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**ACRONYMS AND ABBREVIATIONS**

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<th>Acronym</th>
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<tr>
<td>ARECOMS</td>
<td>Agency for Regulation and Control of Strategic Mineral Substance Markets (DRC)</td>
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<td>ASM</td>
<td>Artisanal and Small-scale Mining</td>
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<td>BGR</td>
<td>Bundesanstalt für Geowissenschaften und Rohstoffe, German Geological Survey</td>
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<td>CAP</td>
<td>Cobalt Action Partnership</td>
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<td>CAHRAs</td>
<td>Conflict-affected and High-risk areas</td>
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<td>CCCMC</td>
<td>China Chamber of Commerce of Metals, Minerals and Chemicals Importers and Exports</td>
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<tr>
<td>CEEC</td>
<td>Center of Expertise, Evaluation and Certification (DRC)</td>
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<td>COTECO</td>
<td>Combatting Child Labor in the Democratic Republic of the Congo’s Cobalt Industry</td>
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<td>DRC</td>
<td>The Democratic Republic of the Congo</td>
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<td>EGC</td>
<td>Entreprise Générale du Cobalt</td>
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<td>ESG</td>
<td>Environmental, Social and Governance</td>
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<td>GBA</td>
<td>Global Battery Alliance</td>
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<td>ICGLR</td>
<td>International Conference on the Great Lakes Region</td>
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<td>LSM</td>
<td>Large-scale Mining</td>
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<td>OEM</td>
<td>Original Equipment Manufacturer</td>
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<td>OHS</td>
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<td>RMAP</td>
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<td>SAEMAPE</td>
<td>Department of Assistance and Supervision of Small-Scale Mining (DRC)</td>
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<td>SSA</td>
<td>Sub-Saharan Africa</td>
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<td>SDGs</td>
<td>Sustainable Development Goals</td>
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<td>SOR</td>
<td>Smelter or refiner</td>
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<td>WFCL</td>
<td>Worst Forms of Child Labor</td>
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<td>ZEA</td>
<td>Artisanal Mining Zone</td>
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EXECUTIVE SUMMARY

This Report provides a mapping of the cobalt supply chain from its source in the Democratic Republic of the Congo (DRC) to the international market, along with an analysis of its child labor and forced labor risks. This effort will assist the Global Trace Protocol project in developing traceability tools and protocols to identify and eliminate those risks throughout the cobalt supply chain’s various tiers. It may also assist other similar efforts.

Beginning with country context in Section One, the Report introduces cobalt and the cobalt traceability pilot project and explains that DRC is poor in terms of income, with about 73% percent of the population living on less than US $1.90 a day, and rich in resources, by, for example, accounting for about 60% of global cobalt production (about US $1.91 billion worth in 2019). Large-scale mining (LSM) accounts for 70-80% of total processed exports of cobalt while artisanal and small-scale mining (ASM) accounts for 15-20% of exports of cobalt. While LSM has major risks, particularly in the environmental and social domain, this Report primarily focuses on ASM, which has substantially higher risks.

ASM is labor intensive and under-capitalized, resulting in unique risk exposure, particularly in human rights (including labor rights) and occupational health and safety (OHS). It is estimated that about 150,000 to 200,000 people work in ASM mine sites across the DRC, including a significant number of children and persons subjected to forced labor, with more than a million others economically dependent on their activity. The cobalt ASM sites are found in the two southeastern provinces of Lualaba and Haut-Katanga, almost always in combination with copper ASM sites. Data evaluation from a 2021 study suggests that the artisanal mining sector in the DRC has recently become less important in terms of size and economic relevance, as partly reflected in a reduction in the number of active mines and reduction in the number of artisanal miners between 2018 and 2020. However, the environment remains dynamic and, in some respects, opaque: the same study showed that many mines are still operating illegally or in legal grey areas.

Since 2020, the political situation in the DRC has changed substantially, with a newly elected President stepping into power, followed by the appointment of a new Prime Minister and a new Minister of Mines. While the implications of these changes are not yet fully clear, key interventions aimed at the cobalt sector are continuing. The Entreprise Générale du Cobalt SA (EGC), a product of the previous DRC Administration, was created with the aim of centralizing ASM cobalt purchasing and export in partnership with Trafigura SA, one of the largest global commodity traders providing pre-financing assistance. At the time of writing, given EGC’s strong ties to the previous political administration, it is unknown if the EGC program will continue with the same level of support and as originally envisioned. Other Government efforts are advancing in parallel to the EGC; for example, the Provincial Government of Lualaba has contracted with SudSouth, a private company, to manage the local cobalt market in Musompo, Lualaba province.

Other cobalt sector initiatives, such as the Better Mining program, the upstream assurance mechanism implemented by RCS Global in partnership with the Responsible Minerals Initiative (RMI) and global industry, the ASM Cobalt Framework developed under the Cobalt Action Partnership (CAP) of the Global Battery Alliance (GBA), as well as Cobalt 4 Development and the Fair Cobalt Alliance, are also working to improve ASM sector practices.

In Section Two, the Report analyzes the cobalt supply chain with a tier map and an explanation of the tiers and common operational models within each of them. A graphic map demonstrates the relationship between processes and actors across tiers. The Report starts with the originating upstream tier (mining), which is the furthest level away from the finished products and brands. The map extends via the midstream, downstream to the first tier (battery manufacturing) and eventually to the original equipment manufacturers (OEMs). It is important to note that the battery industry is only one that uses cobalt; others include the aerospace and the tire industries, both of which have their own labor rights risks.

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5. See BGR. Mining Conditions and Trading Networks in Artisanal Copper-Cobalt Supply Chains in the Democratic Republic of the Congo (2021), pp. iii-iv at Mining Conditions and Trading Networks in Artisanal Copper-Cobalt Supply Chains in the Democratic Republic of the Congo (bund.de).
Tier 5A LSM is characterized by capital intensive, mechanized and industrial-scale mining, which comes with its own high risks in environmental management, OHS, community engagement and working conditions. Investigative reports have found that workers and contractors have experienced exploitive labor practices. LSM mines apply one of three supply chain models based on whether cobalt ore is sourced on-site or from other operations, the form of land use agreements (“concessions”), ownership arrangements, and management structures. They include:

- Model 1: LSM with no external sourcing (all mined on-site).
- Model 2: LSM with external sourcing and enhanced due diligence (on-site production with externally sourced material).
- Model 3: LSM with external sourcing and no enhanced due diligence (externally sourced from other LSM and/or ASM).

Tier 5B ASM involves miners working in informal groups and/or cooperatives to extract cobalt ore. The Uniform Act of 2010 requires artisanal miners to be organized into cooperatives. Models at this level include:

- Model 1: Government approved Artisanal Mining Zones (ZEA).
- Model 2: ASM on LSM concessions (some authorized, most are unapproved).
- Model 3: Waste rock gathering (hand-picking at rock dump site or on haul truck routes).

Tier 4 Treatment Unit/Crude Refiner is the level at which cobalt ore is converted into cobalt hydroxide for the purpose of exporting to refineries. Local traders (“négociants”) act as intermediaries, buying ASM sourced cobalt ore and providing it to treatment units (also known as a Crude Refiner, used interchangeably herein) and refiners. Models at this level include:

- Model 1: Co-located with LSM with no external sourcing (within integrated company or group).
- Model 2: Sourcing from external sources with enhanced due diligence (material from other LSM and/or ASM).
- Model 3: Sourcing from external sources without enhance due diligence.

Tier 3 Refiner includes ‘fine’ refiners that process cobalt concentrates or recycle cobalt products into outputs such as cobalt tetroxide and nickel cobalt manganese hydroxide, which are essential components for downstream manufacturing. Models at this level include:

- Model 1: Sourcing of inputs without enhanced due diligence.
- Model 2: Sourcing from external sources with enhanced due diligence (on part of supplies from conflict-affected and high-risk areas (CAHRAs).
- Model 3: Sourcing from external sources with enhanced due diligence on their supplies, fully implemented and aligned with international standards.

Tier 2 Cathode Manufacturer is the level at which manufacturers process cobalt products into cathode material compositions, which are critical components of lithium-ion batteries. International traders are intermediaries between refiners and manufacturers.

Tier 1 Battery Manufacturer is the level at which manufacturers produce batteries or battery cells, mainly in China, Japan, and South Korea, for a variety of uses. The US and the EU are investing heavily in domestic battery production, though China dominates the industry with, at the time of writing, 93 “gigafactories” producing batteries for electric vehicles and solar power and plans to build more.

In Section Three, the Report provides an analysis of the child labor and forced labor risks found in the cobalt supply chain. The risk of child labor is particularly high in ASM, as detailed in a series of human right reports. Child labor in ASM is difficult to precisely assess outside of the ASM mine sites formally monitored by Better Mining. Due to the informal nature of ASM, the estimates of child labor in the workforce have ranged from 13% to 20% and up, with one of highest estimating that as many as 35,000 of DRC’s 255,000 ASM workers could be children. It notes a lack of data regarding child labor in mid and downstream. The highly technical nature of smelting and refining, as well as the formalized nature of operations, mean that the risk of child labor at those stages is low to moderate. The Report also summarizes the legal, regulatory and enforcement context as well as the status of DRC ratification of key treaties and conventions, including its ratification of ILO Convention 182 on the Worst Forms of Child Labor.

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Indicators of forced labor are be found in the mining sector\(^8\) in both the LSM and ASM sectors at varying levels across the value chain,\(^9\) though comprehensive public data on forced labor in cobalt is lacking. Many companies are taking steps to avoid and/or mitigate the risks, yet audit programs continue to reveal significant risk of forced labor as well as documented instances of forced labor indicators. At the ASM level, forced labor is common as debt bondage. At the midstream and downstream levels in the cobalt industry hard data is scarce. Additional audit data would benefit the global discourse, if it could be made publicly available, to provide a data-backed perspective of forced labor risks, including risks related to dispatched, outsourced, and vocational laborers. While China, above South Korea, Japan and select EU countries (including Belgium and Finland), is currently the dominant country in the cobalt midstream industry, the downstream sector increasingly has a global reach. In Section Three, the Report also provides a risk scoring matrix for child labor, forced labor and the risks of sourcing inputs.

**Section Four** addresses traceability requirements in DRC, which are found in laws and regulations. Also, the Certified Trading Chains (CTC) project which was developed by the German Geological Survey provides one of several certification schemes for responsibly sourced mined and traded materials. Additional traceability directions are found in the RMI and CCCMC’s Cobalt Refiner Due Diligence Standard, as well as others. In Section Five, the Report identifies constraints to traceability implementation, such as regulatory enforcement and capacity needs, and identifies leverage points for action.

**Annex I** provides examples of ASM Traceability Data Points and **Annex II** identifies Financial Flows related to the cobalt supply chain.

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**Author’s Note:** RCS Global Group is the lead author of this report. The Responsible Mineral Initiative (RMI) provided contributions to it. ELEVATE has also provided contributions and edited the report. These three organizations, along with Diginex and the Global Fund to End Modern Slavery (GFEMS), formed a consortium to implement this four-year project, funded by USDOL, with the goal of developing, piloting, and publishing a traceability protocol and a set of digital tools to equip businesses and other stakeholders with new approaches to bring greater transparency to their supply chains.

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1. CONTEXT

1.1 COBALT OVERVIEW

Cobalt is a critical input to the cathodes used in the lithium-ion batteries found in electric vehicles and other powered tools and instruments, which have become keys to the green economy. The emergence of the battery economy, with multi-faceted use of energy storage solutions across industries, has resulted in an exponential increase in demand for cobalt and other battery raw materials. A cobalt supply chain tier map is presented from the upstream, 'first mile', where the raw material is mined, to the treatment unit, to the Original Equipment Manufacturer (OEM) (which includes brands) in the downstream, such as consumer-facing electric vehicle or consumer electronics brands, with the leading European and US automotive brands.

The cobalt economy is not only connected to the global battery value chain, but also to other industries that are heavy cobalt users, such as the tire and aerospace industries. Demand for cobalt is expected to increase,\(^{10}\) having tripled in the five years prior to 2019 and doubled again by the end of 2020.\(^{11}\)

The interface between supply chain actors, including between artisanal and small-scale mining (ASM) and large-scale mining (LSM), is complex and interconnected. Cobalt ore is extracted by LSM or ASM operations, with ASM production often transported by local traders to open market depots. Initial processing, known as crude refining, frequently takes place in the DRC, resulting in cobalt hydroxide. Cobalt hydroxide is transported to “fine” refining facilities where it is further processed into other cobalt-containing chemicals or metal form. These processing points treatment units and fine refiners are considered essential control points where materials are aggregated from multiple sources.

Control Points

**Control points** (also referred to as choke points) are those areas in the supply chain where chain of custody or traceability data may be aggregated or lost. Identifying factors for control points include key points of transformation of materials, steps in the supply chain with few actors that process the majority of material, steps with visibility, control or leverage over the mineral production and trade.\(^ {12}\)

In the cobalt supply chain, **treatment units** and **fine refiners** are considered the essential control points where material is aggregated from multiple sources. In accordance with international norms and standards such as the OECD Guidance, independent third-party audits are required for Treatment Units and Fine Refiners (Cobalt Refiner Due Diligence Standard, 2021).\(^ {13}\)

The **open market** in the ASM sector and to a degree also some **international traders** can also be considered points of aggregation, making it difficult to trace material back to the specific mine site without the direct cooperation of the actors involved.

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12. Ibid.
1.2 THE DRC ECONOMIC CONTEXT

The DRC is the largest country by area in Sub-Saharan Africa (SSA) and one of the poorest countries in the world when measured by income per capita. In 2018, it was estimated that 73% of the Congolese population, approximately 60 million people, lived on less than $1.90 a day.\(^\text{14}\) The mining industry is integral to the economic well-being. In 2018, the sector contributed 32% of GDP and 95% of export revenues.\(^\text{15}\)

The DRC is the world's largest source of cobalt. The country holds 48% of known global cobalt reserves and makes up approximately 60% of global cobalt production.\(^\text{16}\) In 2019, it exported $1.91 billion USD of cobalt, which makes cobalt its second top export behind refined copper ($4.06 billion USD).\(^\text{17}\) Roughly 150,000 to 200,000 people work in ASM mine sites across the DRC.\(^\text{18}\)

LSM production of cobalt, using mechanized methods, in the DRC typically comes as a by-product of copper mining. Copper–cobalt ore deposits are widely found across the Central African Copperbelt,\(^\text{19}\) in distinction to nickel/cobalt deposits found in many other parts of the world. The Copperbelt encompasses regions in northern Zambia and southeastern DRC. In DRC, the area includes Haut Katanga and Lualaba provinces, in particular the towns of Likasi, Lubumbashi, and Kolwezi.

**Figure 1: Location of Lualaba and Haut-Katanga Provinces**\(^\text{20}\)

LSM accounts for between 70% and 80% of the total processed exports (cobalt hydroxide) from the DRC. LSM in cobalt and copper is beset with significant Environmental, Social and Governance (ESG) risks,\(^\text{21}\) however child labor risks at the site level are considerably lower than in the ASM sector because of greater site controls and security.

ASM plays a significant role in the DRC's mining sector, including but not limited to cobalt. ASM is a considerable source of cobalt supply to the global market, including the ASM supply produced by children and forced labor, which freely accessing global value chains. ASM is described by the OECD Due Diligence Guidance as “formal or informal small-scale mining operations that use rudimentary tools and labor-intensive work with low financial investment for extraction, processing and transportation.”\(^\text{22}\) ASM production accounts for at least 15-20% of cobalt production in the DRC.\(^\text{23}\)


\(^{19}\) Found at [https://www.sciencedirect.com/topics/chemistry/cobalt-ore](https://www.sciencedirect.com/topics/chemistry/cobalt-ore).


A field study published by the Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) in 2021 provides data evaluation suggesting that the artisanal mining sector in the DRC has become less important in terms of size and economic relevance, as partly reflected in a reduction in the number of active mines and reduction in the number of artisanal miners between 2018 and 2020. While estimates related to number of workers and total number of sites in the ASM cobalt sector differ widely, this field survey (conducted in fall 2020) registered a decline to a total of 67 copper and cobalt producing artisanal copper and cobalt mines in the DRC and that the total number of artisanal miners had dropped to about 31,000 at the surveyed mines. However, the survey also showed serious deficits in the formalization of the sector remain, with many mines still operating illegally or in legal grey areas.24

Child labor and forced labor are prevalent throughout the DRC’s ASM sector, including in, but not limited to, the cobalt sector.25 Thousands of children work in ASM in the Copperbelt region. Child labor, fatal accidents, and violent clashes between artisanal miners and security personnel of large mining firms are recurrent.26 These risks, explained in more detail in Section 4 of this report, have been exacerbated in the mining sector by incidents of corruption and abuses committed by a variety of actors. While the ASM sector is inundated with risks, the geographies where ASM cobalt production occurs is not considered a conflict zone, unlike Eastern DRC. Most ASM cobalt production is concentrated in two Southeastern provinces: Lualaba and Haut-Katanga.27 These provinces were previously part of the former Katanga Province which was separated into four smaller provinces during a 2015 repartitioning. The former capital of the region Lubumbashi, now the capital of Haut-Katanga Province, is the second largest city in DRC28 and is known as a mining sector hub. Researchers highlight that many ASM workers in the cobalt sector originally migrated from the neighboring Kasai provinces.29

In-country processing of cobalt prior to export is required by DRC export regulations at treatment units (also known as crude smelters). To stimulate such production of refined cobalt further and drive this in-country value addition, the DRC’s Government announced an export ban on cobalt and copper concentrates on May 28, 2021. Previous bans were enacted and broadcasted in 2015, 2016 and most recently in 2019. Although the ban is in effect, DRC has issued waivers to individual exporters to continue exporting concentrates, as a result of the limited processing capacity of the current stock of treatment units (also known as crude smelters).30

1.3 THE DRC MINING SECTOR GOVERNANCE CONTEXT AND SECTOR INITIATIVES

Since 2020, the political situation in DRC has rapidly evolved, bringing major changes to governance of the mining sector and minerals trade. Significant engagement with the DRC Government on the traceability topic has already occurred and the DRC Government is familiar with implementation of traceability in the tin, tantalum, tungsten, and gold (3TG) sector. Several examples of successful implementation of digital traceability efforts exist in the DRC’s 3TG sectors.

Current traceability and responsible sourcing initiatives in the 3TG sectors have laid groundwork to engage the government on the benefits of implementing traceability also in cobalt. A traceability system in ASM, irrespective of whether it is cobalt or any other critical mineral, requires government technical services participation.26 The government has played an important role in implementing traceability in ASM sector, following the validation of the Regional Certification Mechanism by the International Conference on the Great Lakes Region (ICGLR) member states and by including traceability requirements in the legal framework through the Traceability Manual (edition 2).26 Based on experience in the 3TG sectors, capacities of DRC mining sector administration officials will need to be strengthened for them to play an effective role in day to day traceability implementation.

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24. See BGR. Mining Conditions and Trading Networks in Artisanal Copper-Cobalt Supply Chains in the Democratic Republic of the Congo (2021), pp. iii-iv at Mining Conditions and Trading Networks in Artisanal Copper-Cobalt Supply Chains in the Democratic Republic of the Congo (bund.de).
26. Ibid.
32. Ibid.
Complementing its engagement with industry and private sector initiatives in cobalt responsible sourcing, the DRC Government has also advanced a set of additional efforts. This includes the Government’s collaboration with SudSouth and the establishment of the Entreprise Générale du Cobalt SA (EGC). SudSouth, which is a private company, the Provincial Government of Lualaba has contracted to manage the local cobalt market in Musompo, Lualaba province.

The Entreprise Générale du Cobalt SA (EGC), a brainchild of the previous DRC Administration, was intended to centralize ASM cobalt purchasing and export in partnership with and with pre-financing from Trafigura SA, one of the largest global commodity traders. Trafigura has driven the development of the ‘EGC Responsible Sourcing Standard’, which was launched prior to the multi-stakeholder work on the CAP’s ASM Cobalt Framework concluding. The EGC standard is intended to align with DRC law as well as other standards deployed by the DRC’s Agency for Regulation and Control of Strategic Mineral Substance Markets (ARECOMS), the Department of Assistance and Supervision of Small-Scale Mining (SAEMAPE) and the Center of Expertise, Evaluation and Certification (CEEC). ARECOMS is mandated to have oversight over the EGC. ARECOMS remains to be operationalized. At the time of writing, given EGC’s strong ties to the previous political administration, it is currently unknown if the EGC program has full central or provincial government backing, whether it will be implemented and, if so, whether implementation is feasible as envisioned.

Other cobalt sector initiatives, such as the Better Mining program, the upstream assurance mechanism implemented by RCS Global in partnership with the Responsible Minerals Initiative (RMI) and global industry, the ASM Cobalt Framework developed under the Cobalt Action Partnership (CAP) of the Global Battery Alliance (GBA), as well as Cobalt 4 Development and the Fair Cobalt Alliance are other important initiatives. As of August 2021, the Better Mining program implemented by RCS Global covered about 50 ASM sites, 11 of which in cobalt, with both ESG risk monitoring and digital traceability implementation. It is implemented in partnership with the RMI (see box above). Key actors from the full cobalt value chain, including OEMs, battery producers and midstream entities. It operates in technical partnership with UNICEF and GIZ in the deepening of its solution in specific risk areas, including in child labor. Designed to drive the sector-wide uptake of OECD Due Diligence Guidance aligned practices, Better Mining principally acts as an upstream assurance mechanism, monitoring ASM sites and value chain for conformance with relevant market access standards, most notably the RMI and CCCMC’s cobalt refiner standard.

The Responsible Minerals Initiative and RCS Global Better Mining collaboration

The RMI Responsible Minerals Assurance Process (RMAP) uses independent third-party assessments of smelter and refiner (SORs) management systems and sourcing practices to validate conformance with RMAP standards. The assessment employs a risk-based approach to validate smelters’ company-level management processes for responsible mineral procurement. The RMAP standards are developed to meet the requirements of the OECD Due Diligence Guidance, Regulation (EU) 2017/821 of the European Parliament, and the U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act. In cobalt, the assurance standard is known as the Cobalt Refiner Due Diligence Standard as was recently updated in August 2021.

RMAP focuses assurance activities on the key “control points” in the global metals supply chain. RMI maintains a public list of “RMAP Conformant” smelters/refiners to facilitate responsible procurement from downstream buyers. RMAP conformant smelters or refiners can source from sites participating in recognized Upstream Assurance Mechanism (UAM) programs to meet these requirements or they can conduct the due diligence on their own. An Upstream Assurance Mechanism is a system that provides upstream actors with the assurance necessary to comply with the OECD Due Diligence Guidance requirements for due diligence and chain of custody. Upstream Assurance Mechanisms may be industry initiatives or third-party entities. RMI requires UAMs to conduct mine-site monitoring, incident data collection and resolution processes, chain of custody / traceability, and provide an accessible grievance mechanism.

RCS Global and the RMI collaborate in the implementation of the Better Mining program in the ASM sector. Better Mining is an RMI-recognized Upstream Assurance Mechanism for 3TG supply chains. Better Mining has replicated its process to cobalt-copper and has scaled the solution to 8 cobalt-copper ASM sites with a further 4 sites identified and in preparation for onboarding in 2022. The 8 cobalt-copper sites in the program in 2021, brought the current total number of ASM sites in the scope of the program to 49 overall, serving ~50,000 ASM miners. As part of its successful replication and scaling, Better Mining is currently finalizing its accreditation process as a UAM for cobalt-copper, which will include traceability via RCS Trace.

Better Mining drives improvement on and around ASM sites, through the implementation of digital traceability from the mine site to smelter/refiner, as well as the permanent on-site monitoring of ASM sites with the of RCS Global staff, equipped with the Better Mining cellphone application. Recorded incidents are translated into ESG risks, including those stipulated in the OECD Due Diligence Guidance, but also environmental, chain of custody, and other risks, established through in-depth stakeholder-consultation which resulted in an approved risk reporting methodology, which RCS Global has developed with support from the RMI. RCS Global’s team of risk experts recommend corrective actions to local stakeholders for implementation through Corrective Action Plans (CAPs). These are workshopped for implementation in monthly on-site meetings. The implementation of corrective actions, in turn, is monitored and reported on by Better Mining allowing for a measurable and dynamic improvement of conditions.

The outcome is a consistent dataflow to the value chain, directly supporting responsible sourcing efforts at midstream and downstream levels. This assurance dataflow is complemented by a product traceability dataflow via the RCS Trace app on those sites where product traceability already is or will be implemented in 2022. Better Mining collaborates with UNICEF to ensure appropriate risk mitigation efforts are available to value chain participants related to child labor.

The Global Battery Alliance was established by a public-private collaboration platform of 70 organizations in 2017 to help establish a sustainable battery value chain. The GBA operates under a set of a principals meant to align with the Sustainable Development Goals (SDGs). This includes GBA Principle #8 – reflective of the SDG #8 – of Decent Work and Economic Growth. UNICEF acts as the in-country coordinator for GBA in the DRC and convenes multi-stakeholder dialogues and events along with the International Institute for Environment and Development (IIED).

The CAP was established by the Global Battery Alliance in 2020 as a coalition of organizations working together to eliminate child and forced labor from the cobalt value chain. The CAP is governed by an independent steering committee with representation from private sector, civil society, and governments. The CAP also supports the “GBA Battery Passport” project, which seeks to create a “digital representation of a battery that conveys information about all applicable ESG and lifecycle requirements based on a comprehensive definition of a sustainable battery”. The Battery Passport initiative includes working groups, including a Human Rights and Child Labor Working Group.

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Another initiative, the ASM Cobalt Framework, is a collaborative project supported by the Responsible Cobalt Initiative, the Global Battery Alliance’s Cobalt Action Partnership, and the Fair Cobalt Alliance. The ASM Cobalt Framework “ESG Management Framework” was published in 2021, and included baseline, progressive, and the best-practice expectations of the ASM cobalt sector, using tiered requirements, aiming to address hazards and challenges faced by miners at during cobalt mining. The stated goal of this initiative is to “achieve measurable improvements of mine site workers’ working conditions and livelihoods through a progressive approach, and to provide a globally recognized threshold for acceptability of cobalt by the entire value chain.”

As described in more detail in Sections 4 and 5, the DRC has significant national legislation on child protection and forced labor. Most laws and regulations lack effective implementation. The ILAB Combatting Child Labor in the Democratic Republic of the Congo’s Cobalt Industry (COTECCO) Project, implemented by ILO and PACT, is one of the projects that support labor rights in the sector. COTECCO seeks to build the enforcement capacity of government and other relevant stakeholders and improve private sector monitoring and remediation of child labor violations in the cobalt supply chain.
2. SUPPLY CHAIN TIERS AND MODELS

2.1 TIER MAP

The map in Figure 1 presents the main tiers and processes found in the (from DRC origin) cobalt supply chain. The tier numbers represent the perspective of an OEM who uses a lithium-ion battery in their product. This illustrative map contains five tiers from battery assembly to extraction in the DRC. Tier 5 – the furthest tier upstream – differentiates between various models of ASM and LSM, as well as linkages between them. The interface between supply chain actors, including between ASM and LSM, can be complex and interconnected, and as such, this is an illustrative visual.

<table>
<thead>
<tr>
<th>Key Terms:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASM:</strong> Artisanal and small-scale mining</td>
</tr>
<tr>
<td><strong>Cathode:</strong> The electrode from which current leaves a polarized electrical device. Cathodes are the cobalt-containing component of a battery terminal.</td>
</tr>
<tr>
<td><strong>LSM:</strong> Large-scale mining</td>
</tr>
<tr>
<td><strong>OEM:</strong> Original equipment manufacturers (brand)</td>
</tr>
<tr>
<td><strong>Supply Chain Tier:</strong> The supply chain actor, organization, or facility that provide materials, components, and processes that make up a finished good. Tiers are described in terms of their one-up, one-down supplier relationships.</td>
</tr>
<tr>
<td><strong>Treatment Unit:</strong> Crude cobalt refiner, often located in exporting country</td>
</tr>
</tbody>
</table>

Figure 2: Cobalt Supply Chain Tiers
Cobalt ore is extracted by LSM or ASM operation. ASM production is often transported by local traders to open market depots, prior to initial processing. This initial processing known as crude refining (at treatment units), takes place in the DRC, resulting in cobalt hydroxide. Cobalt hydroxide is transported to “fine” refining facilities for further value-added processing. Most fine refineries are in China with others located in other parts of Asia and Europe.

After processing at fine refineries, intermediary chemical products are sold to component producers (cathode manufacturers) located largely in China, Japan, South Korea or Europe. Cathode components are included as essential part of batteries. Battery manufacturers are opening new factories at a rapid pace, particularly in China, Japan, the European Union and the United States.

Due Diligence in Cobalt

The OECD Due Diligence Guidance for Responsible Mineral Supply Chains presents a 5-step, risk-based, process to help companies respect human rights and avoid contributing to conflict through mineral purchasing decisions and practices. The OECD Guidance is widely used across the ASM minerals sector as the de facto responsible sourcing standard and is an important element of industry audit standards.

Many battery manufacturers have vertically integrated cathode and battery capabilities. Batteries for the technology and automotive industries are delivered to downstream consumer brands, many in key global EV markets, for assembly at global assembly plants.

2.2 EXPLAINING THE TIERS

Throughout this section, tiers will be referenced based on their position in the Figure 1 map. The tiers are described in more detail, beginning at the upstream tiers in the DRC, moving downstream through the battery manufacturing process. Under each tier, different operational “models are found. The models show the degrees of organizational formalization and levels of due diligence being conducted on sources of cobalt inputs at these tiers.

TIER 5A: LARGE-SCALE MINING (LSM)

LSM is characterized by capital intensive, mechanized, or industrial-scale mining. Within the LSM sector, there are common supply chain models, based upon whether they source cobalt ore from other operations or conduct all mining activities themselves on-site. Depending on the model, the LSM site has different levels of interaction with ASM (see Tier 5B for ASM-LSM interaction). There are different forms of land use agreements (concession agreements), ownership arrangements, and management structures found across the LSM operators. These LSM operators also have varying maturity of due diligence implementation, depending on shareholder priorities, including ESG (Environment, Social, and Governance) and sustainability goals.

The DRC Mining Code and Mining Ordinance (Règlement Minier) requires LSM operators to hold either an exploitation permit (PE), exploration permit (PR), or tailings permit (PER). Exploitation permits are granted for 25 years with renewal periods up to 15 years and secures exclusive rights to the holder to conduct exploration, development, construction, and mining minerals as indicated on the permit. It also gives access to resources within the concession including water and forests, as well as the ability to process, transport and market the material produced. Exploration permits are granted for 5 years and renewable once and allow the permit holder to carry out exploration for the mineral stated on the permit. Tailing permits are granted for 5 years with renewal for 5-year periods. This permit allows the holder to mine and process tailings on the concession.

The OECD listed the top 5 productive industrial mine sites in the DRC, with the most known cobalt tonnes produced in 2018, being Mutanda (Glencore), Tenke Fungurume Mining (China Molybdenum – CMOC), Kamoto Copper/Katanga Mining (Glencore), Congo DongFang (Huayou Cobalt), and Chemaf (Shalina Resources). Of the top 12 producers, 7 are owned by parent companies based in China.

39. Ibid.
There are three common models of LSM operations in the DRC. The principal factors that distinguish the models are a) whether the LSM sources ore from external sources; and b) whether the LSM conducts enhanced due diligence on any of these external sources. Enhanced due diligence requires that operators establish and implement a supply chain policy and management system in line with the OECD Due Diligence Guidance. This includes ensuring chain of custody or identification of external suppliers in addition to assessing and responding to risks associated with suppliers.

Model 1: LSM with no external sourcing

LSM operators who mine all cobalt/copper ore on-site. They do not source external material. These LSM mines supply treatment units that are fed only by the material produced by the one or more LSM mines within the same integrated company (or group of companies). On some production sites, LSM and treatment units are co-located.

Model 2: LSM with external sourcing from within DRC (with enhanced due diligence)

LSM operators who supplement their on-site operations with externally sourced material. These operators conduct enhanced due diligence on their external suppliers. The sourced material can be from other LSM mines and/or from ASM.

Model 3: LSM with external sourcing from within DRC (without enhanced due diligence)

LSM operators who supplement on-site operations with externally sourced material and do not conduct enhanced due diligence on all or some of their external suppliers. The sourced material can be from another LSM operator and/or from ASM.

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41. Image source: Darton Commodities, Financial Times 2019c.
TIER 5B: ARTISANAL AND SMALL-SCALE MINING (ASM)

Tier 5B includes the models common in ASM cobalt production. ASM miners work in informal groups or cooperatives to extract cobalt/copper ore in the DRC. The Uniform Act of 2010, governing cooperatives in the DRC, establishes the law of cooperatives. In this law artisanal mining must be approved by the Minister, and engaged in the artisanal exploitation of substances, mineral or quarry products inside an artisanal mining area. The law stipulates that artisanal miners are required to be organized into cooperatives to engage in ASM mining.42

On more formalized ASM cobalt sites, cobalt ore is generally extracted manually using rudimentary tools from underground pits by diggers (creuseurs) and put in 40-70kg bags. Workers who transport material (saliseurs) manually or with the use of electric pulleys, pull the ore-filled bags to the surface from the pit. Once the mineral is extracted, the ore is transported by foot or bicycle to a washing basin to be sorted and washed. Ore is then transported to on-site or off-site depots for sale.

After purchase, cobalt ore is sealed in trucks for transport to a treatment unit for further processing. At each site, production is often inconsistent and varies from month to month. There can be times with no production due to accidents as a result of unsafe working conditions, natural disasters, landslides (especially in rainy season), political motivations, or ASM miners abandoning cobalt to mine more profitable minerals such as copper.

A large portion of the population in the Copperbelt relies directly or indirectly on income from ASM mining activities. Mappings undertaken by the German Geological Survey (BGR) collected data at from 102 ASM copper and cobalt sites in southeastern DRC. In their September and October 2020 survey, BGR registered a total of 67 copper and cobalt producing artisanal mines in the DRC, down from a previous BGR survey that showed 102 sites.43 Other mapping reports have claimed the number of ASM sites is closer to 200. These differences likely derive from different definitions of what constitutes a site and the challenges related to availability of data collection. While ASM sites can have a different risk exposure, they are beset with a diverse typology of risks, including labor issues, occupational health and safety, and site level conflict.44 Child labor and forced labor are two risks that are observed frequently, particularly on ASM sites close to human settlements in neighborhoods or urban areas as well as on sites with little access control.45 Due to a lack of sustainable alternative economic opportunities, ASM continues to attract miners despite the significant risks associated with occupational health and safety.

Model 1: Government approved Artisanal Mining Zones (ZEA)

The DRC Mining Code requires ASM activities to occur by approved cooperatives on government designated Artisanal Mining Zones (Zone d’exploitation Artisanale or ZEA), except in the case of authorized areas on LSM sites.46 There are 92 ZEAs designated in the Copperbelt. ZEA licenses are requested by the Service d’Assistance et d’Encadrement du Secteur Artisanale et à Petite Echelle (SAEMAPE) and granted by the Mining Cadastre. The supervision and inspection of cooperatives on ASM sites is conducted by the Mining Division and SAEMAPE.47

As LSM mining is generally prioritized over ASM, it is rare that small-scale miners can identify and secure suitably mineralized ZEAs to enable more sustained ASM. ZEAs are often located in unfavorable or undeveloped areas. ASM cooperatives often lack the financial or technical resources to adequately mine ore from these areas. Of these ZEAs, at the time of writing, there are only two government designated ZEA is known to be “active” and legally producing ASM cobalt.48

Model 2: ASM on LSM concessions

LSM operators hold permits to one or multiple concessions. Concession areas can be vast land holdings spanning several hundred square kilometers. Operational footprints of the actual LSM mine can be a small portion of the overall concession area. On some of these concessions or parts of their concessions, the LSM company may not have chosen to start LSM operations yet and/or may not have any plans to ever start LSM operations (they lie “dormant”). These dormant concessions or parts of concessions can attract artisanal miners, with the LSM company focusing their active security and access control on the operational area of the LSM mine, rather than on the full concession.49

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47. Ibid.
While the LSM permit holder can authorize ASM on the concession in specified areas in line with the Mining Code, it can be challenging to develop these areas in the future. Once the agreement is in place, the permit holder relinquishes control over the designated areas. This occurs typically only in isolated cases on some LSM concessions, allowing the resident cooperatives to formalize their activities. As such, most ASM on dormant LSM concessions or active parts of LSM concessions occurs illegally without the concession holder’s authorization. This can lead to conflictual relationships between mine site security providers and artisanal miners and the local population.

One example is so-called “waste rock gathering” (see below), however illegal ASM activities on LSM concessions can also take more permanent and established forms. It is important to note that just because there is an ASM operation on an LSM concession, it does not mean that the LSM is buying or otherwise using the ASM production on its concession. The informality of many ASM sites in this model increases risks such as unsafe working conditions, child labor, forced labor, mineral theft and others. Cooperatives often lack technical and financial capacity to improve conditions on site.

Model 3: Waste rock gathering

Waste rock gathering or “hand-picking” often occurs on the active operational areas of LSM operations, where persons gather mineralized ore on waste rock dumps or on haul truck routes. It is an illegal and particularly dangerous and high-risk activity, both for the LSM company and the persons involved in the activity. It brings the persons involved in the activity into an active industrial operational zone (safety hazard for both sides), breaching private property. This model may result in the use of security services which can lead to conflict and is a notable safety and human rights risk.

Local Trader/ Négociants and the Open Market

Local traders or négociants are local buyers of ASM produced cobalt ore. Traders often have unofficial offtake agreements between miners or cooperatives in which they provide pre-financing, tools, or transport. By pre-financing and providing materials, local traders support mines to operate long term as they compensate for changing production levels and consequently, income for ASM miners. Although they play a key role, local traders are often criticized due to informal business arrangements and lack of transparency over transactions.

Local traders work out of depots or buying stations where miners bring material to be sold. Depots can be located on site, or off-site in villages, towns or larger cities. Like treatment units, depots are permitted to purchase ASM material from cooperatives, cooperative representatives, and intermediaries, but not from individual miners (Règlement Minier Article 25).

There are approximately 180 cobalt depots in Southeastern DRC who sell ASM cobalt production to the treatment units in the region through traders. According to interviews conducted in 2021 by a researcher from University of British Columbia, most of these depots are owned and operated by Chinese, Indian, and Lebanese nationals, with direct links to crude refiners.

A variety of scenarios exist including but not limited to depots with a single buyer with exclusive rights and independent depots (sell to multiple buyers). When there are several depots or trading houses in one location it is often referred to as an open market. The open market heightens traceability and chain of custody risks due to the aggregation of material from multiple, sometimes unknown sources. Buyers in open markets often do not verify the origin of minerals, which is why they are attractive for traders sourcing from high-risk and illegal sites.

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52. Ibid.


TIER 4: TREATMENT UNIT/ CRUDE REFINER

Treatment units, also referred to as crude refiners, are found in DRC and convert cobalt bearing ore into cobalt hydroxide for export and onward shipping to refineries outside of the country. As mentioned earlier, in-country cobalt processing prior to export is required by DRC export regulations for in-country value addition, however waivers are often granted as a result of the limited processing capacities of the existing stock of treatment units (also known as crude smelters).

There are approximately 15 treatment units currently operational in the DRC, all located in the Haut-Katanga and Lualaba provinces. The largest ones are co-located at LSM mines, notably Kamoto Copper Company (Glencore) and Tenke Fungurume (CMOC). Various audit programs, including but not limited to RMAP, can include these crude refiners, with RMAP audited sites listed publicly on the RMI website. Currently there are three conformant treatment units, Kamoto Copper Company and Chemaf’s Etoile & Usoke sites. There are also two “active” treatment units, Metalkol and STL. These “active” sites are cobalt refiners that are currently engaged in the RMAP, but for which a conformance determination has yet to be made. Other audit programs which are frequently used in the cobalt value chain, including RCS Global’s VINE audit and mapping program, with over 500 audited entities in scope, have audited most treatment units and refiners for conformance with the requirements of the OECD Due Diligence Guidance and additional ESG performance criteria. The latter shows that a multitude of information sources are available to industry concerning the responsible sourcing performance of upstream treatments units and the cobalt value chain overall.

Model 1: Co-located LSM with no external sourcing

Treatment units that do not source external material but are fed by material produced by one or more LSM mines within the same integrated company (or group of integrated companies).

Model 2: Sourcing from external sources within DRC (with enhanced due diligence)

Treatment units that source external material and conduct enhanced due diligence on the external suppliers. The sourced material can be from other LSM and/or from ASM.

Model 3: Sourcing from external within DRC (without enhanced due diligence)

Treatment units that source external material and do not conduct enhanced due diligence on all or some of their external suppliers. The sourced material can be from other LSM and/or from ASM.
TIER 3: FINE REFINER

Of the world’s cobalt fine refiners, 80% are located in China.\textsuperscript{56} Refiners (also called ‘fine refiners’ to differentiate them from the treatment units / crude refiners located in DRC) process cobalt concentrates, intermediaries, or recycle cobalt products into outputs. These outputs, such as cobalt tetroxide and nickel cobalt manganese hydroxide, are used as essential chemical components for downstream manufacturing, including at the precursor and/or cathode producer tiers.

As of November 2021, there are approximately 72 confirmed/operational cobalt refiners worldwide. Out of these refiners, 21 are on the RMI’s List of Refiners conformant with requirements of the RMI Responsible Minerals Assurance Process (RMAP). 19 additional refiners have committed to this goal (called “active” refiners) but have not yet successfully completed the RMAP assessment. Of the total number of known fine refineries globally, 37 are in China.\textsuperscript{57}

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>China</th>
<th>DRC</th>
<th>Other Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmed/operational</td>
<td>72</td>
<td>37</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Cobalt Refiners</td>
<td>21</td>
<td>8</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Active Cobalt Refiners</td>
<td>19</td>
<td>14</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Significant progress towards OECD-aligned due diligence is being made by cobalt refiners since 2018, when due diligence expectations in the cobalt supply chain were just commencing and cobalt assurance programs were not yet built or scaled. There has been significant uptake in independent third-party assurance systems, including the RMI’s RMAP and RCS Global’s VINE responsible sourcing audit programs. These audit programs seek to advance companies’ ability to meet international standards while also driving continuous improvement. That said, most cobalt refiners have not yet fully met standard requirements and most continue to struggle with the same core set of challenges:

- Lack of understanding of the OECD Due Diligence Guidance
- Limited engagement and leverage with upstream supply chain actors
- Limited engagement with existing on-the-ground upstream assurance mechanisms, like Better Mining

**Model 1: Sourcing of inputs without enhanced due diligence**

Fine refiners that do not implement enhanced due diligence on their feed from conflict-affected and high-risk areas (CAHRAs).

**Model 2: Sourcing from external sources (with enhanced due diligence on at least part of their supplies)**

Fine refiners that implement enhanced due diligence on at least part of their feed from CAHRAs.

**Model 3: Sourcing from external sources (with enhanced due diligence on their supplies)**

Fine refiners that implement enhanced due diligence on their feed from CAHRAs. At this time, only a few refiners worldwide conduct complete enhanced due diligence with plans that are fully implemented and aligned with international standards

\textsuperscript{56} OECD. Interconnected supply chains: a comprehensive look at due diligence challenges and opportunities sourcing cobalt and copper from the Democratic Republic of the Congo. (2019).

\textsuperscript{57} RMI Active and Conformant Refiner Lists, available here: [http://www.responsiblemineralsinitiative.org/cobalt-refiners-list/](http://www.responsiblemineralsinitiative.org/cobalt-refiners-list/)
International Traders

International traders are intermediaries between treatment units, refiners, and downstream manufactures. International traders source, store and deliver cobalt hydroxide and other cobalt bearing products globally. They thereby create market links between producers (i.e. mines and treatment units and refiners) and the downstream market, thereby servicing market needs with a large degree of flexibility. Annex II describes typical offtake agreements.

There are two principal models of traders observable:

Model 1: Vertical integration or exclusive offtake (with or without multiple sources of material)

Under this model an international trader either a) offtake material from a producer that is owned by the same company or group of companies as the international trader; or b) have an exclusive offtake agreement with a producer. These type of offtake relationships are sometimes publicly known. At the same time, the international trader may also source material from other producers or depots.

Model 2: Multiple sources of material

An international trader offtakes material from multiple sources, without vertical integration with a particular producer.

International traders, for the most part, have not proactively disclosed much detail on the level of implementation of due diligence on their sources of material, neither have they – for obvious competitive business reasons – publicly disclosed all of their product sources. While some traders implement due diligence, the international trading sector overall continues to be a challenge for the implementation of responsible sourcing, due to limitations of disclosures of sources and verifiable due diligence activities. This is an unresolved, critical challenge for the implementation of traceability and responsible sourcing.

TIER 2: CATHODE MANUFACTURER

Cathode manufactures process refined cobalt products into cathode material compositions. Cathodes, critical component of lithium-ion batteries, are a device in a battery terminal where current flows out during discharge. Cathodes and anodes (electrode that receives electrons during charge) are connected electrically by an electrolyte to create the electrochemical cell, which is a small yet important component of the lithium-ion battery.\(^{58}\) Anodes do not contain cobalt. Cathode manufacturers often source from multiple refiners.

There still exist differing degrees of the extent to which cathode manufacturers implement due diligence on their supplying refiners. Many cathode manufacturers conduct at least some due diligence on the refiners and some cathode producers go beyond the refiners. Most cathode manufacturers are in China, the European Union, Japan, South Korea, and the United States, with the largest ones being Umicore, 3M, Mitsubishi Chemical Holdings, Johnson Matthey, POSCO and Hitachi Chemical.\(^{59}\)

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TIER 1: BATTERY MANUFACTURER

The battery manufacturer may produce batteries (or ‘battery cells’) for single use or a variety of uses. Cathodes for batteries are typically sourced from a few companies under long-term agreements. Most battery manufacturers are in China, Japan, and South Korea. The European Union and the United States are investing heavily in developing domestic battery production capacities. The construction of ‘gigafactories’ or megafactories is on the rise. These factories bring together multiple entities to enable end to end production from sourcing raw material to the final product, lithium-ion batteries, with output capacity measured in Gigawatt hours. China is leading the way with 93 ‘gigafactories’ that are producing batteries for electric vehicles and solar power.\(^{60}\) Considering current trends, China is estimated to continue dominating the sector with 140 gigafactories planned to be completed by 2030, followed by Europe with 17, and 10 in the United States.\(^{61}\) In 2020, the leading companies total output ranged from 28 to 80 Gwh.\(^{62}\) This is estimated to increase significantly over the next decade. The global lithium-ion battery cell capacity is projected to increase from 500.5 GWh in 2020 to 3,009.7 GWh by 2030.\(^{63}\)

The largest producers are LG Energy Solution, Contemporary Amperex Technology (CATL), Panasonic, BYD, SK Innovation and Samsung SDI.\(^{64}\)

The degree to which battery manufacturers implement due diligence on its sub-suppliers differs. While not all battery manufacturers have shown the same level of commitment to date, several battery producers are implementing significant responsible sourcing efforts in collaboration with RCS Global, for example. Battery manufacturers directly supply Original Equipment Manufacturers (OEMs), such as consumer-facing electric vehicle or consumer electronics brands, with the leading European and US automotive brands.

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61. Ibid.
3. CHILD LABOR AND FORCED LABOR – RISKS AND CONTEXT

The following section provides analysis of the child labor and forced labor risks present in the cobalt value chain. Figure 4 shows the risk level for each tier of the value chain and risk of material produced by child labor or forced labor entering each tier as an input.

3.1 CHILD LABOR

### Definition of Child Labor

**Worst Forms of Child Labor Convention, 1999 (No. 182):** Defines a “child” as any persons under 18 years old. It also establishes that the worst forms of child labor includes all forms of slavery or practices similar to slavery, such as the sale or trafficking of children, debt bondage and servitude, or forced or compulsory labor, including forced or compulsory recruitment of children for use in armed conflict; the use, procuring or offering of a child for prostitution, for the production of pornography or for pornographic purposes; the use, procuring or offering of a child for illicit activities; and work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children.

**Minimum Age Convention, 1973 (No. 138):** Defines the general minimum working age as 15 years old, the minimum working age for light work as 13 years old, and the minimum age for hazardous work at 18. It also defines allowances for the minimum working age to be 14 where the economy and education facilities are insufﬁciently developed.

### UPSTREAM CHILD LABOR RISK

Within the cobalt value chain, the risk of child labor is particularly concentrated in ASM. Further downstream activities such as smelting, refining and assembling require technical skills which reduces the risk of child labor. Several studies have documented the pervasiveness of child labor in the ASM cobalt sector in DRC. In 2016, a groundbreaking Amnesty International report revealed violations in working conditions and human rights on cobalt ASM sites. “This is what we die for: Human rights abused in the Democratic Republic of Congo power the global trade in cobalt” was one of the first accounts published covering widespread child labor and human rights abuses linked to artisanal cobalt mine sites in DRC. The researchers of the report found child labor, including Worst Forms of Child Labor (WFCL), as prevalent across mine sites. At the time of their research in 2016, due diligence efforts to prevent or mitigate child labor were also significantly lacking. In addition to child labor, children working on mine sites reported physical abuse from security guards on LSM concessions and health problems related to exposure to cobalt ore or dust.

In 2017, a follow up Amnesty International report analyzed 29 major companies purchasing and using cobalt in their products. Amnesty concluded that child labor risks remained high, and cobalt mined through child labor is finding its ways into global supply chains. While the estimated number of children working in the DRC cobalt sector have a significant range, there are several references and research reports that show the number to be in the thousands. According to a BGR study in 2019 the presence of children was found at 20% of their study sample. Children were observed working (handpicking, washing, sorting, transporting material, and working in tunnels) on these mine sites. In addition to working, children were also seen selling food or goods to miners on sites. A 2017 population-based survey of 426 cobalt mining communities in southeastern DRC found that of the miners working in ASM, roughly 13%, were children (estimated 4,717 children). According to some reports, the number may be higher, with estimates being that “as many as 35,000 of the DRC’s 255,000 artisanal cobalt miners being children.”

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Factors contributing to the risk of child labor include the absence of alternative economic opportunities for ASM cobalt mining communities, and the lack of implementation of existing laws and regulations regarding child labor.\textsuperscript{72} There is considerable risk that treatment units in the DRC source from ASM produced with child labor, as many have limited due diligence or controls.

**MIDSTREAM AND DOWNSTREAM CHILD LABOR RISK**

There is a lack of data regarding the presence or involvement of children in the refining and manufacturing stages of the value chain. Much of the smelting and refining work requires a high level of technical skills, training and knowledge that children lack; therefore, children are not recruited into this work for practical production-related reasons. Moreover, the work is typically performed in controlled and formalized industrial settings, in which child labor protections are expected to be commonly enforced.

### 3.2 CHILD LABOR REGULATORY AND ENFORCEMENT CONTEXT

#### NATIONAL

Although DRC has significant national legislation on child protection, most laws and regulations lack implementation. Relevant national legislation includes the 2009 Child Protection Code which sets the minimum age for work at 16 and restricts children from night work or engaging in light work for more than 4 hours a day. In addition to setting regulations on the minimum age, the Code mandates free primary education, increases the age to 14 for criminal responsibility, and requires the government to provide protection for vulnerable or abused children.\textsuperscript{73}

The DRC government have also enacted key policies regarding eliminating Worst Forms of Child Labor. In collaboration with UNICEF, the National Labor Council launched the National Action Plan to Combat Worst Forms of Child Labor (2012-2020) in 2012. The action plan works to eliminate WFCL by establishing universal primary education, monitoring and evaluation efforts, strengthening coordination between stakeholders and awareness raising among communities on practices to end WFCL.

Additionally, the National Sectoral Strategy to Combat Child Labor in Artisanal Mines and Artisanal Mining Sites (2017-2025) was developed by the Ministry of Mines aiming to eradicate the prevalence of child labor in ASM by 2025. The strategy works to improve the implementation of existing laws, strengthen data collection, build on child protection initiatives, promote responsible sourcing and engage relevant stakeholders. The government is also working with the Public Private Alliance for Responsible Minerals Trade to eliminate child labor in the cobalt sector.\textsuperscript{74}

#### INTERNATIONAL

DRC has ratified several international treaties protecting the rights of children. These include the UN Convention on the Rights of the Child, the African Charter on the Rights and Welfare of the Child, ILO Convention on the Minimum Age for Admission to Employment, and ILO Convention 182 on the prohibition and Immediate Action for Elimination of the Worst Forms of Child Labor.\textsuperscript{75} While the 2006 DRC Constitution states that international treaties implementation have hierarchy over national laws and allows national courts to enforce international mandates, there is a significant lack of implementation and enforcement.\textsuperscript{76}

\textsuperscript{72} Bayer, C., and Cooper A. Worst Forms of Child Labor in the Democratic Republic of the Congo: Cobalt Refiner Due Diligence Reporting. (2019). https://docs.wixstatic.com/ugd/f0f801_2a378fa6e3a246868fe136512d92b8e.pdf.


\textsuperscript{75} Ibid.

3.3 FORCED LABOR

FORCED LABOR RISKS

While comprehensive public data on forced labor in cobalt is lacking, instances of child labor in cobalt have involved coercion,\(^{77}\)
such as abusive conditions, excessive overtime, restriction of movement, and isolation,\(^{79}\) Moreover, the risk of forced labor transcends the mining sector and extends into other tiers of the supply chain. While some formalized companies have expressed a willingness to evaluate and improve operations and working conditions, others have not.

MINING AND TREATMENT UNIT FORCED LABOR RISK

In the ASM sector forced labor may occur in the form of debt bondage. Miners will take on debt from intermediaries to purchase food, supplies, tools, and equipment, often at high interest rates. As the miners’ ability is pegged to their success in finding productive areas and exploiting them effectively, they can easily accumulate debt, if either factor does not materialize. This can see them forced to work until the debt is paid off. This is particularly problematic when more debt is taken on in order to “work off” the initial debt.\(^{80}\) Importantly, forced labor is also a risk in the LSM sector and in treatment units. This is because there are a vast array of companies working with different levels of commitment to, or disregard of, good practice in protecting human rights. Many of these companies do not have regular oversight or checks done on them, which has been further exacerbated by the lack of access to many companies during the Covid-19 pandemic.

Forced Labor Definition

**Forced Labor Convention, 1930 (No. 29):**
Defines forced labor as all work or service exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.\(^{81}\)

**Abolition of Forced Labor Convention, 1957 (No. 105):**
Prohibits the use of any form of forced or compulsory labor.\(^{82}\)

The 11 Indicators of Forced Labor:\(^{83}\)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abuse of vulnerability</td>
<td>Deception</td>
</tr>
<tr>
<td>Isolation</td>
<td>Physical and sexual violence</td>
</tr>
<tr>
<td>Retention of identity documents</td>
<td>Withholding of wages</td>
</tr>
<tr>
<td>Abusive working and living conditions</td>
<td>Excessive overtime</td>
</tr>
<tr>
<td>Restriction of movement</td>
<td></td>
</tr>
<tr>
<td>Intimidation and threats</td>
<td></td>
</tr>
<tr>
<td>Debt bondage</td>
<td></td>
</tr>
</tbody>
</table>

---

\(^{77}\) See e.g., ILO. *Child Labour in Mining and Global Supply Chains, 2019.*

\(^{78}\) ILO. *The Cost of Coercion.* Global Report under the follow-up to the ILO Declaration on Fundamental Principles and Rights at Work, 2009, p. 15.


\(^{81}\) ILO, *Forced Labor*.


\(^{83}\) ILO, *ILO Indicators of Forced Labour.*
**Figure 4: Standard Risk Matrix**

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Negligible 1</th>
<th>Minor 2</th>
<th>Moderate 3</th>
<th>Major 4</th>
<th>Catastrophic 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost Certain 5</td>
<td>Moderate 5</td>
<td>High 10</td>
<td>Extreme 15</td>
<td>Extreme 20</td>
<td>Extreme 25</td>
</tr>
<tr>
<td>Likely 4</td>
<td>Moderate 4</td>
<td>High 8</td>
<td>High 12</td>
<td>Extreme 20</td>
<td>Extreme 25</td>
</tr>
<tr>
<td>Possible 3</td>
<td>Low 3</td>
<td>Moderate 6</td>
<td>High 9</td>
<td>High 12</td>
<td>Extreme 15</td>
</tr>
<tr>
<td>Unlikely 2</td>
<td>Low 2</td>
<td>Moderate 4</td>
<td>Moderate 6</td>
<td>High 8</td>
<td>High 10</td>
</tr>
<tr>
<td>Rare 1</td>
<td>Low 1</td>
<td>Low 2</td>
<td>Low 3</td>
<td>Moderate 4</td>
<td>Moderate 5</td>
</tr>
</tbody>
</table>

Only limited data is publicly available on this topic. One source is Human Rights Watch, who in 2020 reported incidents of forced labor throughout the Copperbelt on industrial mine sites. Union representatives and workers reported companies forcing workers to stay on site during the pandemic with the threat of termination of employment should they attempt to leave site. Workers said they were forced to work beyond the maximum daily working hours without additional pay and received little to no communication about the confinement timeframe.84

**MIDSTREAM AND DOWNSTREAM FORCED LABOR RISK**

At the midstream and downstream levels in the cobalt industry hard data is scarce and it would benefit the global discourse, if more audit data could be made publicly available to provide a more data-backed perspective of forced labor risks, including risks related to dispatched, out and vocational laborers. While China, before South Korea, Japan and select EU countries (including Belgium and Finland), is currently the dominant country in the cobalt midstream industry, the downstream sector increasingly has global reach and includes other Asian, as well as European and American manufacturers. In Section Three, the Report also provides a risk scoring matrix for child labor, forced labor and risk of sourcing inputs for both.

---

3.4 FORCED LABOR REGULATORY AND ENFORCEMENT CONTEXT

NATIONAL

The DRC Constitution and 2002 Labor Code state that all forms of forced labor are prohibited and punishable by imprisonment of up to 6 months or fines. Implementation and enforcement remain a challenge because forced labor is challenging to identify through audits and its enforcement requires financial resources for capacity building of government officials tasked with performing checks on companies. Corruption risks are a further potential barrier to good practice implementation.\(^{85}\)

INTERNATIONAL

Governments are increasingly applying and enforcing international standards on labor throughout global value chains. In national legislation, trade agreements and government procurement policies, governments are integrating standards addressing forced labor risks. Supply chain due diligence is necessary, as part of the UK and Australia Modern Slavery Acts. European Union conflict minerals regulations, the French Vigilance Law, and the German Due Diligence Law.

In the United States there are regulations on merchandise produced using forms of forced labor and imports are subject to the Tariff Act of 1930 (19 U.S.C. 1307). The U.S. Customs and Border Protection prohibits the importation of products made with forced labor, and the act makes it illegal to import “goods, wares, articles, and merchandise mined, produced, or manufactured wholly or in part” by forced labor. This merchandise is subject to exclusion and/or seizure and may result in criminal investigation of the importer(s).\(^{86}\) In 2021, the United States adopted the Uyghur Forced Labor Prevention Act with the aim of giving “the U.S. government new tools to prevent goods made with forced labor in Xinjiang from entering U.S. markets and to further promote accountability for persons and entities responsible for these abuses.”\(^{87}\)

The terms of the Act may apply more broadly to forced labor in China; regulations, currently under review, will clarify its application. In short, the question to be answered is the extent that this Act, and its traceability requirements, as well as other pending legislation, could be applied to cobalt refining and manufacturing.

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3.5 Risks Per Supply Chain Tier

The Global Trace Protocol project consortium (ELEVATE, RCS Global and RMI) created risk scores based on direct experience in the cobalt sector. The risk scoring approach is based on a Standard 25-point Risk Matrix, which is commonly used in risk management to evaluate child and forced labor risks at various cobalt supply chain tiers to prioritize due diligence efforts. Risks of “Likelihood” are scored between 1 to 5 and Risks of “Consequence” are scored between 1 to 5 (from negligible to catastrophic for stakeholders involved) to determine the total score between 1 to 25 (see figure 4: Standard Risk Matrix). As the Project moves forward, a more advanced risk model will be developed based on the Better Mining monitoring results from the pilot traceability site and a risk ranking for each indicator.

Figure 5: Risk Definitions for Child Labor and Forced Labor

<table>
<thead>
<tr>
<th>Site Level Risk Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extreme Risk</strong> (Score 15-25)</td>
<td>Extreme Risk scores of 15-25 are found in the top right section of the matrix. These events can be of catastrophic consequence (5) with almost certain likelihood (5), such as a WFCL event – rated as a catastrophic incident – at a site where this risk is almost certain (25). It could also be an event with moderate consequence (3) that is of almost certain likelihood (5), resulting in a risk score of 15.</td>
</tr>
<tr>
<td><strong>High Risk</strong> (Score 8-14)</td>
<td>High Risk Scores of 8-14 are found in the middle of the matrix. These events range from unlikely possibility (2) of a catastrophic event (5) resulting in a risk score of 10, to almost certain possibility (5) of minor consequence events (2), resulting in risk score of 10.</td>
</tr>
<tr>
<td><strong>Medium Risk</strong> (Score 4-7)</td>
<td>Medium Risk Scores of 4-7 are found in the middle/left of the matrix. These scores range from a rare likelihood (1) of a serious consequence event (5) to a negligible consequence event (1) with high certainty of likelihood (5). In these scenarios it is still possible for child labor or forced labor events to occur.</td>
</tr>
<tr>
<td><strong>Low Risk</strong> (Score 1-3)</td>
<td>Low Risk Scores of 1-3 mean range can include rare likelihood (1) of moderate consequence events (3), to possible likelihood (3) of events with negligible consequence (1). Under this score category, no worst forms of child labor or forced labor would be expected.</td>
</tr>
</tbody>
</table>

---

Figure 6: Tier Risk Scoring

<table>
<thead>
<tr>
<th>Model</th>
<th>Risk of Site Level Child Labor</th>
<th>Risk of Site Level Forced Labor*</th>
<th>Risk of Source Inputs Produced w/ Child Labor</th>
<th>Risk of Source Inputs Produced w/ Forced Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM Model 1 On ZEA</td>
<td>High</td>
<td>Medium</td>
<td>Not Applicable – No External Source Inputs</td>
<td>Not Applicable – No External Source Inputs</td>
</tr>
<tr>
<td>ASM Model 2 On LSM</td>
<td>Extreme</td>
<td>High</td>
<td>Not Applicable – No External Source Inputs</td>
<td>Not Applicable – No External Source Inputs</td>
</tr>
<tr>
<td>ASM Model 3 Waste Rock</td>
<td>Extreme</td>
<td>High</td>
<td>Not Applicable – No External Source Inputs</td>
<td>Not Applicable – No External Source Inputs</td>
</tr>
<tr>
<td>LSM Model 1 LSM with no external sourcing</td>
<td>Low</td>
<td>Medium</td>
<td>Not Applicable – No External Source Inputs</td>
<td>Not Applicable – No External Source Inputs</td>
</tr>
<tr>
<td>LSM Model 2 LSM with external sourcing and due diligence on inputs</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>LSM Model 3 LSM with external sourcing and no due diligence on inputs</td>
<td>Low</td>
<td>Medium</td>
<td>Extreme</td>
<td>Extreme</td>
</tr>
<tr>
<td>Open Market Trading House with no due diligence</td>
<td>Medium</td>
<td>Medium</td>
<td>Extreme</td>
<td>Extreme</td>
</tr>
<tr>
<td>Treatment Unit Model 1</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Treatment Unit Model 2</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Treatment Unit Model 3</td>
<td>Low</td>
<td>Medium</td>
<td>Extreme</td>
<td>Extreme</td>
</tr>
<tr>
<td>Cathode and Battery Manufacturing</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Figure 6 ranks the risks of child labor and forced labor at both the specific tier (two left hand columns). The “input level” (two righthand columns) refers to the risk that the sourcing inputs into the specific facility/tier were produced with child labor or forced labor. Input level risks are correlated with the maturity of a due diligence management system at a facility, and the likelihood that they receive inputs from production with forced labor or child labor.

*Risk scoring based on limited data sets related to the 11 indicators of forced labor.

The rationale for including the input level, is to highlight the fact that the trade of cobalt products produced with child labor or forced labor, typically passes through multiple actors, including essential control points. It is common for control points to accept material tainted by forced labor or child labor. Formalizing the due diligence controls at these control points is critical to ending forced labor and child labor in the cobalt supply chain.

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89. Unless a downstream manufacturer conducts full traceability, from a certified mining source, and implements a robust due diligence management system, risk remain high that a percentage of DRC sourcing inputs come from a source where child labor occurs.
4. TRACEABILITY

Traceability requirements are present in DRC mining regulations, in recognized smelter assurance programs, and as parts of due diligence guidelines. In the DRC Manual of Traceability Procedures for Mining Products from Extraction to Export, state agents are required to complete a paper-based traceability system at various points throughout the upstream supply chain to establish chain of custody for artisanally mined cobalt.\(^{90}\) The regulations lay a foundation for the implementation of a traceability solution in the cobalt sector, while digital traceability in conformance with the Regulations is already being implemented in the 3TG sectors and under implementation preparation in cobalt-copper for 2022, such as through the Better Mining program’s RCS Trace implementation, implemented by RCS Global in partnership with the RMI and global industry.

The key market access standard for ASM cobalt is the RMI’s and the China Chamber of Commerce of Metals, Minerals and Chemicals Importers and Exports (CCCMC)’s Cobalt Refiner Due Diligence Standard. Adhering to the standard is necessary to pass refiner level audits when sourcing cobalt from Conflict Affected High Risk Areas (CAHRAs), such as the DRC. The standard ensures that treatment units and refiners can demonstrate conformance with the requirements of the OECD Due Diligence Guidance and other frameworks, such as the London Metal Exchange’s responsible sourcing requirements. This standard require that refiners show evidence they conduct due diligence on their upstream supply chains. In order to be conformant, refiners must establish strong “systems of controls and transparency” to determine the chain of custody of material from suppliers. When sourcing from CAHRAs, and regardless of the extraction process, refiners must know the origin – to the specific mine site – of all mined material. The newly updated version of this standard in August 2021 clarifies data points relevant to traceability, and requests items such as: location(s) and name(s) of mines where cobalt is extracted, and the date and details about processing events. These events are stated as where cobalt is consolidated, blended, crushed, milled, smelted and/or refined. This includes the locations of processing events, as well as weight, assay results, and dates, across these stages in the supply chain.\(^{91}\) A core motivation of the RMI to partner with the Better Mining program is that Better Mining, as an upstream assurance mechanism, is a key mechanism enabling smelters (including treatment units) and refiners to generate the evidence data that they require to demonstrate the implementation of enhanced due diligence and chain of custody in conformance with the standard’s requirements.

Additional traceability requirements are outlined as part of the launch of Enterprise Générale du Cobalt SA (EGC) in the ASM cobalt sector, which has been introduced in Section 1. EGC has made very slow progress to date but has leapfrogged the Global Battery Alliance’s CAP in issuing Responsible Sourcing Requirements, including on traceability. The EGC requirements include allowing only minerals from controlled areas in ZEAs or designated artisanal mining areas (without, blending or aggregating) from other sources, mining cooperatives must ensure there is no contamination from minerals originating from outside the designated areas into EGC supply chains, and all ASM cooperatives are encouraged “to keep an inventory and transaction record of the weights, volumes, ore grades, dates and buyers for all production held on-site and/or transferred to EGC buying stations.”\(^{92}\)

Another approach and set of requirements are found in the German Geological Survey (BGR) developed Certified Trading Chains (CTC) program, a certification scheme for responsibly mined and traded minerals. The CTC approach is comprised of a baseline audit where cooperatives are issued recommendations to improve their mining practices, and a compliance audit. Audits are conducted against the CTC standards which cover 6 principles. Principle 1 requires “Good Government, Transparency, Traceability and Due Diligence in accordance with the OECD Guidance.”\(^{93}\) Specific requirements of traceability include proof of conformance with the steps and procedures outlined in the DRC Manual of Traceability Procedures and absence of evidence showing contamination of minerals from other supply chains.\(^{94}\)

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4.1 COBALT TRACEABILITY SOLUTIONS

A number of traceability solutions are being piloted or have impending plans to be launched in the cobalt value chain. LSM sector focused solutions include Better Mining’s RCS Trace, Circulor, the Responsible Sourcing Blockchain Network (RSBN) solution, and the ReSource project. ASM-input tracing is provided by Better Mining through the RCS Trace solution and in the future maybe provided by an EGC pilot.

BETTER MINING’S RCS TRACE

RCS Global’s Better Mining program, implemented in partnership with the RMI and 19 corporations from mine to market in the electronics and battery value chain, has developed RCS Trace, a proprietary digital traceability methodology and solution currently used in tin, tantalum, tungsten, and gold, and expanding to cobalt and copper with the first cobalt mine site identified and prepared for implementation in 2022. RCS Trace is used in the ASM sector to track shipments from the pits of ASM mines in the Better Mining program to the SOR (smelter or refiner) level, allowing both the upstream and midstream industries to meet regulatory and market requirements for demonstrable traceability. Better Mining’s RCS Trace digital solution follows the material flow at each business step and point of transport collecting key data points along the way. The system is fully digital and easily adaptable, with a quick set up time on new sites. All data collected is verified by international systems teams with on the ground teams supporting local buy-in and transition to Better Mining systems.

RESOURCE

ReSource is an initiative developed by mining giants Glencore, Eurasian Resources Group (ERG), and China Molybdenum (CMOC), with support from Umicore and Tesla. The traceability solution, which as of the time of report writing had not yet been launched, will use blockchain technology to trace cobalt from mines along the supply chain to downstream electric vehicle facilities. The technology states it will “couple blockchain with zero-knowledge proofs to link physical material flow on sites to digital data flows”. The solution was envisioned to be piloted in 2021 in DRC with plans to scale to the ASM sector also stated.  

CIRCUlor

Circulor, a start-up traceability company, utilizes Oracle, Amazon Web Services and their own proprietary applications to provide traceability-as-a-service in the cobalt sector. The solution is available on a public ledger allowing all supply chain participating parties to have access to information as it tracks materials from the source of supply chains to finished products. Circulor creates a digital identity for a physical material at the origin in the supply chain and connecting inputs and outputs from downstream manufacturing processes to allow the identification of the original material. The system collects data such as material flows, elapsed time, mass balance calculations, responsible standards or energy use. Circulor is being piloted in the Volvo Cars’ supply chain.

RESPONSIBLE SOURCING BLOCKCHAIN NETWORK (RSBN)

RCS Global and IBM implement the RSBN with support from network users including Ford Motor Company, LG Chem, Posco Chem and NorNickel. RSBN uses a traceability approach built on the Hyperledger Fabric blockchain, coupled with the assurance expertise of RCS Global. RSBN member companies increased transparency and insights into their supply chain, while providing the ability to generate consensus over conditions and supply chain performance. RSBN is being piloted in Ford Motor Cars’ supply chain with LSM inputs.

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https://www.circulor.com/technology

97. RCS Global.  
https://www.rcsglobal.com/blockchain-traceability/  
5. CONSTRAINTS TO TRACEABILITY IMPLEMENTATION

There are numerous challenges to implementing a sustainable traceability program in cobalt. This section discusses barriers related to cultural and local context, regulatory and enforcement, and industry.

5.1 REGULATORY AND ENFORCEMENT

A traceability system in cobalt requires government participation in order to be successful. Capacities will need to be built out further for DRC government officials present at mine sites to effectively participate in the process. According to a recent desk-based study of initiatives focused on child labor conducted by Levin Sources and ILO, a barrier reported by stakeholders on addressing child labor in ASM supply chains includes a lack of understanding and information on ASM by government officials. Government stakeholders often lack valuable information and data on the ASM sector including traceability and risk data that can contribute to mitigate the risk of child labor, though Better Mining is providing data to the Government and in an accelerated fashion in 2022. Additionally, some organizations reported challenges related to procedures and processes as well as challenges engaging local governments for project buy-in.98

As is mandated by the regulatory framework in the DRC, government mining service agents play an important role in the implementation of traceability systems. In Better Mining, for example, state agents record and validate information as part of the traceability system implementation. A variety of factors, including but not limited to low wages, sometimes late Government salaries, and some ASM sites’ remote location can result in state agent’s absence, which can lead to delays in material flow. Based on the Global Trace Protocol Project consortium experience, a challenge with DRC government participation in traceability efforts has been to ensure the reliable presence of state agents during key business steps along the upstream supply chain.

With several access routes to market available, a major traceability risk is material leaving sites through mineral theft and illegal buying. Material leaking out of trading chains negatively affects the mine site and impacts business for cooperatives or mine operators. A key benefit for mining operators or cooperatives implementing traceability is their ability to better monitor and control outward leakage of the material that they could otherwise market. In order to achieve this, mine operators or cooperatives will need to adjust business steps in order to be traceable. For example, material will need to be collected in designated areas at a weighing station. Changing behaviors tends to take time and requires training for stakeholders on processes.

5.2 INDUSTRY

As stated above, only 3 of all confirmed DRC treatment units have undergone RMAP Cobalt Refiner Due Diligence Standard audits. The audits verified these treatment units’ ability to trace material back to the mine site. While the downstream supply chain and refiners have commissioned a significant number of independent responsible sourcing audits of treatment units outside of RMAP, not all control points in the cobalt supply chain are demonstrating the ability to implement traceability to mine sites in their supply chain.

## 5.3 CAPACITY BUILDING AND TECHNICAL SUPPORT NEEDS

<table>
<thead>
<tr>
<th>Tier/Process</th>
<th>Barriers to Implementation of Traceability</th>
<th>Support Areas – Project Capacity Building and Technical Assistance</th>
</tr>
</thead>
</table>
| **ASM Mine Site** | • Capacity of SAEMAPE and ARECOMS (yet to be activated) to implement traceability role in CTC/EGC/Mining Code  
• Limited number of ZEAs or established ASM sites on concessions  
• Overlapping mandates for mine site responsibilities among mining services  
• Limited ability to manage and share traceability data to downstream stakeholders  
• Cost and perceived value for local stakeholders and lack of local ownership of projects  
• Leakage from sites  
• Traders and open market benefiting from lack of transparency and current system  
• Elite capture at ASM sites by individuals who benefit, corruptly or otherwise, from opaque practices, thus not supporting improved transparency | • Training for local state agents and relevant government officials on traceability roles  
• Build on COTTECO project work with Interministerial Commission Responsible for Addressing the Issue of Child Labor in Mines and on Mine Sites in DRC in labor and traceability, particularly to clarify roles and responsibilities and site selection for pilot  
• Monitoring and traceability support at mine site and data management support, using mobile enabled traceability solutions  
• Alignment with other cobalt labor programs in the pilot region  
• Training and support to adjust key business steps to be traceable  
• Training on due diligence fundamentals, labor standards, and monitoring of human rights conditions |
| **Treatment Unit** | • Reticence to provide origin information to downstream actors  
• Provision of origin evidence for all material presents heavy cost and administrative burden  
• Varying levels of material control where ASM and LSM operations are co-located | • Raise awareness around traceability approaches, data management, and customer expectations to receive buy-in from treatment units  
• Industry approach to establishing statistically significant indication of origin that reduces documentation burden  
• Implementation of third-party due diligence assessments to provide targeted insight on improvement measures to be taken for material control  
• RMI engagement with Crude Refiners related to RMAP™ to the Treatment Unit, Support Areas table on this page. |
| **Refiner** | • Varying levels of material controls, due diligence implementation, and management systems | • RMI engagement related to RMAP and DOL project  
• Raise awareness around traceability approaches, data management, and customer expectations  
• Support data sharing among supply chain actors, including necessary traceability and due diligence documentation for refiners to align with audit expectations |
6. LEVERAGE POINTS

The interrelated leverage points for advancing traceability in the cobalt sector include:

1. Traceability is anchored in national mining regulations\textsuperscript{99} and the DRC Government has a strong interest in traceability. In the national manual on traceability, regulations require a system, implemented by DRC state agents, in cobalt to record data at various business steps. The regulation lays a foundation for the implementation of a traceability solution in the sector.

2. Significant engagement with the DRC government on the traceability topic has already occurred and the DRC government is familiar with implementation in the 3TG sector. Current traceability initiatives such as Better Mining have laid much of the groundwork on engaging the government on the benefits of implementing traceability and Better Mining is now moving its RCS Trace solution to cobalt, with the first site in preparation for implementation in 2022. The project can inform and gain the support of the key mining service agencies of the Ministry of Mines for the pilot project and Inform CEEC that the traceability configuration will be managed according to the requirements set out in the DRC Mining Code, the Certified Trading Chains (CTC) Traceability.

3. Contractual requirements at all levels of the supply chain, from upstream to downstream, including OECD Step 4 audits and mine site monitoring provide a point of leverage. According to Step 4 of the OECD Due Diligence Guidance, third party audits are required for smelter/refiners sourcing from CAHRAs.\textsuperscript{100} There is incentive for upstream and downstream actors to participate in the pilot and in traceability more generally. As a fully digital traceability initiative implemented in copper-cobalt, the pilot will give offtakers the opportunity to market fully-responsibly sourced cobalt. For downstream brands, the tools developed in this pilot will allow them to identify and address exploitive labor practices in their cobalt supply chains, demonstrate conformance with the OECD Guidance, and show market leadership.

4. A traceability solution and tracing efforts can capitalize on this requirement for midstream and downstream companies. In addition to alignment with the OECD Due Diligence Guidance, Traceability is increasingly an international market requirement that is referenced in market access enabling good practice frameworks.

5. The DRC Ministry of Mines is engaging in initiatives focused on mitigating child labor in cobalt mining including the Cobalt Action Partnership (CAP). In 2020, the former Minister of Mines joined the steering committee showing support for the goals of the initiative. The CAP, formed in May 2020, in collaboration with the Global Battery Alliance, aims to engage companies to promote responsible cobalt value chains in an effort to improve working conditions, safety, gender equality and address human rights abuses such as child labor and forced labor.\textsuperscript{101} With the DRC Ministry of Mines engaged in human rights issues, traceability and identification of risks in support of these efforts may be prioritized.

6. Engaging current members in the RCS Global Better Mining program is advancing, both at the mine, treatment unit levels and the value chain. Some downstream members have expressed interest in receiving material from Better Mining monitored ASM sites with the RCS Trace traceability solutions in place. Better Mining is supported by several leading downstream companies to implement the program mineral-agnostically, globally, including with its existing significant footprint in 3TG, cobalt-copper.

7. Other initiatives in the region are open and supportive of partnership and alignment. There is a broad network of existing organizations working on labor issues in cobalt. This includes the ILO, UNICEF, Global Battery Alliance projects, and the stakeholders from the EGC Project, in addition to the project consortium led Better Mining program.


7. CONCLUSION

This Report aims to better inform efforts to eliminate child labor, forced labor and other abusive labor practices in DRC’s cobalt supply chain. To effectively design and implement traceability tools, it is essential to map the contours of the DRC cobalt supply chain and identify the types of chain of custody models, the prevalence of child labor and forced labor, the nature of the legal, political and regulatory environment, and leverage points.

The Report provides a snapshot of an opaque and dynamic environment; the facts and circumstances will need to be periodically reevaluated to ensure that due diligence, with traceability as one important aspect of such efforts, is meaningful and effective. The Project’s pilot traceability tool will provide more information and a foundation for improving efforts to track and measurably reduce child labor, forced labor and other abusive practices in global supply chains. Engaging a wide range of stakeholders in business, finance, government, international organizations, and civil society, including unions and NGOs, is essential to ensure that such efforts are sustainable in mining as well as other industries.
## 8. ANNEX I: EXAMPLES OF ASM TRACEABILITY DATA POINTS

The below table show draft traceability data points for an ASM cobalt supply chain.

<table>
<thead>
<tr>
<th>Tier/Process</th>
<th>Critical Tracking Events</th>
<th>Key Data Elements</th>
<th>Transport</th>
</tr>
</thead>
</table>
| ASM Mine Site         | 1. Extraction 2. Blending | • Date and time the mineral is extracted  
• Mineral weights and grade (assay results)  
• Locations where material was blended, processed, or milled  
• Local Transportation (bicycle, truck, etc.) | Bicycle   |
|                       |                          | • DRC State Agent name  
• Trader ID  
• Payment details | Truck     |
| Local Trader          | 1. Packing 2. Unloading  | • Date and time  
• Mineral weights | Truck     |
|                       |                          | • Trader names and ID  
• Truck ID |           |
| Treatment Unit        | 1. Arrival 2. Blending 3. Export | • Locations where material was consolidated, blended, and milled  
• Date the mineral is processed, concentrated smelted/refined  
• Mineral weights and grade (assay results)  
• Exporter ID | Truck     |
|                       |                          | • DRC State Agent name  
• Transportation details  
• Payment details |           |
| International Trader  | 1. Arrival 2. Export     | • Date of shipment  
• Shipment weight | Truck     |
|                       |                          | • Transportation details |           |
| Refiner               | 1. Arrival 2. Refining 3. Outgoing shipment | • Date of mineral arrival, refining, and export  
• Mineral weights and grade (assay results)  
• Transportation details | Truck     |
|                       |                          | • Payment history of all transactions relating to previous business steps | Ship      |
| Cathode Manufacturer  | 1. Arrival 2. Processing 3. Export | • Date and time of incoming material  
• Mineral weights and grade (assay results)  
• Transportation details | Truck     |
|                       |                          | • Payment details  
• Batch number/ID  
• Exporter ID | Ship      |
| Battery Manufacturer  | 1. Arrival 2. Processing 3. Export | • Date and time of incoming materials  
• Material weight  
• Batch number/ID | Truck     |
|                       |                          | • Transportation details  
• Payment details | Ship      |

**Sources:**

1. The China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters (CCCMC), (2019). Guidelines for Cobalt Smelters Supply Chain Due Diligence
## 9. ANNEX II: FINANCIAL FLOWS

The below table shows the financial flows of the cobalt supply chain originating from DRC including the cobalt product and type of transaction.

<table>
<thead>
<tr>
<th>Tier/Process</th>
<th>Cobalt Product</th>
<th>Typically Sell To</th>
<th>Financial Transaction Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM Mine</td>
<td>1. Cobalt-Copper Ore</td>
<td>1. Traders</td>
<td>1. Spot Commodity Sales (cash)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Open-Market Trading House</td>
<td>2. Off-take agreement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Treatment Unit</td>
<td></td>
</tr>
<tr>
<td>Open-Market Trading House</td>
<td>1. Cobalt-Copper Ore</td>
<td>1. Traders</td>
<td>1. Spot Commodity Sales (cash) as percentage of estimated purity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Treatment Unit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Large-Scale Mine</td>
<td></td>
</tr>
<tr>
<td>Large-Scale Mine</td>
<td>1. Cobalt-Copper Ore</td>
<td>1. Trader</td>
<td>1. Long-term offtake agreements, with a duration of between two and 20 years</td>
</tr>
<tr>
<td></td>
<td>2. Cobalt-Nickel Ore</td>
<td>2. Treatment Unit</td>
<td>2. Short-term contracts</td>
</tr>
<tr>
<td></td>
<td>3. Cobalt Chloride</td>
<td></td>
<td>3. Single cargo spot contracts</td>
</tr>
<tr>
<td></td>
<td>4. Crude Cobalt hydroxide</td>
<td></td>
<td>4. Royalty agreements</td>
</tr>
<tr>
<td></td>
<td>5. Cobalt Salts</td>
<td></td>
<td>5. Streaming agreements</td>
</tr>
<tr>
<td>Treatment Unit</td>
<td>1. Crude cobalt hydroxide</td>
<td></td>
<td>1. Feed purchase contracts</td>
</tr>
<tr>
<td></td>
<td>2. Cobalt carbonate</td>
<td>2. Fine Refiner</td>
<td>2. Toll Agreements</td>
</tr>
<tr>
<td></td>
<td>3. Cobalt-bearing alloys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Trader</td>
<td>1. Crude Cobalt hydroxide</td>
<td></td>
<td>1. Off-take agreement</td>
</tr>
<tr>
<td></td>
<td>2. Cobalt Carbonate</td>
<td>2. Fine Refiner</td>
<td>2. Spot Commodity Sales</td>
</tr>
<tr>
<td></td>
<td>3. Cobalt-bearing alloys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refiner</td>
<td>1. Cobalt Sulfate</td>
<td>1. Pre-cursor</td>
<td>1. Feed purchase contracts</td>
</tr>
<tr>
<td></td>
<td>2. Cobalt Acetate</td>
<td>2. Cathode Manufacturer</td>
<td>2. Toll Agreements</td>
</tr>
<tr>
<td></td>
<td>3. Cobalt Carbonate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Cobalt Chloride</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Cobalt Metal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Cobalt Nitrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precursor/Chemical</td>
<td></td>
<td>1. Cathode Manufacturer</td>
<td>1. Contracts</td>
</tr>
<tr>
<td></td>
<td>1. Lithium cobalt oxide</td>
<td></td>
<td>2. Toll Agreements</td>
</tr>
<tr>
<td></td>
<td>2. Lithium Manganese Oxide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Lithium Iron Phosphate</td>
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<td></td>
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<tr>
<td></td>
<td>4. Lithium Nickel Manganese Cobalt</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Lithium Nickel Cobalt Aluminum Oxide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cathode</td>
<td></td>
<td>1. Battery Manufacturer</td>
<td>1. 1. Contracts</td>
</tr>
<tr>
<td>Trader/Market</td>
<td>1. Cathodes (broken or cut)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Ingots, briquettes, rounds or coarse grain powder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td>1. Lithium Nickel Cobalt</td>
<td>1. Auto</td>
<td>1. Long-term Battery Supply Agreements</td>
</tr>
<tr>
<td></td>
<td>2. Aluminum Oxide (LINiCoAlO2) — NCA</td>
<td></td>
<td>2. Sales contracts</td>
</tr>
<tr>
<td></td>
<td>3. Lithium Cobalt Oxide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Lithium Manganese Oxide</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>5. Lithium Nickel Manganese Cobalt Oxide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Lithium Iron Phosphate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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