191 ppm)	500µg/m³ (0.191 ppm)	No guideline
1-hour	No guideline	No guideline	300µg/m³ (0.115 ppm)
24-hour	40µg/m³ (0.015 ppm)	125µg/m³ (0.048 ppm)	125µg/m³ (0.048 ppm)
Annual	No guideline	50 µg/m³ (0.019 ppm)	No guideline

Source: EIA, based on data from World Health Organization, South African Department of Environmental Affairs, and European Commission.[103]

ANNEX 3: Community Relocation in DRC: How it Should Be Done

The conditions, process, and imperatives that must be respected when citizens are relocated to new homes because of mining operations are well codified in the DRC. Article 281 of DRC's Mining Code states that "in the event of a displacement of population, the mining operator is obliged to proceed beforehand with indemnification, compensation and resettlement of affected communities."[104]

The procedures that must be followed are detailed in a dedicated Annex (Annex XVIII) of the Mining Regulations ("Reglement minier").[105] The annex establishes these procedures unambiguously in several articles, notably "On the right to information and participation" (Article 4), "On the right to compensation, fair and equitable benefits and other forms of resettlement assistance" (Article 5), and "On the right to relocation" (Article 7), which states that: "The new space should enable displaced communities to achieve a higher standard of living than they had in their original environment."[106] The Mining Regulations further establish that, "Regardless of the agreed criteria and scales [for the compensation to be paid], the loss of housing, community infrastructure, and land access rights will be compensated by the construction of adequate new housing and infrastructure and the provision of alternative arable land," (Article 18).

ANNEX 4: Umicore's Network

In April 2022, Umicore signed a long-term strategic supply agreement with Automotive Cells Company (ACC), a joint battery technology venture of Stellantis, Mercedes-Benz, and TotalEnergies. Umicore agreed to supply high-nickel cathode materials from its Nysa plant to ACC's large European battery plants (only one of the three plants has been built so far), where Stellantis makes components for EVs that are used in cars like the Peugeot E-3008 and E-5008 (Figure 4).[107] In September 2022, Umicore established a joint venture with PowerCo, the Volkswagen Group's battery company, to produce precursor and cathode materials in Europe.[108] This joint venture aims to supply PowerCo's battery cell factories from 2025 onwards, targeting an initial 40 GWh capacity in 2026 and growing to 160 GWh by 2030, sufficient to power about 2.2 million electric vehicles annually. This collaboration appears to be central to Volkswagen's strategy for its electric vehicle transition in Europe.[109]

Umicore has also developed partnerships with major battery manufacturers that supply automakers. In February 2019, Umicore announced a multi-year supply agreement with LG Chem for cathode materials and a multi-year agreement with Samsung SDI to supply Nickel Manganese Cobalt (NMC) cathode materials. Both agreements were scheduled to take effect in 2020.[110] LG Chem and Samsung SDI have since reported battery supply agreements with a number of automakers.[111]

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