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Responsible procurement of cobalt in bus batteries

Commissioned by Skånetrafiken

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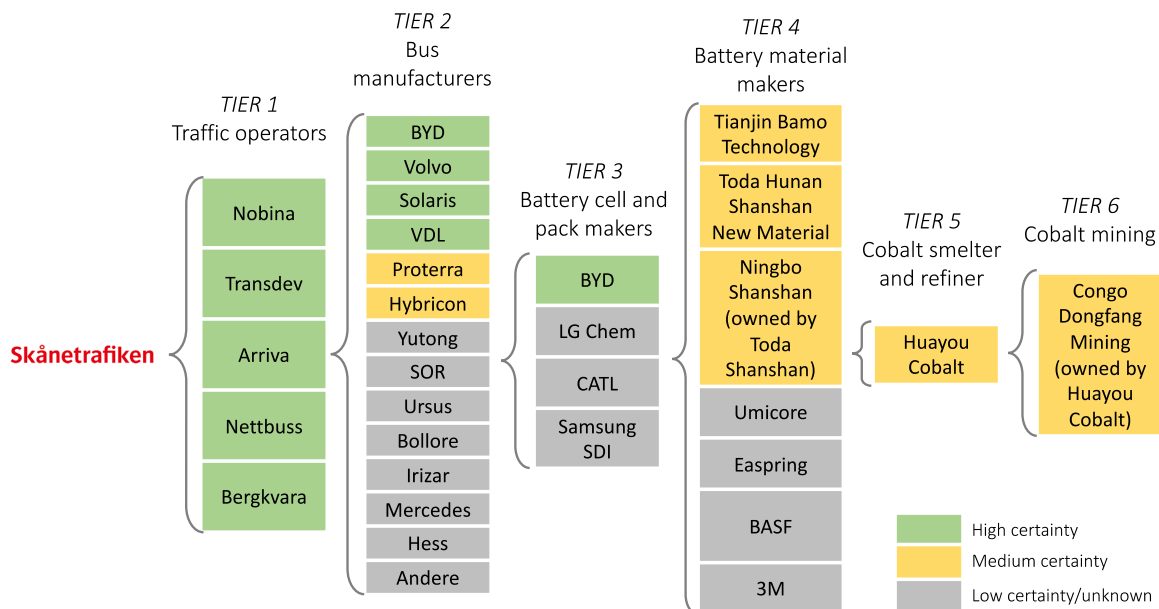
Executive summary

Globally, we are in the midst of an electric vehicle boom. The electric vehicle evolution has primarily been driven as a means to tackle climate change. However, certain aspects of electric vehicle production can carry significant negative social impacts – particularly in the sourcing of raw materials for producing electric vehicle batteries, such as cobalt.

In Sweden, Skånetrafiken has been exploring strategies to expand on bus electrification and would like to better understand the issues of cobalt as a potential conflict mineral, how it relates to the organization and its goal to shift towards bus electrification, and how to avoid the social sustainability risks regarding raw material procurement.

The objectives of this study were: 1) to compile and analyse the situation on the electric vehicle battery and cobalt market, major social sustainability issues related to cobalt raw material sourcing and the relevant conflict mineral initiatives at the international level; 2) to map out Skånetrafiken’s potential supply chain of cobalt in bus batteries and analyse the sustainability policies of supply chain actors, assess the extent to which their requirements and codes of conduct tackle responsible cobalt sourcing (if any) and analyse the extent to which tier-1 suppliers adhere to Skånetrafiken’s sustainable procurement code of conduct; and 3) to make recommendations to Skånetrafiken on how to tackle responsible sourcing issues and the way forward.

A summary of Skånetrafiken’s potential supply chain is given as follows. Potential major players in each supply chain stage are listed with varying levels of certainty.



Based on the sources reviewed in this research, the level of responsible mineral initiatives was apparently the highest for Volvo (tier 2), LG Chem (tier 3), Samsung SDI (tier 3) as well as Huayou Cobalt (tier 5) and Congo Dongfang Mining (tier 6). All these companies had some form of a responsible cobalt sourcing initiative, policy or code of conduct. Adherence to the OECD Five Step Framework and CCCMC conflict mineral due diligence guidance was the most common (for both companies that are tackling both 3TG and/or cobalt), indicating that the two initiatives (OECD and

CCCMC) have become an industry standard. It is important to note, however, that the actual progress and impact on-the-ground of such initiatives are unclear.

Tier-1 traffic operators were assessed in terms of their adherence to the five key aspects of Skånetrafiken's code of conduct (which is under the umbrella code developed by the Swedish County Council and Regions): human rights, labour rights, environment, anti-corruption and beyond first-tier supplier engagement. It was found that two of five tier-1 suppliers (Nobina and Transdev) tackled almost all aspects, while information was missing on the other suppliers.

However, none of the tier-1 traffic operators studied have policies on conflict minerals or cobalt. There could be several reasons for this. First, these tier-1 companies may not view this as part of their mandate given that they are not direct producers of the physical battery products. It could also be because there has been no direct consumer demand (either by public household consumers or downstream institutional consumers such as traffic authorities). Furthermore, the awareness about cobalt as a potential conflict mineral may only be starting to emerge recently, and perhaps less so among household consumers, which contribute to low demand for responsible sourcing. While the climate and local environmental benefits of electric mobility are indeed significant, the demand for conflict-free electromobility will likely only increase in the future as public awareness grows.

Based on the above results and discussion, the following recommendations are made for Skånetrafiken:

- Elaborate on this research conducted in this report to conduct a systematic audit of tier-1 traffic operators and their level of compliance to Skånetrafiken's (i.e. the Swedish County Council and Regions') code of conduct.
- Develop a responsible cobalt sourcing management system with the input of internal and external stakeholders (especially suppliers across multiple tiers), top-level commitment and enforcement standards/codes of conduct/contract requirements.
- Consult with suppliers on developing cobalt sourcing standards and policies, engage the full supply chain to the extent possible.
- Build buyer influence by engaging with other buyers (i.e. traffic authorities) to collaborate and streamline policies, processes and standards in order to build unified standards in the industry in Sweden.
- Finally, other recommendations include lobbying with national policymakers to drive regulatory change and build a policy incentive for the supply chain. At the same time, Skånetrafiken can explore the situation in the market for recycled cobalt and assess whether it is a viable option in line with the organization's bus electrification strategy in the future.



Acronyms

3TG	Tin, tantalum, tungsten and gold
AMS	Artisanal mining sites
CCCMC	China Chamber of Commerce of Metals, Minerals and Chemicals Importers and Exporters
CDM	Congo Dongfang Mining
DRC	Democratic Republic of Congo
EEIC	Electronic Industry Citizenship Coalition
GADSL	Global Automotive Declarable Substance List
IMDS	International Material Data System
OECD	Organisation for Economic Co-operation and Development
RCI	Responsible Cobalt Initiative
RMAP	Responsible Minerals Assurance Process
RMI	Responsible Minerals Initiative

1 Introduction

Globally, we are in the midst of an electric vehicle boom. Consumer demand for electric vehicles is rising, and this includes electric buses. While electric buses currently account for less than 1% of the Nordic bus market, it is expected that in 2025, over half of all new urban buses may be electrified (Nobina, 2018).

The electric vehicle evolution has primarily been driven as a means to tackle climate change –for example, Sweden set a goal to have 90% of its buses in traffic running on renewable fuel by 2020 (Nobina, 2016). Another benefit of electromobility is that it can reduce local air pollution and noise in heavily urbanized cities. However, certain aspects of electric vehicle production can carry significant negative social impacts – particularly in the sourcing of raw materials for producing electric vehicle batteries, such as cobalt.

Minerals are considered as *conflict minerals* if they are sourced from areas that are often politically unstable, and where the “minerals trade can be used to finance armed groups, fuel forced labour and other human rights abuses, and support corruption and money laundering” (European Commission, 2017). While the international focus on conflict minerals has so far been on tantalum, tin, tungsten and gold (3TG), cobalt is also being increasingly recognized as a potential conflict mineral.

Cobalt is mainly mined as a by-product of nickel and copper. Most of the world’s supply of cobalt comes from the Democratic Republic of Congo (DRC), where severe human rights abuses, child labour and hazardous working conditions can be rampant in the artisanal mining sector (i.e. mining by hand using rudimentary and basic tools, often without adequate protective equipment).

Nonetheless, such issues should not imply that electrification should necessarily be abandoned. Mobility electrification can be a sustainable option for reducing the environmental impact of transport and contribute to climate change mitigation, especially when the electricity source is renewable. Therefore, increasing the awareness of conflict minerals issues in society and working proactively to tackle them can shift electrification towards a fully sustainable, conflict-free path.

The global demand for cobalt is rising rapidly. By 2025, it is estimated that over 50% of the cobalt demand will be driven by the electric vehicle market. In parallel, public awareness of cobalt conflict mineral mining is also increasing. In turn, the societal and downstream consumer demand on sustainable cobalt will likely grow as the electric vehicle revolution continues.

In Sweden, Skånetrafiken has been exploring strategies to expand on bus electrification and would like to better understand the issues of cobalt as a potential conflict mineral, how it relates to the organization and its goal to shift towards bus electrification, and how to avoid the social sustainability risks regarding raw material procurement.

Based on the above, this study was initiated with the following objectives:

1. To compile and analyse the situation on the electric vehicle battery and cobalt market, major social sustainability issues related to cobalt raw material sourcing and the relevant conflict mineral initiatives at the international level;
2. To map out Skånetrafiken’s potential supply chain of cobalt in bus batteries and analyse the sustainability policies of supply chain actors, assess the extent to which their requirements and codes of conduct tackle responsible cobalt sourcing (if any)

and analyse the extent to which tier-1 suppliers adhere to Skånetrafiken's sustainable procurement code of conduct; and

3. Based on the above, to make recommendations to Skånetrafiken on how to tackle responsible sourcing issues and the way forward.

In the remainder of this report, Section 2 provides a summary of the methods and data sources used in this study. Section 3 provides the results of the situational analysis (of cobalt sourcing issues and relevant conflict minerals initiatives) and Section 4 provides the results of the preliminary supply chain mapping exercise. Section 5 discusses the results and provides some critical reflections on the study, as well as provides recommendations. Section 6 concludes the report.

2 Methodology

The compilation of the situation on lithium-ion battery and cobalt trends, related supply chain sustainability issues and major initiatives (responding to Objective 1 of the study) was mainly conducted through desk research. The preliminary supply chain mapping exercise and sustainability policy assessment (Objective 2 of the study) were also conducted via desk research as well as through one interview with a traffic operator.

The identification and selection of supply chain actors was based on the likelihood of their presence on Skånetrafiken's supply chain – by seeking companies that were either mentioned directly by Skånetrafiken or if suppliers or clients are mentioned in company documents and websites, industry news or other publications. Since supplier names tend to be closely guarded information in the value chain, the transparency and availability of information tends to decrease upstream, and the reliance on information from external sources, such as industry news and NGO exposé reports, increases.

In terms of scope and data sources, the study focused on five tier-1 traffic operators as a starting point – as they were listed by the main client contact Iris Rehnström at Skånetrafiken as the suppliers with whom the company has been in contact on bus electrification. They are Nobina, Transdev, Arriva, Nettbus and Bergkvara. All five companies were contacted for an interview, only one (Nobina) was interviewed in the study. In addition, an interview was conducted with Volvo Group and VDL Bus and Coach (tier 2 bus manufacturers).

Regarding desk research - in general, the company website was the starting point for searching for information, where the author would look for company overviews and descriptions of business areas that relate to lithium-ion batteries for electric vehicles. Then, the author looked for annual reports or sustainability reports, then narrowed down to sustainability policies, supplier requirements, codes of conduct, responsible procurement policies and any other content related to conflict minerals. This was complemented by searching in external search engines such as Google, especially in cases when company website information was insufficient or inadequate. At times, external searches returned results of company documents that were not actually found on the company website. At other times, academic literature, industry news and sector analyses articles (e.g. supply chain information, news on electric bus fleet purchases and trends in bus electromobility) were also used as data sources.

When reviewing sources, the author also used key word searching to seek relevant information. This involved searching a combination of terms including *conflict*, *mineral*, *supplier*, *code of conduct*,

supplier requirement, cobalt, responsible, procurement, purchasing, human rights and child labour. When reports return no results, the author turned to online search engines for company names and the above keywords. Both Google and Baidu (the major search engine in China) were used, the latter for researching Chinese companies given that Google is blocked in China.

Data was collected on select companies on the extent to which any policy, procedure, code of conduct or practice relate to cobalt conflict mineral management, or lack thereof. Lastly, Skånetrafiken’s social sustainability policies was also reviewed to identify opportunities and gaps to address responsible cobalt sourcing. The results are then assessed and discussed to produce recommendations for Skånetrafiken (Objective 3 of the study).

The above methodology consists of several limitations, including:

- The report does not extensively discuss the progress, success or failure of the conflict minerals initiatives studied (though some discussion is made in comparing the OECD Conflict Minerals Guidance and Dodd-Frank Act – see Box 1).
- Supply chains are typically opaque and complex, so naturally it was not possible to cover all companies in the supply chain in this report. Instead, key companies are selected and discussed based on their prominence in sources and any direct referencing of companies on the supply chain.
- In relation to the above, the certainty of some suppliers in the supply chain mapped decreases upwards in the supply chain. Nonetheless, it can provide some indication to Skånetrafiken on which players may be present in the upstream, and the kind of supplier that downstream actors may be working with, to help increase transparency in the supply chain.
- Cobalt recycling is not discussed. While private sector efforts are emerging to recycle cobalt minerals in batteries, this is still at its “infancy” (Azevedo, o.a., 2018). However, further investigation should be made for recycled cobalt as a potential resource in the future.

3 Results of the situational analysis

This section provides a brief introduction of lithium-ion batteries and the role of cobalt. It also summarizes the main social sustainability issues with raw cobalt material sourcing, as well as the governmental and non-governmental initiatives that are tackling conflict minerals. Conflict mineral initiatives first emerged to cover tungsten, tantalum, tin and gold (3TG), though the principles of most standards can be applied to cobalt. Some cobalt-specific initiatives have also emerged.

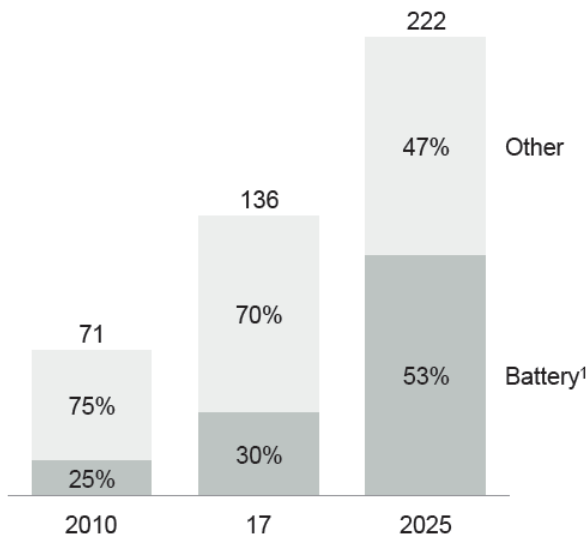
3.1 Lithium-ion batteries and cobalt

Lithium-ion batteries are a class of rechargeable batteries and consist of different types that are differentiated by their battery chemistries. The operating principle is that charged lithium ions travel from the positive electrode (cathode) through an electrolyte to the negative electrode (anode) during battery discharge, and in the reverse direction during recharge (Melin, 2018).

Lithium-ion batteries have been a cornerstone to the digital revolution, where among portable electronic devices (e.g. laptops, tablets and mobile phones) and hand-held appliances, electric vehicles have been the fastest growing segment demanding lithium-ion batteries (Melin, 2018).

While the anode of lithium-ion batteries is commonly graphite-based, the chemistries of the cathode differ among varying compositions of lithium in combination with iron, manganese, cobalt, nickel and aluminium (Desjardins, 2017).

Figure 3-1 Cobalt demand (Kt, refined metal equivalent)



It is estimated that the fraction of cobalt demand for batteries will exceed other applications by 2025. (Battery applications include automotive, trucks and buses, 2 and 3-wheelers, machinery, grid storage and consumer electronics) (Azevedo, et al., 2018).

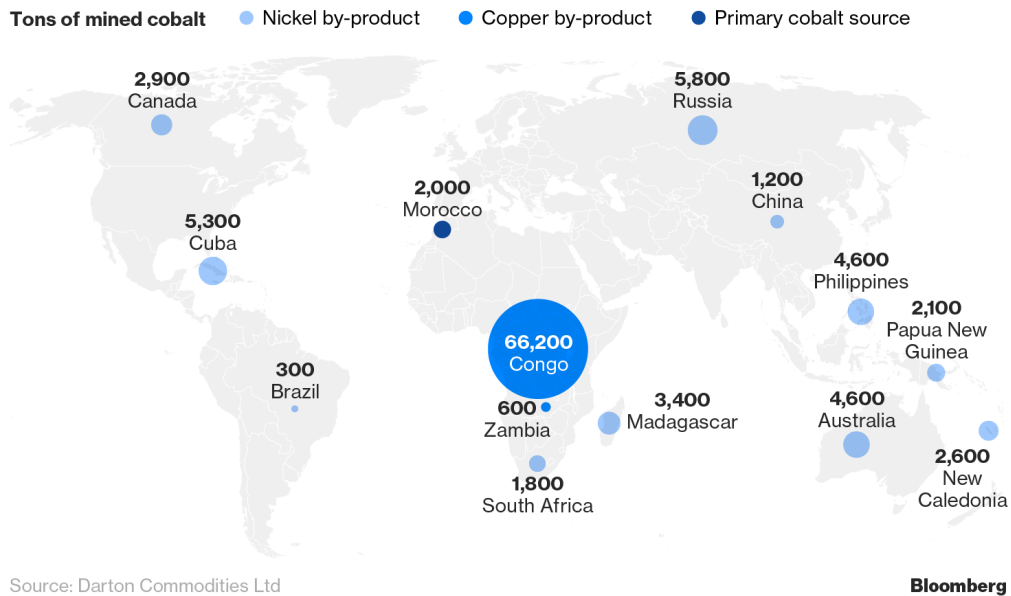
Cobalt is a transition metal that is typically added to metallic alloys to increase their strength and durability at high temperature as well as resist corrosion. In general, the higher the fraction of cobalt in a lithium-ion battery, the higher its specific energy (i.e. the amount of energy a battery can hold based on its weight). Cobalt increases the energy density of cathodes, which allows batteries to run longer and electric vehicles to extend their range between charging cycles. (Desjardins, 2017).

While cobalt is also used as high-performance alloys in other products such as permanent magnets, turbines and prosthetics, it is its use in batteries that is expected to become the greatest source of demand for cobalt mineral (Desjardins, 2017) (Azevedo, et al., 2018).

Cobalt is mainly sourced from primary sources (i.e. mines), whereas recycling remains at its infancy (Azevedo, et al., 2018).

Most of the world’s supply of cobalt is from the Democratic Republic of Congo (DRC), which comprises approximately 58.8 % as of 2017 (London Metals Exchange (n.d.) as cited by Elbagir, van Heerden & Mackintosh (2018)). However, depending on the source, the estimate for the fraction of global cobalt supply by the DRC differs. Mellin (2018) estimates 70%, while Wilson (2017) cited close to 63%. While the estimates differ, it appears that figures float between 60 to 70%.

Figure 3-2 Sources of mined cobalt worldwide

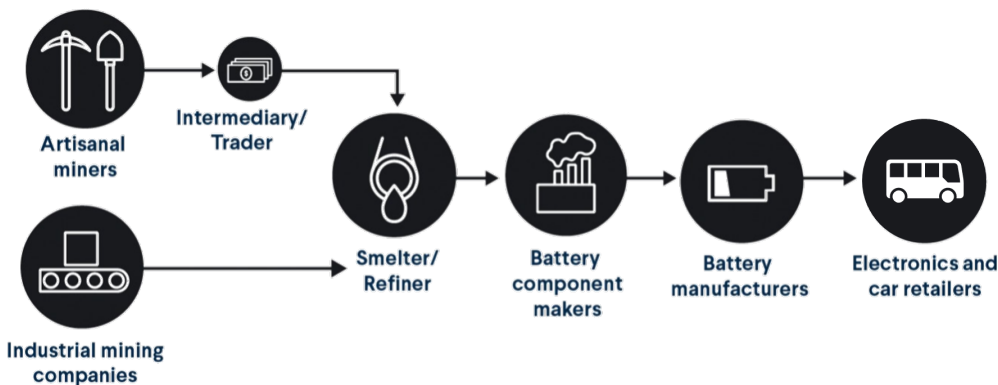


In 2016, DRC comprised 63% of global mined cobalt supply. Cobalt is typically mined as a by-product of nickel and copper mining (Darton Commodities Ltd (n.d.) as cited by Wilson (2017)). Depending on the source, the estimate for the fraction of global cobalt supply by the DRC differs – floating between 60 to 70%.

3.2 The value chain of cobalt in li-ion batteries

The following describes major stages in the value chain of cobalt in lithium-ion batteries. Unless otherwise specified, the information is drawn from Melin (2018).

Figure 3-3 Major stages of the cobalt value chain (for li-ion batteries)



Redrawn and adapted based on Amnesty International (n.d.) as cited by Felter (2018).

Mining

The mining stage can be differentiated into artisanal and industrial mining. In both cases, the principle is to extract rocks that contain cobalt ore which would then be sent to a smelter and refinery to further refine and extract the desired mineral. The key difference is that industrial

mining is conducted at much larger scale by corporations using heavy machinery, while artisanal mining is conducted at small scale often by hand and with simple tools for digging out rocks and washing and sorting out ore.

According to Amnesty International (2016), artisanal mining in the DRC can be generally categorized into two types. The first involves digging deep underground tunnels to access ore, and this is typically carried out by men who could be working for themselves or hired as labourers. The second is typically carried out by women and children, who dig for cobalt in tailings (by-products of industrial mining) located near industrial mining sites. They typically work for themselves. In both cases, the ores are then washed (typically in open rivers or surface water bodies) and sorted, then sold in open trading markets to ore traders, who then sell to smelting and refining companies.

It is estimated that 110,000 to 150,000 artisanal miners are present in the southern DRC, where artisanal cobalt mines are found (Amnesty International, 2016).

Refining – involves converting cobalt into other cobalt compounds. This stage is dominant in China but also found in other countries.

Battery component and material making – involves the production of cathode and anode material. Globally, the dominant companies have traditionally been Umicore and Easpring but others such as BASF and 3M are emerging (Melin, 2018). Production is concentrated to China, South Korea and Japan.

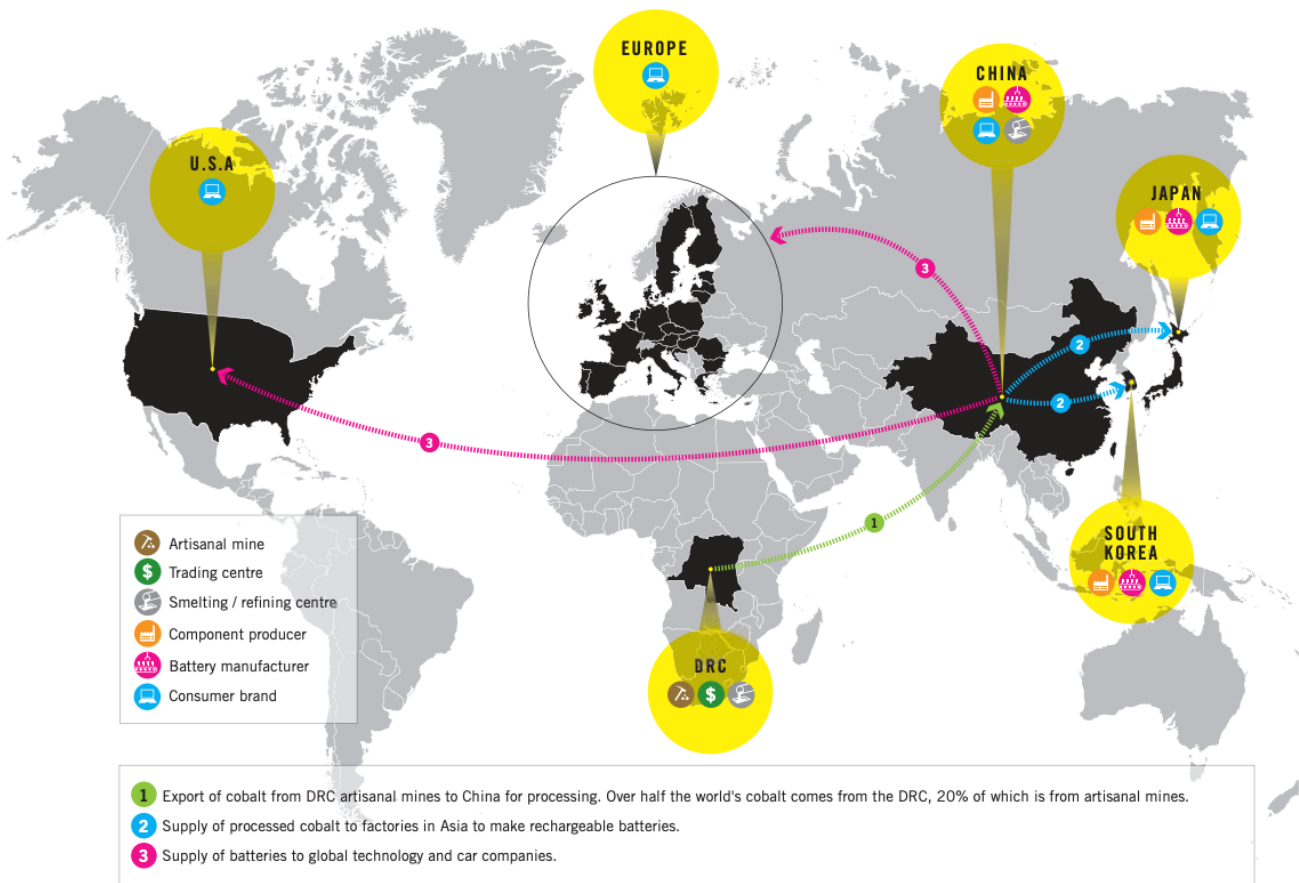
Battery manufacturing – involves the arrangement of cathodes and anodes in various configurations and chemistries to produce battery cells. This stage is traditionally dominated by LG Chem, Samsung SDI, Panasonic and Sony, but Chinese manufacturers are also growing very fast, such as BYD (also a vehicle manufacturer) and CATL, who are now global cell manufacturing leaders. These are followed by Chinese SMEs.

Battery cells are mounted into packs in various quantities and configurations depending on the final product. Major pack makers include LG Chem, CATL and Samsung SDI. According to Melin (2018), this is the only step that is not dominated by Chinese companies.

Vehicle manufacturing – based on procurement specifications, automotive manufacturers purchase the battery packs for assembling into their own products, which are then sold to end consumers (commercial and private).

Figure 3-4 The geographic value chain of cobalt (Amnesty International, 2016)

Movement of cobalt from artisanal mines in the DRC to the global market



3.2.1 Sustainability risks in the raw material value chain

As with most raw material extraction and industrial production processes, negative environmental and social impacts can occur all along the value chain. For example, all stages of mineral mining, extraction, smelting/refining, manufacturing and transport can produce air and water pollution. Negative social impacts can also be found in countries with inadequate regulations and norms to protect workers' rights and safety, and where child labour is present.

In this section, focus is placed on raw material extraction of cobalt – i.e. the mining stage – given the focus of this study on cobalt as a potential conflict mineral. Further, focus is placed on artisanal mining in the DRC, which is indeed one of the most significant aspects associated with sustainability risks in the cobalt raw material supply chain.

Artisanal mining in the DRC became a source of livelihood in the 1990s when one of the largest state-owned mining companies in the country collapsed. In 2002, the government released the Mining Code which stipulated that artisanal mining may only take place in designated Artisanal Mining Zones, where industrial mining is not feasible. However, the government created insufficient Artisanal Mining Zones, and combined with the displacement of artisanal miners from the increasing takeover of western and Chinese companies in artisanal mining sites, many artisanal miners were driven to work in unauthorized and unregulated areas (Amnesty International, 2016).

Below are condensed statements of the sustainability issues of artisanal mining in the DRC. Readers of this report are encouraged to obtain the full details of issues on-the-ground by reading the Amnesty International report (2016) – *This is what we die for: Human rights abuses in the Democratic Republic of the Congo power the global trade in cobalt*, which was one of the first investigations and exposures of the unethical mining conditions in the DRC.

These issues are closely interlinked to each other, and the fact that artisanal mining has been a historical source of local livelihood only adds to the complexity to the problem. The information below is based on the Amnesty International report, unless otherwise stated.

Human health issues: Artisanal miners typically work under hazardous conditions without basic protective equipment such as work clothes, gloves and masks. As a result of chronic exposure to cobalt dust, miners often have the potentially fatal “hard metal lung disease”, in addition to respiratory sensitization, asthma, shortness of breath and certain skin conditions. Many miners also work long hours and report constant bodily pain.

Child labour: As a source of local livelihood, children often join their families to work in the mines to supplement household income. About 40,000 children are estimated to work in the mines, some as young as seven years old. The working hours can be long, some reaching 12 hours per day. Even children who go to school may work in the mines during the weekend, holidays and before/after school.

Abuse and exploitation: In many cases, artisanal cobalt mines are operated by armed rebel groups in the DRC. Corruption and exploitation can be commonplace in the mines and in the open trading markets to which ore from artisanal mines are gathered and sold. Child workers are also susceptible to financial exploitation since they are not able to independently verify the weight and grade of the ore they sell to the traders, who can thus take advantage of the children. Armed guards may at times also demand payment from workers and threaten violence if the workers are not compliant. Workers’ rights to safe working conditions, fair wages and working hours are not enforced or regulated.

Environmental pollution: occurs as a result of toxic chemicals being leached in the mining process and released into water bodies, as well as deforestation to clear lands for mines, ultimately impacting local wildlife and biodiversity.

The responsible sourcing challenge is compounded by local trading markets, in which cobalt ore from numerous mines are collected together and sold, making it immensely difficult to trace sources of unsustainable cobalt. (Lee, 2018)

3.3 Existing initiatives to tackle conflict minerals

This chapter summarizes major industry, governmental and non-governmental initiatives that tackle conflict mineral sourcing (non-exhaustive). While the major initiatives and regulations only focus on 3TG, the guiding principles and experience of implementing these programs can serve as important lessons for responsible cobalt sourcing.

3.3.1 IGO and Industry Groups of Minerals

3.3.1.1 OECD Conflict Mineral Due Diligence

The OECD Conflict Mineral Due Diligence Guidance provides a framework to companies to avoid human rights and other sustainability issues linked to minerals sourced from conflict and high-risk areas. Its scope officially only covers tungsten, tin, tantalum and gold (3TG) (OECD, 2019), but its guidance information can be applied to all other mineral sources. This includes the Model Supply Chain Policy for a Responsible Global Supply Chain of Minerals from Conflict-Affected and High-Risk Areas, which companies can use as a template to develop their own supply chain sourcing policies (this is found in Annex II of the OECD Guidance) (OECD, 2016).

The OECD also produced the 5-Step Framework for Upstream and Downstream Supply Chains. In a nutshell, these steps are to: 1) Establish strong company management systems, 2) Identify and assess risk in the supply chain, 3) Design and implement a strategy to respond to identified risks, 4) Carry out independent third-party audit of supply chain due diligence, and 5) Report annually on supply chain due diligence (OECD, n.d.).

The OECD 5-Step Framework for Upstream and Downstream Supply Chains is a guidance tool under the OECD Due Diligence Guidance for Minerals. It describes smelters and refiners as a “choke point” and should be given particular attention as a key stage in the supply chain that tends to include fewer actors (but processes a significant fraction of the commodity), have greater visibility and control over upstream production and trade, and as such can be seen as a ‘key point of transformation’ in the supply chain (OECD, 2019).

The five steps apply to both downstream and upstream value chain actors but in slightly different variations. Key points are summarized below:

Table 3-1 OECD 5-Step Framework for Upstream and Downstream Supply Chains (reproduced and summarized from OECD (n.d.))

Steps	Upstream	Downstream
1. Strong Company Management Systems	<ul style="list-style-type: none"> • Adopt responsible mineral supply chain policy • Communicate the policy to suppliers and integrate into contracts • Establish transparency systems to collect data from suppliers 	<ul style="list-style-type: none"> • Adopt responsible mineral supply chain policy • Communicate the policy to suppliers and integrate into contracts • Establish traceability or chain of custody system over supply chain
2. Identify and Assess Risks in Supply Chain	<ul style="list-style-type: none"> • Identify products containing target minerals • Use best efforts to identify smelters/refiners of target products. For very complex products, focus on engaging with smelters and direct sourcing from responsible smelters 	<ul style="list-style-type: none"> • Identify and verify traceability or chain of custody information (e.g. mine of origin, trade routes, suppliers) • For red flags locations, suppliers or circumstances, assess risks on-the-ground to determine risk of

		contributing to conflict or serious abuse
3. Manage Risks	<ul style="list-style-type: none"> • Report on the identified risks to senior management, fix internal systems • Disengage from suppliers that are associated with smelters/refiners that may be contributing to the most serious impacts (e.g. non-state armed groups, serious abuses) • Encourage more identified smelters/refiners to be audited (could be through individual or collaborative efforts) • Due diligence capacity building for suppliers • Direct sourcing from responsible smelters/refiners • Implement risk management plan, monitor and track progress 	<ul style="list-style-type: none"> • Report on the identified risks to senior management, fix internal systems • Disengage from suppliers that are associated with the most serious impacts (e.g. non-state armed groups, serious abuses) • Mitigate risk, monitor and track progress
4. Audit of Smelter/Refiner Due Diligence Practices (Choke Point)	<ul style="list-style-type: none"> • Smelters and refiners should participate in industry programs to be audited for their due diligence practices • Prepare documentation for audit (e.g. chain of custody or traceability documents, risk assessment and management documents for red-flagged sources) • Allow auditors to access company documents and records • Facilitate auditor access to samples of suppliers as appropriate • Publish summary audit report with conclusions of the audit 	
	<ul style="list-style-type: none"> • Support smelter and refinery audits by allowing auditors access to company sites, documents and records • Facilitate audit contact and logistics with upstream actors and local stakeholders 	<ul style="list-style-type: none"> • Support smelter and refinery audits by periodically assessing the quality of audit programs • Communicate and use leverage to strengthen the programs

5. Publicly Report on Due Diligence	<ul style="list-style-type: none"> • Annually describe all due diligence efforts (Steps 1-4), e.g. risk assessment & mitigation, with due regard for business confidentiality and other competitive or security concerns (e.g. supplier relationships, price information, or identities of whistle-blowers or sources should not be disclosed) • Make report publicly available in offices and/or on company website 	<ul style="list-style-type: none"> • Annually describe all due diligence efforts (Steps 1-4), e.g. risk assessment & mitigation, with due regard for business confidentiality and other competitive or security concerns (e.g. supplier relationships, price information, or identities of whistle-blowers or sources should not be disclosed) • Smelters should publish (a summary of) their independent audit report • Make report publicly available, in offices and / or on company website
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3.3.1.2 Responsible Minerals Initiative (RMI)

The Responsible Minerals Initiative (RMI) was founded in 2008 by members of the Responsible Business Alliance (formerly Electronic Industry Citizenship Coalition, an industry group for electronics supply chain responsibility which has developed guidance for materials-in-products reporting and the Global e-Sustainability Initiative) (RMI, 2019). Its mission is to “Provide companies with tools and resources to make sourcing decisions that improve regulatory compliance and support responsible sourcing from conflict-affected and high-risk areas.” Over 350 participant companies and associations from 10 industries are members, including Volvo, Volkswagen and other automotive companies.¹

The scope of RMI’s work covers the most common conflict minerals (3TG) as well as other emerging conflict minerals. Besides producing due diligence guidance and conducting stakeholder engagement, key activities related to cobalt are as follows:

Responsible Minerals Assurance Process (RMAP) - identifies smelters and refiners that produce responsibly sourced materials, using a "pinch point (a point with relatively few actors)" approach to target points on the supply chain to conduct third-party audits of smelter/refinery management systems and sourcing practices. A risk-based approach is used to validate smelters/refiners.

Third-party auditors conduct independent verifications that systems are in place to responsibly source minerals in compliance with RMAP requirements which are developed based on OECD Due Diligence Guidance and the US Dodd-Frank Act. A list of verified smelters and refiners of 3TG has been published online. For cobalt, a list of known active cobalt smelters has also been published, however at present, there are no conformant cobalt smelters listed² (RMI, 2019).

¹ The list of RMI members can be accessed here: <http://www.responsiblemineralsinitiative.org/about/members-and-collaborations/>

² The list of known active cobalt smelters can be accessed here: <http://www.responsiblemineralsinitiative.org/cobalt-conformant-smelters/>

Cobalt reporting template - Similar to the CMRT, the Cobalt Reporting Template (CRT) was launched in December 2018 to standardize the collection of due diligence information in the supply chain and identify choke points.

The CRT was designed for downstream companies to gather and disclose information about their supply chains, including information on mineral countries of origin, smelters and refiners³ (RMI, 2019).

Pilot Cobalt Refiner Supply Chain Due Diligence Standard – This standard was developed by RMI in partnership with the China Chamber of Commerce of Metals, Minerals and Chemicals Importers and Exporters (CCC MC) and the Responsible Cobalt Initiative (both described below). The standard sets out expectations for cobalt refiners to conduct due diligence when sourcing raw material in the supply chain. The standard follows the five-step framework produced by the CCC MC (described below), which was itself based on the OECD five-step framework (CCC MC, 2019). In 2018, the standard was used to pilot assurance programs for participating cobalt refineries, which includes the Freeport Cobalt Oy (Finland), Jiangsu Xiongfeng Technology Co., Ltd. (China) and SungEel HiTech Co., Ltd. (Republic of Korea).

3.3.1.3 CCC MC

The China Chamber of Commerce of Metals, Minerals and Chemicals Importers and Exporters (CCC MC) produced the Chinese Due Diligence Guidelines for Responsible Mineral Supply Chains in 2015. They were developed in cooperation with the OECD and the guidelines are similar to the OECD Guidelines in having a 5-Step risk-based supply chain due diligence framework of 1) Establishing strong company risk management systems, 2) Identifying and assessing risks in the supply chain, 3) Designing and implementing a strategy to respond to the identified risks, 4) Carrying out independent third-party audits at identified choke points in the supply chain and 5) Reporting on the process and results of supply chain risk management. The CCC MC Guidelines are intended to cover all minerals but are initially prioritizing gold, tin, tungsten and tantalum (CCC MC, n.d.).

One of CCC MC's main initiatives related to cobalt is the **Responsible Cobalt Initiative** – which was established in partnership with electronics brands such as Apple, Huawei, Samsung and Sony, as well as Chinese cobalt smelter/refinery Huayou Cobalt. It aims to engage companies upstream and downstream of the supply chain to align their policies with the OECD Due Diligence Guidance and the CCC MC Chinese Due Diligence Guidance for Responsible Mineral Supply Chains. It also promotes cooperation with the Congo government, with civil society and local communities (CCC MC, 2016). As of May 2018, the RCI has 31 members on its board including lithium-ion battery maker CATL and vehicle manufacturers Volvo Car Corporation (Dolega & Schüler, 2018), BMW and Daimler (Daly, Tom, 2018).

3.3.1.4 Cobalt Institute (formerly Cobalt Development Institute)

The Cobalt Institute is a non-profit trade association with members composed of cobalt producers, traders, users and recyclers. According to the institute, it has 20 members that “represent[s] around 70% of cobalt produced worldwide” (Cobalt Institute, 2017a). The institute acts as a knowledge base for various stakeholder groups on cobalt-related issues, including life cycle assessments,

³ The Cobalt Reporting Template can be downloaded here:

<http://www.responsiblemineralsinitiative.org/emerging-risks/cobalt-reporting-template/>

human health issues, environmental issues, representation of members to regulators and responsible sourcing.

On responsible sourcing, members of the Cobalt Institute sign a code of conduct following the “7-Guiding Principles”. It is also currently drafting the Cobalt Industry Responsible Assessment Framework for companies to demonstrate compliance with existing standards and certifications (LME, 2018). The framework will identify priority risks within the cobalt sector for its members and customers, provide good practice framework for members to respond to the risks, and ensure that the framework is credible, well managed and accepted among stakeholders (Cobalt Institute, 2017c).

7-Guiding Principles of the Cobalt Institute (Cobalt Institute, 2017b):

1. Maintain high ethical standards in all aspects of work
2. Operate with high standards of social responsibility
3. Encourage the implementation of robust internal reporting structures to ensure transparent and sustainable operating practices
4. Work with Regulators and Legislators to communicate the latest science data, ensure it is appropriately applied and encompass best practices regarding any intrinsic hazards and risk management principle
5. Continue to develop scientific information on cobalt to ensure the fullest understanding of cobalt in the context of human health and the environment
6. Work to promote and develop uses for cobalt in a responsible and sustainable way
7. Encourage the Guiding Principles of cobalt to be used throughout the life cycle.

3.3.1.5 European Partnership on Responsible Minerals

The European Partnership on Responsible Minerals is a multi-stakeholder initiative that focuses upstream of the mineral supply chain. It aims to “create better social and economic conditions for mine workers and local mining communities, by increasing the number of mines that adopt responsible mining practices in Conflict and High Risk Areas” (EPRM, n.d.). However, it focuses only on 3TG – cobalt is not part of its scope.

3.3.2 Government

3.3.2.1 US Dodd-Frank Act

The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) was established in 2010 after the financial crisis of 2008. It consists of significant reforms to the US financial regulatory system and regulate the practices of banks and businesses. Section 1502 of the Dodd-Frank Act is the Conflict Minerals Provision, which prohibits US-registered or listed companies from purchasing mineral sources that are associated with armed conflict. (OEF Research, 2017). Under this provision, companies registered to the US Securities and Exchange Commission are required to disclose if any products or raw materials purchased contain tantalum, tungsten, tin and gold, and whether these minerals are connected to “sites of conflict”, identified by certification processes at the mine level (Wolfe, 2015). It is important to note that the US Dodd-Frank Act does not cover cobalt.

3.3.2.2 EU Conflict Minerals Due Diligence Regulation

The EU Conflict Minerals Due Diligence Regulation aims to stop the trade of conflict minerals – though it covers only 3TG. It mainly requires “EU importers of minerals or metals” to follow

mandatory due diligence rules including the collection of information of upstream traders, refiners, smelters and miners. Importers must follow the five-step framework of the OECD Conflict Minerals Guidance. The information collected includes: From importers of minerals – the country of the minerals’ origin, quantities imported and when they were mined. From importers of minerals and metals – list of minerals imported by name and type, names and addresses of suppliers. The import of minerals from high risk areas must be accompanied by extra information on the mines of origin, location of mineral consolidation, trade and processing, and the taxes, fees and royalties that were paid. The regulation enters into force in January 2021 (European Commission, 2017).

Box 1 OECD vs Dodd-Frank Act and unintended negative consequences

While both regulations tackle the issue of irresponsible conflict minerals sourcing of gold, tantalum, tin and tungsten, there are key operational differences.

First, the Dodd-Frank Act requires US companies to “declare due diligence they exercised to prevent [3TG] in their supply chain from contributing to conflict in the Great Lakes region of Africa”, i.e. it targets a specific geographical region (Koch & Kinsbergen, 2018). This is significant because by targeting requirements on sources from a specific geographic region, a “de-facto embargo” was created (Bosco, et al., 2014).

Companies, NGOs, politicians, journalists and academics argued that the de-facto embargo has created unintended negative effects in the region, including “increased human rights violations, such as looting in the minerals trade”, livelihood loss, negative impact to gender relations and women in mining (e.g. women who no longer have income to access medical services), smuggling and the transfer of minerals trade in the black market, and that no real positive change was created on-the-ground (Aronson, 2011), (Bosco, et al., 2014).

Based on these lessons from the Dodd-Frank Act, “...the European Commission of 2014 differed from the Dodd-Frank act in three aspects.

- Firstly, it chose a global geographic scope, so as to avoid one particular region being boycotted. It focused on all ‘conflict affected and high-risk areas’.
- Secondly, it opted for a risk-based approach. Thus, companies would not be asked to claim that their products were ‘conflict free’, but they needed to show that they had a due diligence system in place in line with the OECD Due Diligence guidance on mineral trade from conflict affected and high-risk areas.
- Lastly... it was decided that for some actors (the importers), the regulation would be mandatory, whereas for the downstream... it would be voluntary.” (Koch & Kinsbergen, 2018).

While research by Koch and Kinsbergen (2018) has shown that such unintended negative effects from the Dodd-Frank Act have become less pronounced in the present, the experience described above serves as important lessons to avoid similar unintended negative consequences when designing conflict minerals requirements on other minerals, such as cobalt.

3.3.3 Other actors in the mineral supply chain

3.3.3.1 LME

The London Metal Exchange is a global metal trading marketplace where producers (sellers) and consumers (buyers) of metals and minerals can trade upon futures contracts (LME, 2019). The metals traded on the LME includes non-ferrous metals such as aluminium and copper, ferrous metals such as steel, precious metals such as gold and silver, and minor metals including cobalt.

In 2018, LME published a position paper to establish responsible sourcing requirements for listed brands, in which all brands must conduct an OECD red flag assessment to determine whether they are a “higher focus” or “lower focus” brand except for cobalt, which will be classified as an “automatic higher focus metal”. Higher focus brands will be required to adopt a standard in line with the OECD Guidance and be subject to an external alignment assessment and audit process for compliance to the standard. Cobalt brands that are demonstrated to already have negative impact on LME pricing (for reasons including market concerns related to responsible sourcing credentials of the brand) may be subject to actions at a shorter timeline (LME, 2018). This new requirement is based on several years of engagement with OECD and industry associations, as well as a responsible sourcing survey conducted to its listed brands in 2017 (LME, 2018).

According to the survey conducted in 2017, cobalt producers indicated that steps being taken to address due diligence issues have been focusing on “the worst forms of child labour” as the primary concern, followed by environmental and security considerations (LME, 2018).

3.3.3.2 RCS Global

RCS Global is an example of a company that provides responsible sources services for the mineral supply chain. This includes auditing and supply chain mapping based on OECD, RMI and other frameworks, gathering data upstream of the supply chain, traceability, trainings and other information products (RCS Global, n.d.).

Box 2 Material and substance reporting standards in the automotive industry

There are two main systems for the exchange of information on materials and substances in parts and products within the automotive industry: The International Material Data System (IMDS) and the Global Automotive Declarable Substance List (GADSL).

The IMDS is the main material data system used in the automotive industry. It was initiated jointly by a number of automotive brands such as Audi, Volvo and Ford. It has since become a global standard used by original equipment manufacturers to gather and communicate material-in-product data (DXC Technology, 2017).

The GADSL is a database of substances regulated in the automotive industry. A substance is added to the GADSL if it is regulated in at least one country. It is a declarable-prohibited substance, usually with reporting threshold of 0,1% by weight (American Chemistry Council, 2019).

While the automotive industry is known for its comprehensiveness of exchanging full-material disclosure data within the supply chain, the systems surrounding these practices do not yet include the collection of conflict minerals at the system level – i.e. it does not differentiate between responsible and irresponsible mineral sources. Efforts to restrict and require conflict mineral data remain at the level of individual buyer-supplier agreements.

4 Results of supply chain mapping

The previous chapter summarized the situation of industry, governmental and non-governmental initiatives that tackle conflict mineral sourcing. While the major initiatives and regulations only focus on 3TG, the guiding principles and experience of implementing these programs can serve as important lessons for responsible cobalt sourcing.

To better understand how the cobalt sourcing situation may be affecting Skånetrafiken, this chapter turns to Skånetrafiken's supply chain of cobalt in bus batteries. It presents a summary of a supply chain mapping exercises that traced Skånetrafiken's suppliers from traffic operators (tier 1), to bus manufacturers (tier 2), to battery cell and pack makers (tier 3), to battery material maker (tier 4), to cobalt smelter and refinery (tier 5) and up to cobalt miners (tier 6). Potential major players in each supply chain stage are listed with varying levels of certainty (further explained below). For each supplier, a summary is presented of the company's operations in relation to Skånetrafiken and any policies, codes of conduct and/or practices relating to responsible mineral sourcing (highlighting cobalt wherever possible).

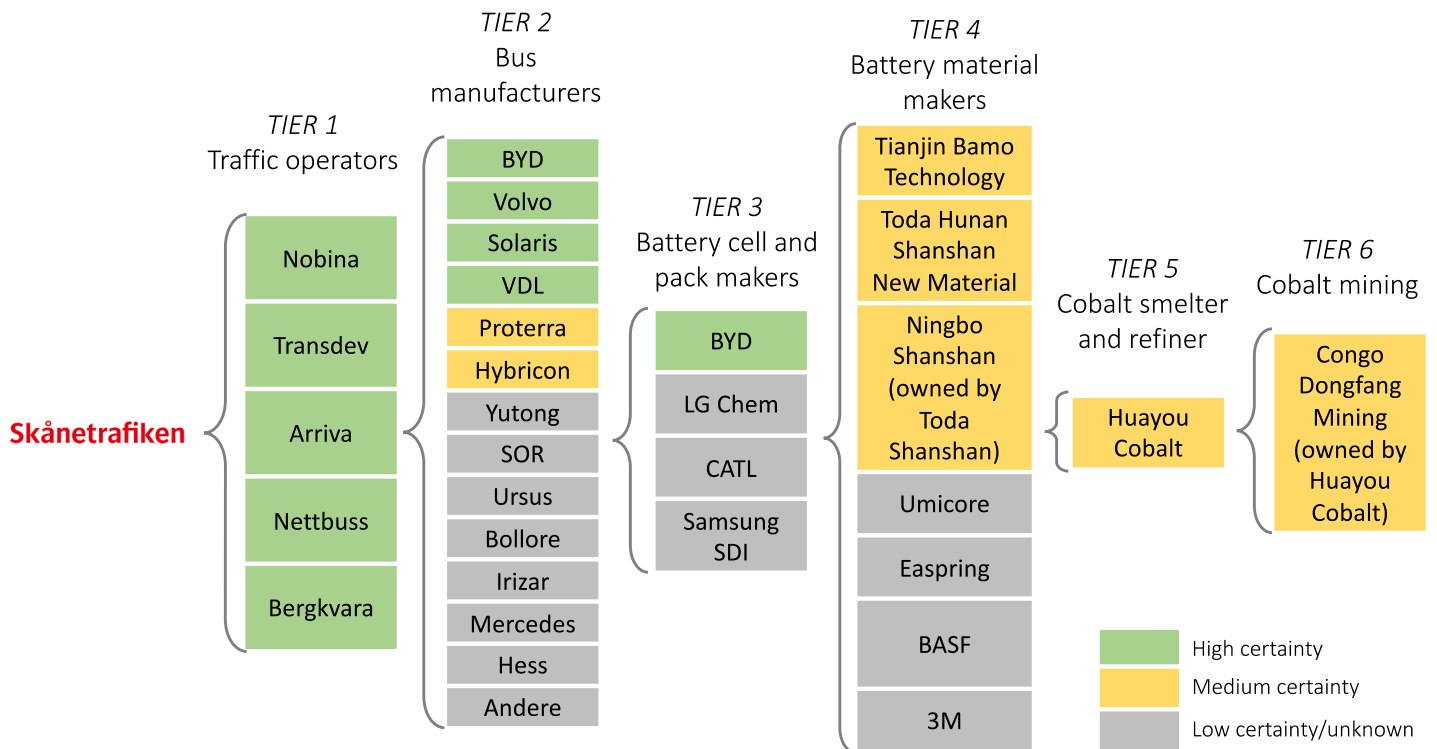
The diagram below illustrates Skånetrafiken's potential supply chain of cobalt in electric bus batteries. It only shows the list of potential suppliers for each stage of the value chain without specific linkages between buyers and suppliers across stages. While evidence of specific buyer-supplier relationships was found in research (e.g. Transdev lists BYD as a supplier on its website), it is also possible that other buyers in the same tier source from the same suppliers.

The degree of certainty of manufacturers on Skånetrafiken's supply chain is determined based on the source (reliability) of the reference (see Section 2 **Error! Reference source not found.** for more information). Further information is provided below for each certainty category, by supply chain tier.

High certainty - Tier-1 traffic operators Nobina, Transdev, Arriva, Nettbuss and Bergkvara were selected based on information from the main Skånetrafiken contact of this project, Iris Rehnström, who indicated that these are the main suppliers with which Skånetrafiken has been in discussion and coordination with on bus electrification. Ms. Rehnström has also mentioned the following tier-2 electric bus manufacturers as having been in contact with Skånetrafiken (though mainly via tier-1 traffic operator companies): BYD, Volvo, VDL and Solaris. Therefore, these tier 1 and 2 companies are listed as “high certainty” on Skånetrafiken’s supply chain.

Medium certainty – Tier-2 bus manufacturers Proterra and Hybricon are mentioned in Transdev sources as suppliers of electric buses, but it is unknown whether these vehicles currently or will operate in Sweden (and for that matter, Skåne). Tier-3 battery cell and pack makers Tianjin Bamo Technology, Toda Hunan Shanshan New Material and Ningbo Shanshan; tier-5 cobalt smelter/refinery Huayou Cobalt and tier-6 cobalt mining company Congo Dongfang Mining were all listed in the Amnesty International report (2016).

Low certainty/unknown – Tier-2 bus manufacturers listed under this category were found in an industry news article which cited information from manufacturer Solaris comparing its market position with other electric bus producers present on the EU market. They are included for the possibility that buses from these producers may end up on the Swedish market but are listed in this category due to low certainty and lack of clarity. Tier-3 battery cell and pack makers LG Chem, CATL and Samsung SDI; and tier-4 battery material makers Umicore, Easpring, BASF and 3M were listed in Hans Eric Melin’s report as major players in the global supply chain (Melin, 2018), though there is insufficient information to further confirm whether they are linked with the other buyers and supplier listed in Skånetrafiken’s supply chain. Therefore, companies listed in this category only provides an indication of their potential to be present on the supply chain. It should be verified with other supply chain actors, especially downstream buyers, if possible.

Figure 4-1 Skånetrafikens potential supply chain of cobalt in electric bus batteries.⁴


4.1 Tier 1: Traffic operators and bus companies

In this section, the main traffic operator companies servicing Skånetrafikens and any sustainability policies relating to conflict minerals (or at least supplier engagement on sustainable procurement) are summarized. The amount of information and level of detail varies between the companies studied depending on the availability of information online. Further, only Nobina was interviewed, so more detail was obtained.

4.1.1 Nobina

According to their website (Nobina, 2015), Nobina is the largest bus transport group in the Nordics. Serves Sweden, Denmark, Finland and Norway. The company prospects, tenders and

⁴ Additional notes on information sources:

Tier 1: All traffic operators: Skånetrafikens

Tier 2: Nobina likely supplied by BYD (not in Skåne) (Randall, 2019), Transdev stated its electric bus fleet is supplied by BYD, Proterra, Hybricon and VDL (location unknown) (Transdev, n.d.), no supply chain information for Arriva, Nettbus and Bergkvara. Tier 3: Tianjin Bamo, Toda Hunan Shanshan New Material and Ningbo Shanshan (parent company of Toda Shanshan) were mentioned as potential suppliers to BYD (Amnesty International, 2016).

Tier 5: Huayou Cobalt was mentioned as a potential supplier to Toda Hunan Shanshan and Tianjin Bamo Technology (Amnesty International, 2016). It is also audited by LG Chem as part of their supplier due diligence activities (LG Chem, n.d. d). Amnesty International (2016) listed Tianjin Bamo Technology as a potential supply chain actor in the DRC cobalt supply chain based on "publicly available information", but this was also reportedly denied by the authors of "a connection to [the] potential supply chain and/or to DRC cobalt".

manages public transport contracts in the long term and manage public transport systems. Nobina has a bus fleet of 3600 throughout the Nordic region, and most of its electric vehicle fleet (approximately 45 buses) is found in Sweden. By the end of 2019, it is estimated that there will be a total of 150 electric buses in the fleet (Kasskawo, 2019).

Bus electrification initiatives in Sweden include a city transport electrification plan at the end of 2018 in partnership with Landskrona Municipality and Skånetrafiken - for a total of 19 electric buses on 5 routes (Nobina, 2018). Another collaboration with Skånetrafiken is in place on electric power in Malmö, where one city bus route will be electrified with 13 new electric buses. Finally, a contract with Skånetrafiken in Malmö will be extended until 2021, including a total of 83 buses of which 13 are electric.

Supply chain

According to sources available online, in 2018 Nobina procured 26 electric buses from Chinese manufacturer BYD to be delivered in summer 2019 – though none of them will be used in the Skåne region (Lidköping, Borås and Ale) (Randall, 2019). The same source by Randall (2019) was updated in May 2019 stating that Nobina has further ordered 20 electric buses from BYD scheduled for delivery before the end of 2019 and destined for Stockholm and Linköping.

Sustainability policy and code of conduct

According to the Nobina code of conduct (Nobina, 2015), Suppliers must comply with UN Global Compact⁵, UN Declaration of Human Rights and ILO Declaration on the “basic principles and rights in working life from 1998, in accordance with national laws and practices”; this includes the prohibition of child labour. Further, suppliers are expected “to have a system perspective on environmental issues and use routines to reduce... waste and land, atmospheric and water emissions. Chemicals should be handled in a safe manner for man and nature”. Suppliers are also required to ensure a working environment that “complies with international guidelines” and that “all employees must have access to and use relevant protective equipment”.

Nobina mainly communicates and engages with bus manufacturers on these sustainability policies, as they are the main supplier which hold responsibility in meeting Nobina’s requirements. According to the Nobina interviewee (2019), at present there are no specific requirements in Nobina’s procurement procedures with suppliers on conflict mineral sourcing. However, if the company is made aware of such issues, it works to engage and tackle such issues with their suppliers as they arise.

4.1.2 Transdev

Transdev is an international private and public transport operator, with subsidiary companies including Flygbussarna (which also runs in Skåne region). Transdev (n.d.) states that it is a “leading operator of electric buses in Sweden...” and within its electric bus fleet of 150 vehicles, the company operates in Eskilstuna, Umeå and Gothenburg, with the remainder of its electric bus fleet in other European cities. The majority of the vehicle fleet is biofuel-powered (Transdev, n.d.).

⁵ The UN Global Compact is a voluntary initiative to encourage businesses to adopt a common sustainability and social responsibility standard. It consists of 10 principles related to human rights, labour, environment and anti-corruption (United Nations, n.d.).

Supply chain

Transdev (n.d.) states that its electric bus fleet is supplied by manufacturers including BYD, Proterra, Hybricon and VDL.

Sustainability policy and code of conduct

According to the company's Statement of Extra-financial Performance (Transdev, 2018b), Transdev is a signatory to the UN Global Compact. It has also published a Human Rights Group Statement in which it states that the company is committed to protect human rights including working hours, fair wages, prevention from harassment or discrimination, child labour and modern slavery, but it is not specified how (Transdev, 2018a).

Transdev also has a "responsible procurement program" including a "CSR Supplier Charter based on a code of conduct", which suppliers must integrate into their contract if the contract value exceeds EUR 100,000. It doesn't specify what is in the charter or code of conduct, but the company states that they endeavour to maintain "relationships with our suppliers... ensuring they undertake to comply with our ethical principles..." (Transdev, n.d.). While there is no specific list of ethical principles, under a section on "our actions to promote respect for human rights", it states that the company's Group Policy covers "combating child labour and all forms of forced labour...". However, it is unclear to what extent this is integrated into the CSR Supplier Charter and to what level of suppliers this is followed up upon. The author was also unable to find the code of conduct document. "Responsible procurement" is also mentioned, but as a means of "contributing to the social inclusivity and cohesion and economic vitality of local areas", which is not very specific as to the level of the supply chain or geographic area in which this applies.

4.1.3 Arriva

Arriva is a UK-based multinational public transport company which operates buses amongst other public transport systems across the EU. Operation in Sweden began in 1999 when Ödåkra Buss in Skåne was acquired (Arriva, n.d. c). The company website states that it has a "completely fossil-free bus service", which includes HVO100 fuel (hydrogenated vegetable oil), ethanol, RME (rapeseed oil methyl esters) and biogas, but there was no mention of electric buses (Arriva, n.d. c), therefore, it is unknown to what extent Arriva has worked towards bus electrification, especially in Sweden.

Sustainability policy and code of conduct

According to the company website, Arriva's sustainability policy includes goals to reduce greenhouse gases, energy use, water consumption, electricity consumption and waste reduction (Arriva, n.d. a). The author was unable to find social aspects including responsible procurement and supply chain responsibility (e.g. child labour, forced labour, etc). However, there was mention of that "suppliers (in connection with procurement of goods and services) comply with Swedish laws and have a preventative working method for the environment in their operations" (Arriva, n.d. b).

4.1.4 Nettbuss

Nettbuss (now known as Vy) is a Norwegian bus company that also operates in Sweden. According to the Sustainability Report 2018 for Nettbuss Sverige (Nettbuss Sverige, 2018), the

company first introduced six electric buses in Östersund in 2019. Its sustainability policy includes aspects on reducing negative environmental impacts and workplace ethics, but the author was unable to find further information related to responsible procurement and supplier engagement on sustainability and social responsibility.

4.1.5 Bergkvara

Bergkvara is a Swedish charter bus company based in Småland, which services clients including public and private companies, individuals and organizations (Bergkvara, n.d.). The company's environmental policy mentions a purchase plan that "strives to reduce our climate impact through better vehicles and fuel", and target areas for environmental improvements are on average fuel consumption, chemicals and power consumption (Bergkvara, n.d.). The author was unable to find further information on social aspects related to supply chain procurement risks.

4.2 Tier 2: Bus manufacturers

In this section, the main bus manufacturers that likely supply to the above listed tier 1 traffic operators and any sustainability policies relating to conflict minerals (or at least supplier engagement on sustainable procurement) are summarized. The amount of information and level of detail varies depending on the availability of information online. One interview was conducted with the Volvo Group and one with VDL Bus and Coach.

4.2.1 BYD in Europe

BYD is a Chinese automotive manufacturer covering a wide product line of various electric vehicle types and batteries. It is a more vertically integrated company than others, and so exist as both tier-2 bus manufacturers and tier-3 battery makers in the supply chain. In 2018, a press release by an electric mobility sector news service (Randall, 2019) cited a quote by BYD that Scandinavia "has become the fastest growing market for BYD in Europe...", with Sweden having been the second European country to procure BYD buses. In Sweden, BYD is servicing e-buses in Eskilstuna, Orust and Angelholm (Skåne) (BYD Europe, n.d.).

Sustainability policy and code of conduct

According to the latest Social Responsibility Report (2016) that was found online, BYD states that they seek to apply "closed cycle for the suppliers' life cycle management (BYD, 2016). The BYD Supplier Requirements require that "suppliers should ensure no child labour is used in any stage of the operation process". Suppliers are also asked to formulate procedures to protect against labour of minors as well as gender equality and women's protection (BYD, 2016).

On responsible procurement, BYD states that they require suppliers to "set clearly defined and formal business ethics and code of business conduct according to industrial standards such as EICC (Electronic Industry Citizenship Coalition)" (BYD, 2016).⁶ The review standards used for

⁶ The Electronic Industry Citizenship Coalition (known today as the Responsible Business Alliance) is an industry group for sustainable electronics. See section 3.3.1.2 for more information.

approving suppliers is based on the BYD Supplier Requirements, and non-compliant suppliers are blacklisted (BYD, 2016).

On conflict minerals, BYD conducts annual checks on the sources of metals used by suppliers for compliance with the OECD Due Diligence Guidelines on Conflict Minerals. Suppliers are required to complete the Responsible Conflict Minerals Reporting Template (launched by Responsible Business Alliance, see Section 3.3.1.2 for more information) (BYD, 2016). Suppliers are obligated to avoid purchasing conflict minerals from “the [DRC] or surrounding countries”. BYD reassesses its suppliers if it finds out that its supply chain includes metals from conflict areas (BYD, 2016).

The author was unable to find the BYD Supplier Requirement or other codes of conduct for further detail.

4.2.2 Volvo Bus (part of Volvo Group)

Volvo is a Swedish manufacturer of automobiles, construction equipment and marine and industrial engines. The Volvo Group’s brand portfolio includes Volvo, Volvo Penta (engines), Volvo Buses and various truck brands. The sustainable procurement standards of Volvo Buses are covered under the overall standards and procedures of Volvo Group (Volvo Group, 2006).

Sustainability and code of conduct

The Supplier Code of Conduct of Volvo Group covers the areas of *human rights and working conditions, health and safety, responsible sourcing of raw materials, environmental performance and business ethics*.

Volvo carries out this code of conduct in its procurement process, where after an initial screening, suppliers are required to participate in the *Key Elements Procedures*. These procedures cover standard supplier criteria such as management, quality and product design as well as sustainability elements, including the supplier code of conduct.⁷

Suppliers are required to conduct a Self-Assessment Questionnaire (SAQ) on CSR, which is based on the standard self-assessment template produced by the Drive Sustainability program, a collaboration amongst automotive corporations of which Volvo Group is a member⁸. This self-assessment is used to evaluate suppliers (especially those in high-risk countries) on key CSR aspects including human rights, environment, working conditions and business ethics (Volvo Group (2016) and Bennis (2019)).

According to the Volvo interviewee, all suppliers must complete the SAQ as part of the sourcing process. An unapproved result means that the supplier must work with a corrective action plan to reach an approved standard. An unapproved result is also included in the decision-making process for whether the supplier is approved. However, there is no stopping parameter, in that an unapproved result does not mean that the supplier is necessarily black-listed but that it forms one

⁷ The questionnaire can be accessed here: <https://www.volvogroup.com/en-en/suppliers/our-supplier-requirements.html> (under the section titled “KEP related documents”)

⁸ Drive Sustainability promotes a common approach on sustainable procurement in the automotive industry. Besides developing the self-assessment questionnaire on CSR for automotive suppliers, the program also conducts capacity building and coordinate approaches for responsible raw material sourcing. More information can be found here: <https://drivesustainability.org>.

of multiple parameters that are considered in the supplier evaluation process. The questionnaire is used by all members of Drive Sustainability that are in the automotive industry (Bennis, 2019).

Given that conflict mineral reporting is not a legal requirement, Volvo has not yet conducted large-scale data collection and sharing on this aspect. However, given significant client demands, Volvo has increased its efforts to roll out programs related to conflict minerals (Bennis, 2019). Such efforts can be seen in the section on *Responsible sourcing of raw materials* of the Volvo code of conduct, where suppliers are required to “exercise adequate due diligence following the OECD Due Diligence Guidelines with respect to sourcing, extraction and handling of [3TG] and cobalt and to make a reliable determination of the origin and source of such minerals” (Volvo, 2019). Further, suppliers are required to “have a policy and process in place to ensure that any of these minerals contained in the products manufactured by the supplier do not directly or indirectly finance or benefit armed groups that are perpetrators of human rights abuses or in any other way directly or indirectly contribute to human rights violations... [and] to ensure that all smelters and refiners in its 3TG and cobalt supply chain take part and actively engage in third party audit programs and to provide any information on such smelters and refiners upon request to the Volvo Group” (Volvo, 2019).

Volvo conducts audits of suppliers in high-risk countries. The Volvo employee visits the supplier for one day and audits the supplier on an in-house audit protocol that conducts an assessment based on the supplier code of conduct. The process is completely internal, and Volvo is aiming to develop an industry audit standard and process (however, this is a work in progress) (Bennis, 2019).

These processes are applied to suppliers with which Volvo has direct contact and agreement, which involves Tier 1 and, in some cases, Tier 2. In both cases however, the self-assessment and audit processes include questions on how the supplier works down the value chain. For example, during the on-site audits Volvo asks the supplier to show and explain the processes, documents and results that the supplier imposes on their subcontractors (Bennis, 2019). According to the code of conduct, suppliers are also encouraged to “work proactively in their supply chain beyond their direct suppliers to implement similar standards” (Volvo, 2019). Capacity building, dialogue and active engagement were also highlighted as key aspects of CSR management for Volvo Group (Bennis, 2019).

On clients, Volvo is also required to complete self-assessments (usually in collaboration with Ecovadis, which is the “market leader” in this area according to the Volvo interviewee). In most cases Volvo can fulfil most of their clients’ requirements though in some areas it may not be 100% in compliance (Bennis, 2019). However, according to the Volvo interviewee the case is the same in that Volvo also does not require 100% compliance of their suppliers to their code of conduct, but close to complete compliance (Bennis, 2019).

4.2.3 Solaris

Solaris is a Polish bus and coach manufacturer that operates electric buses in various European countries including Sweden. While the company covers aspects on driver safety, education and other charity initiatives, the author was unable to find any sustainability policies, supplier requirements or codes of conduct related to responsible procurement or conflict minerals.

4.2.4 VDL

VDL is a Netherlands-based bus manufacturer with electric bus operation in multiple EU countries with production in the Netherlands and Belgium. VDL Bus & Coach is a subsidiary under the VDL Group. A code of conduct was developed in 2019 and VDL's supply chain management efforts are also complemented with a general sustainability clause that is used in internal policy documents and supplier contracts. The requirements and parts of the third-party auditing scope is cascaded up the supply chain (Akkermans & Weijers, 2019).

The code of conduct covers conflict minerals including 3TG, though cobalt is not directly mentioned, the CoC indicates that the conflict minerals listed are not exhaustive. In the CoC VDL states that they endeavour not to purchase materials containing such minerals if they directly or indirectly finance armed groups in the DRC or adjoining countries (VDL Bus & Coach, n.d.). The CoC also includes child labour and modern slavery aspects where it indicates the company does not tolerate, use or support such activities (VDL Bus & Coach, n.d.). Finally, the CoC states that they expect the same from their suppliers (VDL Groep, n.d.).

During an interview with VDL Bus & Coach, it was acknowledged that responsible mineral and metal sourcing, including cobalt, is important for them as well as for their customers. As such, they have decided to follow a number of different guidelines for due diligence in supply chains. This includes the OECD Conflict Minerals Due Diligence framework. As of late 2019 VDL was conducting a risk assessment to identify red flags in their supply chain. It was expected that the findings of these assessments would inform the Code of Conduct development (Akkermans & Weijers, 2019).

VDL Bus & Coach have procedures and policies how they audit and review their supply chain. They have external auditors that conduct audits of their suppliers once a year or every two years. VDL has a global ISO 9001 and 14001 certificate and their policy is that all their suppliers should have implemented this standard in their operation.

VDL has also considered other actions they can take as a business to secure and take responsibility for a sound and safe procurement of bus batteries and their metals. They have looked into processes such as Responsible Mining Index (<https://responsibleminingindex.org/en>) and also if they should join other initiatives concerning responsible sourcing of minerals such as cobalt.

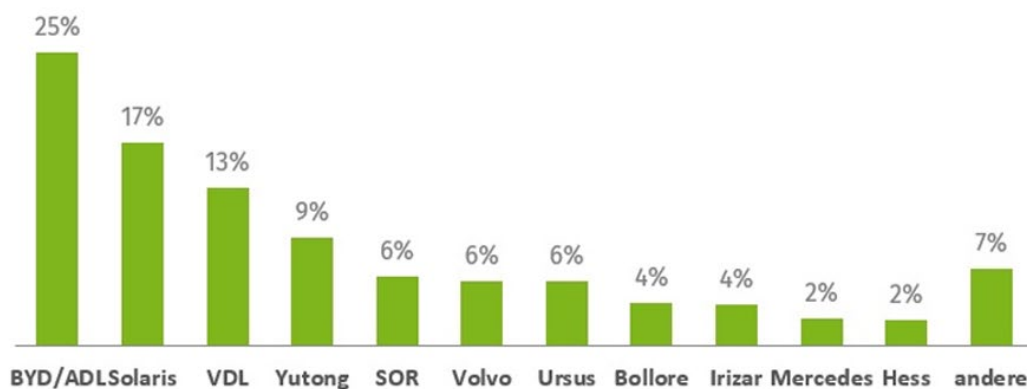
During the interview, it was pointed out that their product lifecycle management (PLM) system which they use as the core of their operation includes the Bill of Materials (tracking all their components and parts), sourcing and procurement information, and financial information (Akkermans & Weijers, 2019).

VDL Bus & Coach pointed out that many clients currently do not have CSR requirements on conflict minerals. When asked how responsible sourcing issues can be tackled from the procurement perspective, interviewees pointed out that tendering procedures must move beyond "lowest price" as the main or only driving factor for evaluating a tender. More specific sustainability elements should be integrated as part of the evaluation process. For this to be successful, there needs to be an acceptance that such CSR elements will likely drive up costs, but it is also in order to improve the overall quality of the tender (Akkermans & Weijers, 2019). As part of this, there must also be a requirement for suppliers to prove that they have acted upon the CSR measures claimed in their tenders.

4.2.5 Other

An electromobility industry news article cited information from Solaris on the market share of electric bus sales in the EU in 2018 – this is led by BYD at 25%, Solaris at 17% and VDL at 13%. The following graph from the same source also lists other potential electric bus manufacturers that supply to Europe (Hampel, 2019). However, due to limited availability of time in the project, the author was unable to further investigate whether these companies (not yet mentioned above) supply to Skåne or Sweden.

Figure 4-2 Sales of electric buses in the EU in 2018 according to producers, in percentage (Solaris, n.d. as cited by Hampel (2019))



4.3 Tier 3: Battery cell and pack makers

Despite low certainty on their presence on Skånetrafiken’s supply chain, these three companies – LG Chem, CATL and Samsung SDI - are described here due to their apparent prominence in the market (Melin, 2018), and their market leading positions likely increases the chance of them being in the supply chain for Skånetrafiken as a downstream consumer.

4.3.1 LG Chem

Established in 1947, LG Chem is a South Korean chemicals research and manufacturing company. Its product areas include petrochemicals, batteries, advanced materials (e.g. materials for semiconductors and water treatment) and pharmaceuticals (LG Chem, n.d. c). Under the business area for batteries, LG Chem’s production encompasses cells, modules and packs (LG Chem, n.d. a).

Sustainability and responsible procurement

LG Chem’s sustainability management system covers economic, environmental and social aspects. The company website also states that it is “committed to responsible sourcing of cobalt and its supply chain management” and is a member of the Responsible Cobalt Initiative (see Section 3.3.1.3CCCMC) (LG Chem, n.d. d).

The *LG Chem code of conduct for suppliers* includes standards on working age, labour exploitation, workers safety and conditions. It also requires suppliers to “prohibit the use of conflict minerals

and materials sourced through any illegal and unethical processes in including the processes where human rights are infringed, and shall establish a precautionary system” (LG Chem, n.d. b). Suppliers are required to comply with surveys and audits.

The code of conduct includes a due diligence policy which covers 3TG and “minerals mined in conflict affected and high-risk areas such as cobalt”. It defines conflict-affected areas as the DRC, Sudan, Rwanda, Burundi, Uganda, Congo, Zambia, Angola, Tanzania and the Central African Republic. It further defines high-risk areas as “the areas where the United States Department of Labor regulates” (LG Chem, n.d. b).

The code of conduct also states that its due diligence standard is based on the OECD’s Five Step Framework for the Due Diligence for Conflict Minerals.

According to an audit report conducted on Huayou Cobalt in July 2017, the audit used standards from the OECD and CCCMC (LG Chem, 2017). Similarly, an audit conducted on Congo Dongfang (CDM) International SARL in May in 2018 was also based on the OECD Due Diligence Guidelines on Conflict Minerals. It also included traders in artisanal mining sites as part of the audit scope and activities (LG Chem, 2018). More information is given in Section 4.5.1 Huayou Cobalt and 4.5.2 Congo Dongfang Mining (CDM) International SARL.

4.3.2 CATL

CATL is a Chinese battery and technology manufacturer that was founded in 2011. It produces cells, modules and packs for electric vehicles as well as energy storage solutions. While the author was not able to find much information on the company’s lithium-ion battery products, an article from the company titled the “Due diligence management policy for responsible mineral resources supply chain” states that the company commits to adopting the conflict minerals guidance from the CCCMC and OECD as well as the US Dodd-Frank Act on Conflict Minerals. It further states that such the CCCMC and OECD guidance are incorporated in contracts with mineral suppliers (CATL, 2018). Risk management measures include suspending or discontinuing engagement with upstream suppliers where risks are identified (CATL, 2018). No specific mention of cobalt was found.

4.3.3 Samsung SDI

Samsung SDI is a South Korean electronic component maker under Samsung Electronics Group. It supplies lithium-ion batteries for electronics, vehicles and energy storage (Nikkei Asian Review, 2019). According to a “2016 progress report on responsible cobalt supply chain”, the responsible cobalt sourcing policy of the company is based on the OECD Five Step Framework and CCCMC guidance. It also describes the audit programme it uses to engage with suppliers including smelters. This involves training and capacity building, requesting suppliers to conduct self-diagnoses, field inspections, development of improvement plans and reassessment. More information can be found in the report (Samsung SDI, 2017).

According to the company’s code of conduct, suppliers are required to maintain a policy of transparency on dealing with minerals including 3TG and cobalt that are “(i) sourced from countries at risk, such as the Democratic Republic of Congo (DRC) and adjoining countries, or (ii) in any way sourced from or connected to child labour, unsafe/unhealthy work environment, and human rights issues” (Samsung SDI, n.d.). Suppliers are also required to have a due diligence system in place to track the origin of materials including smelters. Suppliers are required to work

with their suppliers to comply with the code of conduct and report to Samsung SDI upon request (Samsung SDI, n.d.).

4.4 Tier 4: Battery material makers

This section covers three suppliers - Tianjin Bamo Technology, Toda Hunan Shanshan New Material and Ningbo Shanshan, which were listed by Amnesty International as potential suppliers on the DRC cobalt supply chain (Amnesty International, 2016).

4.4.1 Tianjin Bamo Technology

Founded in 2002, Tianjin Bamo Technology is a Chinese lithium-ion battery material producer (Tianjin Bamo Technology, n.d.). Little information is provided on the company website and online about the company's product ranges and activities related to lithium-ion batteries, with the exception that its products include cobalt lithium oxide composites (Tianjin Bamo Technology, n.d. c). Further, a *Company responsible mineral supply chain policy* can be downloaded on their website (Tianjin Bamo Technology, n.d. b).

Sustainability and responsible procurement

The policy (in Chinese) states that the company is committed to the China Responsible Mineral Supply Chain Due Diligence Management Guide⁹, which is incorporated into supplier contracts and agreements. Aspects covered in the policy also includes intolerance towards serious violations of human rights, commitment to not (directly or indirectly) support illegal armed groups, on corruption and money laundering, on land rights, on the prohibition of child labour and on the avoidance of life-threatening health and safety situations. Responses to these risks when they arise vary from developing, adopting and implementing risk management plans with suppliers, to suspension or discontinuation of cooperation with the supplier depending on the type of risk (Tianjin Bamo Technology, n.d. b). No specific mention of cobalt was found.

4.4.2 Ningbo Shanshan

Established in 2003, Ningbo Shanshan New Material is a subsidiary of the umbrella of the Shanshan Technology Corporation. It specializes in lithium-ion battery anode production (Shanshan Technology, 2014). The author was unable to find further information.

4.4.3 Toda Hunan Shanshan New Material

Also established in 2003, Toda Hunan Shanshan is a subsidiary under Ningbo Shanshan New Material. They manufacture battery cathode materials (Bloomberg, 2019). The author was unable to find further information.

⁹ The scope of this guide covers 3TG only. See Section 3.3.1.3 CCCMC.

4.4.4 Other

In an outlook report on lithium-ion batteries by Melin (2018), Umicore and Easpring are traditional big players in the market though others such as BASF and 3M have been emerging. However, due to limited availability of time in the project, the author was unable to further investigate whether these companies supply to Skåne or Sweden.

4.5 Tier 5: Cobalt refineries and Tier 6: Mining

4.5.1 Huayou Cobalt

Established in 2002, Huayou Cobalt is a smelter of cobalt and copper metals. Activities under the company also includes cobalt mining and cobalt material processing. According to the company website, its main products are “lithium battery cathode material precursors, cobalt chemicals and copper-nickel metal” (Huayou Cobalt, n.d. a).

Perhaps due to societal pressure following the publication of the Amnesty International report (2016), Huayou Cobalt became involved in a number of initiatives to tackle responsible sourcing. One of these is in co-founding the Responsible Cobalt Initiative with CCCMC and other industry players (See Section 3.3.1.3 CCCMC). The company website also describes a due diligence management system that involves establishing a risk management system, identifying and assessing risks, designating risk mitigation measures, independent evaluation, reporting of results and community improvement (Huayou Cobalt, n.d. c)

Huayou Cobalt is also trying to tackle sourcing transparency challenges in open trading markets that source artisanal mines. This involves avoiding the cobalt free trade market and controlling the risk at the source and transporting cobalt from conflict-free artisanal mines directly to the smelter through a traceability system (Huayou Cobalt, n.d. b). In 2017, the company worked with its subsidiary Congo Dongfang Mining to establish a responsible cobalt mining demonstration zone in Congo (Kinshasa) (Huayou Cobalt, n.d. b).

The purpose of community development initiatives is to promote local economic development and create jobs, presumably to disincentivize local people to choose or resort to work in conflict mineral mining. Such activities have also included the provision of medical services, infrastructure building and providing other basic services.

According to an audit conducted by client LG Chem in 2017, Huayou Cobalt has established two policies on cobalt sourcing – the supplier code of conduct and supplier standard for the responsible sourcing of cobalt (LG Chem, 2017).

4.5.2 Congo Dongfang Mining (CDM) International SARL

Congo Dongfang Mining is a subsidiary of Huayou Cobalt. In addition to the information above on the parent company, according to the LG Chem audit report (2017), raw materials are supplied

from CDM to Huayou Cobalt to prevent child labour in artisanal mines. A *Model Mines Program* has also been established in which two artisanal mines are selected and managed by CDM to boost traceability. Unique identification numbers are used for individual truckloads of raw cobalt from these mines. However, the audit report also noted that these raw materials are later mixed with cobalt from CDM's own large-scale mines and other local large-scale mines, and as such the traceability of origin is limited only to mines under which CDM has direct control. It was concluded that "the systems in place are neither sufficiently robust for an effective Chain of Custody nor an effective traceability system for cobalt in Huayou", as provided in the OECD conflict minerals guidance (LG Chem, 2017).

For full details of the audit results and Huayou's responsible sourcing practices on the ground, please see the audit report by LG Chem (2017) and audit report of CDM (LG Chem, 2018).

4.6 Skanetrafiken's sustainability policies on responsible procurement

Skånetrafiken (through Region Skåne) is part of the cooperation between Swedish county councils and regions and the shared sustainable public procurement standards, which includes a common code of conduct for suppliers (Swedish County Councils and Regions, n.d. d).

The code of conduct for suppliers is based on international standards and principles of social and environmental responsibility, including the UN Universal Declaration of Human Rights, Eight Fundamental Conventions of the International Labour Organization, UN Convention on the Rights of the Child and the UN Convention Against Corruption. In addition, suppliers must adhere to the local national legislations that are in force in the countries of production to protect labour rights, the environment and social welfare (Swedish County Councils and Regions, 2013).

The code of conduct covers four main areas on human rights, labour law, environment and anti-corruption (Swedish County Councils and Regions, 2013):

- On human rights, the code of conduct requires suppliers to ensure that they support and respect human rights ("both within its own operations and the supply chain"), ensure that they do not participate directly or indirectly in human rights violations, and that there are routines in place to evaluate risks in the participation of human rights violations "through its operations".
- On labour protection, the code of conduct prohibits child labour, forced labour, discrimination and harassment. It also supports the freedom of association and collective bargaining to support and protect employee rights in the workplace. Suppliers are also required to adhere to the local regulations in the countries they operate in, including areas on wages and working hours and ensuring a safe and hygienic work environment.
- On the environment, suppliers are required to comply with local environmental legislation, and adopt a structured and systematic approach to identify, measure and follow up on its environmental impact, as well as aim to continually improve on its environmental performance and adopt a life-cycle perspective.
- On anti-corruption, suppliers are not to directly or indirectly offer or receive undue payment or compensation that affect the objectivity of business decisions.

The Swedish County Councils and Regions conducts checks on suppliers to evaluate compliance to the code of conduct, which involve documentation review, site visits and site audits, reviews of action plans and monitoring of implementation (Swedish County Councils and Regions, 2013).¹⁰

On the cascading of requirements upstream of the supplier's supply chain, the code of conduct states that suppliers are expected to "do their utmost to live up to its requirements (of the code of conduct) within their own organisations and in the supply chain. This should take place through dialogue, transparency and open cooperation between the Swedish County Councils and suppliers – benefitting both parties" (Swedish County Councils and Regions, 2013). More explicit wording is found on the Swedish County Councils and Regions website, which states that "...it is important that supplier responsibility does not stop at the first stage of suppliers, but also includes their subcontractors. The supplier must therefore make demands on its direct suppliers and encourage them in turn to pass on the basic conditions in their supply chains"¹¹ (Swedish County Councils and Regions, n.d. b).

The joint sustainable procurement standards and code of conduct of the Swedish County Councils and Regions covers eight risk areas, which are: medicines, food and related services, medical instruments, gloves and surgical articles, IT and communication, medical textiles, first-aid supplies and medical technology (Swedish County Councils and Regions, n.d. c). Given the focus on electric vehicle batteries in this report, the most relevant risk area is perhaps IT and communications, which covers (amongst others) computers, network/security/storage systems and mobile devices, which contain lithium-ion batteries (though electric vehicles are not included explicitly as a product in focus) (Swedish County Councils and Regions, n.d. a). The prioritized risks include risks in the violation of human rights, labour rights, environment protection and anti-corruption associated with the mining of 3TG and cobalt conflict minerals, from the raw material stage to manufacturing and assembly value chain stages (Swedish County Councils and Regions, n.d. c).

To assess the extent to which traffic procurement contracts integrated the above sustainable procurement and code of conduct elements, the sustainability appendix of a procurement contract with Helsingborgs stadstrafik was reviewed, also on whether responsible mineral sourcing was included (Skånetrafiken, 2017). Sections on *social responsibility* indeed covered human rights, working environments, labour law and anti-corruption, however the author was unable to find specific mentioning that such requirements should cascade up the supply chain to where such issues (such as severe human rights abuses and child labour) are most persistent (e.g. DRC). There was also no mention of aspects related to conflict mineral mining and responsible mineral sourcing (Skånetrafiken, 2017).

¹⁰ Please see the code of conduct document for full details (<http://www.xn--hllbarupphandling-8qb.se/component/phocadownload/file/58-code-of-conduct-for-suppliers>)

¹¹ Translated from Swedish

4.7 Analysis of tier 1 suppliers and Skånetrafikens CoC

In this section, the sustainable procurement policies and supplier codes of conduct of Skånetrafikens tier 1 are analysed against Swedish County Councils and Regions code of conduct for suppliers for the degree of alignment.

Nobina - Nobina's code of conduct for suppliers covers the same aspects of human rights, labour rights, environment and anti-corruption. According to the interview with a Nobina representative, it was indicated that supplier engagement is mainly with the first tier of suppliers (i.e. bus manufacturers).

Transdev – The author was unable to find a publicly-available version of the CSR Supplier Charter and code of conduct that was mentioned in Transdev sources. However, the sources reviewed in this report indicate that Transdev focuses on human rights, labour rights, anti-corruption and the environment (Transdev, 2018b). The company states that they engage with suppliers and subcontractors through communication, awareness raising, "careful selection" (of suppliers and contractors) and measurement of compliance by surveys (Transdev, 2018b).

Arriva – While the author was unable to find information on a sustainable procurement code of conduct, it was found that Arriva's sustainability policy mainly covers environmental aspects such as reducing greenhouse gas emissions, energy use and waste generation. Beyond this, it is unknown to what extent Arriva's sustainable procurement standards and any code of conduct for suppliers (if exists) aligns with the Swedish County Councils and Regions standards.

Nettbus – While the author was unable to find information on sustainable procurement or code of conduct, it was found that Nettbus' sustainability policy mainly covers environmental aspects (such as reducing negative environmental impacts) and workplace ethics. Beyond this, it is unknown to what extent Nettbus' sustainable procurement standards and any code of conduct for suppliers (if exists) aligns with the Swedish County Councils and Regions standards.

Bergkvara – The author was unable to find any information on sustainable procurement and code of conduct for suppliers. Some mention was made in the company's environmental policy to reduce climate impact and power consumption, amongst others. Therefore, it is unknown to what extent Bergkvara's sustainable procurement standards and any code of conduct for suppliers (if exists) aligns with the Swedish County Councils and Regions standards.

Below is a summary of relevant sustainable sourcing aspects in Skånetrafikens tier 1 suppliers of the supply chain ("✓" = present, "?" = unclear/possible, "-" = not present/no information).

Table 4-1 Summary of relevant sustainable mineral sourcing aspects in tier-1 of Skånetrafiken’s supply chain

Tier 1	Human Rights	Labour Rights	Environment	Anti-corruption	Beyond first-tier supplier engagement (as stated)
Nobina	√	√	√	√	-
Transdev	√	√	√	√	√
Arriva	-	-	-	-	-
Nettbus	-	-	-	-	-
Bergkvara	-	-	-	-	-

The above information was based mainly on online research of publicly-available information (with the exception of an interview with Nobina), which provides some understanding and indication of the state of suppliers’ compliance to Skånetrafiken’s code of conduct. It is recommended that a more detailed and structured analysis be conducted with these traffic operators using the existing tool of the Swedish County Council and Regions’ Self-Assessment Questionnaire and evaluation guidance.¹²

The questionnaire is intended to be a supporting document for auditors to follow up on the contract terms of suppliers on sustainability aspects. This questionnaire asks suppliers to self-declare on the following aspects of the four risk areas of the CoC (human rights, labour rights, environment and anti-corruption): policy commitment, communication for the policy commitment, division of responsibilities, risk analyses, monitoring of compliance, and how deviations from the policy commitment are managed (Swedish County Councils and Regions, 2019 b). The assessment template allows auditors to assess the degree of compliance to the code of conduct, classifying each aspect as “compliant”, “non-compliant: minor” and “non-compliant: major” (Swedish County Councils and Regions, 2019 a).

4.8 Summary of relevant social responsibility aspects in potential supply chain

Below is a summary of relevant sustainable procurement aspects, specifically related to mineral sourcing, in Skånetrafiken’s potential supply chain (“√” = present, “?” = unclear/possible, “-” = not present/no information).

¹² The self-assessment questionnaire can be found here: <http://www.xn--hllbarupphandling-8qb.se/component/phocadownload/file/106-formulaer-foer-egenrapportering> and evaluation guidance can be found here: <http://www.xn--hllbarupphandling-8qb.se/component/phocadownload/file/111-assessment-template-sustainable-supply-chains>.

Table 4-2 Summary of relevant responsible mineral sourcing aspects in Skånetrafiken’s potential supply chain

Tier	Company	Cobalt policy	Conflict minerals policy (excluding cobalt)	Responsible procurement (excluding conflict minerals) <i>E.g. fair labour, human rights</i>	Beyond first tier supplier engagement
1	Nobina	-	-	√	-
1	Transdev	-	-	√	√
1	Arriva	-	-	-	-
1	Nettbus	-	-	-	-
1	Bergkvara	-	-	-	-
2/3	BYD	?	√	√	?
2	Volvo	√	√	√	√
2	Solaris	-	-	-	-
2	VDL	√	√	√	-
3	LG Chem	√	√	√	√
3	CATL	-	√	√	?
3	Samsung SDI	√	√	√	√
4	Tianjin Bamo Technology	-	√	√	-
4	Ningbo Shanshan	-	-	-	-
4	Toda Hunan Shanshan New Material	-	-	-	-
5	Huayou Cobalt	√	-	√	√

Tier	Company	Cobalt policy	Conflict minerals policy (excluding cobalt)	Responsible procurement (excluding conflict minerals) <i>E.g. fair labour, human rights</i>	Beyond first tier supplier engagement
6	Congo Dongfang Mining	√	-	√	√

5 Discussion and recommendations

The previous section 4 summarized the results of mapping out potential actors on Skånetrafikens supply chain of cobalt in electric bus batteries. Section 3 summarized the situation of major governmental and non-governmental initiatives tackling the issues of conflict mineral mining (including 3TG and/or cobalt). This section discusses the findings of both sections, critical reflections of the research and provides recommendations accordingly.

5.1 Comparison across the supply chain on responsible cobalt sourcing

Based on the sources reviewed in this research, the level of responsible mineral initiatives was apparently the highest for Volvo (tier 2), LG Chem (tier 3), Samsung SDI (tier 3) as well as Huayou Cobalt (tier 5) and Congo Dongfang Mining (tier 6). All these companies had some form of a responsible cobalt sourcing initiative, policy or code of conduct. Adherence to the OECD Five Step Framework and CCCMC conflict mineral due diligence guidance was the most common (for both companies that are tackling both 3TC and/or cobalt), indicating that the two initiatives (OECD and CCCMC) have become an industry standard. It is important to note, however, that the actual progress and impact on-the-ground of such initiatives are unclear. The few audit reports that were found – namely those of Huayou Cobalt and Congo Dongfang Mining for LG Chem – confirmed the presence of the mentioned policies and procedures, but also remarked on various areas of improvement, including the need to improve traceability to the origins of source.

None of the traffic operators studied have policies on conflict minerals or cobalt. There could be several reasons for this. First, these tier-1 companies may not view this as part of their mandate given that they are not direct producers of the physical battery products. It could also be because there has been no direct consumer demand (either by public household consumers or downstream institutional consumers such as traffic authorities). Furthermore, the awareness about cobalt as a potential conflict mineral may only be starting to emerge recently, and perhaps less so among household consumers, which contribute to low demand for responsible sourcing. While the climate

and local environmental benefits of electric mobility are indeed significant, the demand for conflict-free electromobility will likely only increase in the future as public awareness grows.

That tier 3 battery manufacturers LG Chem and Samsung SDI and tier 5/6 Huayou Cobalt and Congo Dongfang Mining have responsible cobalt sourcing policies should not come as a surprise, since these companies are much more directly involved with processing and manufacturing with cobalt in its raw or less processed forms – i.e. the issues are closer at hand. However, it is interesting to note that tier 2 Volvo as a bus manufacturer also tackles responsible cobalt sourcing. Specifically, it requires cobalt due diligence requirements not only to first tier suppliers but also to the smelters and refiners in supply chain, and to conduct third party audits. It would be interesting to further assess the reasons and drivers for this. One reason may be that Volvo has a long history and presence on the global market as well as a historical focus on environmental issues.

While tier 2 BYD includes conflict mineral procedures, they only align with OECD (which officially only tackles 3TG), and therefore it was unclear (based on the sources reviewed) whether cobalt is indeed an aspect being tackled by the company. This can indicate a limitation/gap in the scope of international guidelines, and that cobalt must be officially incorporated into the scope of these guidelines (e.g. OECD, Dodd-Frank and CCCMC guidance) in order to be addressed by more companies in the value chain. Nonetheless, initiatives on tackling responsible cobalt sourcing have indeed been emerging. Therefore, a company seeking to develop responsible cobalt management systems must be careful to note that alignment with these initiatives (e.g. OECD) may not be sufficient if they do not specify the coverage of cobalt – at least if or until these guidelines revises its scope to cover it.

5.2 Critical reflections on methodology

In qualitative research, the validity, reliability and generalizability of the methods and data are important to determine research quality. Validity is defined as the “appropriateness of the tools, processes and data” (Leung, 2015). While the availability of information was highly variable across the companies studied in Skånetrafiken’s potential supply chain, the sources can be deemed as valid as the author relied mainly on company websites and reports. Industry analyses and news also provided an external perspective, insight and information that companies may not disclose openly, such as procurement volume.

Reliability can be seen as the replicability of the method across other samples. The methodology of this project can be seen as replicable, since the identification of potential supply chain actors and conducting desk research of the cobalt sourcing standards can be easily replicated for other supply chains. However, improving the variety of data sources for each company, such as by conducting interviews with company representatives - would improve the reliability of results and allow for the cross-verification of findings between different sources. This was not feasible given the time limitations of this project as well as low responses from the five tier 1 companies that were contacted for interviews.

Generalizability is defined as the extent to which the findings of one study can be generalized in another. While this study was conducted and its results are intended for Skånetrafiken, applying similar methods may be useful for other traffic authorities in Sweden who source from similar suppliers.

One other note is that in this study, cobalt recycling was not discussed. While private sector efforts are emerging to recycle cobalt minerals, this is still at an “infancy” stage (Azevedo, o.a., 2018).

Downstream buyers may, however, consider this as a potential sourcing option as the recycling market and infrastructure grows in the future.

5.3 Recommendations for Skånetrafiken

In summary, the following are the most immediate actions that Skånetrafiken can take to tackle responsible cobalt sourcing:

Top recommendation 1

Change organizational policy so that mobility services are included in the scope of the Swedish County Council and Regions' code of conduct (at the moment, public transport is not included in the scope of products covered by the CoC).

Top recommendation 2

2.1. Increase emphasis and integrate criteria on sustainability aspects (especially responsible mineral sourcing) in the tendering process. This includes allocating a set number of points for fulfilling such sustainability aspects in the evaluation, as well as monitoring procedures and actions (such as auditing) to ensure that suppliers fulfil the sustainability claims in the tender.

2.2. Revise contract wording to cover sustainable cobalt sourcing more explicitly. While the final wording should ideally be developed after engagement and communication with suppliers to determine what actions are feasible to deliver effective results, an example of such wording may be considered and adopted:

"The supplier shall have a specific "Supplier Code of Conduct" and a company policy and process in place for the responsible procurement which include sourcing of cobalt, including sourcing, extraction and handling. A reliable determination of the origin and source of cobalt shall be made. The policy and process shall involve the active engagement with the supplier's own supply chain, including upstream suppliers, in its scope and activities.

The suppliers shall adopt a risk management and life cycle approach and do CSR risk assessment to identify and assess risks on their own supply chain and ensure that cobalt sourcing does not come from sources that directly or indirectly finance or benefit armed groups, perpetrate human rights abuses or directly or indirectly contribute to human rights violations.

The supplier shall devise and adopt a risk management plan in relation to the responsible cobalt sourcing policy, process and assessment, including risk mitigation measures.

The supplier shall actively engage in third party audit programs and to report on supply chain due diligence practices, and to report on the progress of such programs and activities upon request to Skånetrafiken. Upon the identification of policy violations, the supplier shall engage with their suppliers and have a process in place to remediate the non-compliance.

The bus manufacturers that provide buses to the suppliers shall have a ISO 14001 and/or ISO 45001 global certification or equivalent system secure that there are internal processes and systems for follow up and audit upstream suppliers."

Top recommendation 3

Conduct continuous stakeholder engagement with: Tier 1 traffic operators and tier 2 vehicle manufacturers to understand their situation on tackling sustainable cobalt sourcing, and what actions are feasible from a contracting perspective. Conduct regular audits of their compliance to the code of conduct and procurement contracts including on-site visits (i.e. beyond documentation review). The Drive Sustainability reporting framework could be a useful tool here.

If the supplier establishes an ISO certification system (as mentioned above), Skånetrafiken should explore with them the potential of integrating responsible sourcing into the system.

Internal stakeholders such as procurement teams on CSR requirements in Skånetrafiken's supply chain, so that considerations of responsible sourcing can be improved in future supplier evaluation and engagement processes. Internal stakeholders also include top-level management to build a commitment from the top-level on sustainable mineral sourcing.

5.3.1 Other recommendations

Based on the above results and discussion, other recommendations are made for Skånetrafiken:

Recommendation: Elaborate on this research conducted in this report to conduct a systematic audit of tier 1 traffic operators and their level of compliance to Skånetrafiken's (i.e. the Swedish County Council and Regions') code of conduct

The existing self-reporting template and assessment guide can be used to carry out this audit. This assessment should extend beyond collecting information in the self-assessment to include more detailed engagement with suppliers such as site-visits, documentation review and discussion with upstream suppliers.

Recommendation: Develop a responsible cobalt sourcing management system with the input of internal and external stakeholders (especially suppliers across multiple tiers), top-level commitment and enforcement standards/codes of conduct/contract requirements.

One other recommended step forward is for Skånetrafiken to develop a comprehensive responsible cobalt sourcing management system. The system can be based on OECD's conflict minerals due diligence principles and Five Step Framework. This system should be designed with the input of key stakeholders including suppliers.

The process of developing this system should also include integrating cobalt conflict minerals in the company's sustainability policy (with top-down mandate and commitment), defining a corresponding code of conduct on suppliers and setting supplier requirements in tendering processes. Such processes should also include supplier engagement and follow up activities to ensure that the practices reported are actually implemented.

It is important to focus on supply chain engagement and establishing due diligence management systems across the supply chain rather than outright banning of geographic sources (e.g. DRC) – which can create unintentional negative impacts for local communities (see Box 1 OECD vs Dodd-Frank Act and unintended negative consequences).

Recommendation: Consult with suppliers on developing cobalt sourcing standards and policies, engage the full supply chain to the extent possible

To maximize the uptake and success of a responsible cobalt sourcing system, Skånetrafiken should seek to understand their suppliers' willingness and feasibility (technological, financial, logistical) to gather information on cobalt sourcing from suppliers, conduct supplier engagement and capacity building, and comply with auditing. It is especially important to involve the smelters/refiners as a choke point.

Given the extensive initiative and access of LG Chem on Huayou Cobalt and CDM (both smelting and mining), the author recommends for Skånetrafiken to seek verification on whether LG Chem is indeed present on the supply chain. If so, the company may be a good starting point for working with smelters and refineries and boost engagement.

In an interview with Nobina (Kasskawa, 2019), it was also stressed that traffic authority buyers should ensure to "level the playing field" when establishing new supplier requirements, standards and codes of conduct, to ensure that all actors are subject to the same rules. The author recommends that further consultation with suppliers be conducted to better understand how this can be achieved.

Recommendation: Build buyer influence

The author recommends for this to be done by engaging with other buyers (i.e. traffic authorities) to collaborate and streamline policies, processes and standards in order to build unified standards in the industry in Sweden. Efforts can also be placed on standardizing information collection and tendering requirements/procedures.

Other recommendations

Finally, other recommendations include lobbying with national policymakers to drive regulatory change and build a policy incentive for the supply chain. At the same time, Skånetrafiken can explore the situation in the market for recycled cobalt and assess whether it is a viable option in line with the organization's bus electrification strategy in the future.

6 Conclusion

This study compiled the current situation on cobalt minerals in electrical vehicle batteries, mapped out Skånetrafiken's potential supply chain and analysed the adherence of tier-1 traffic operators to Skånetrafiken's code of conduct. While the findings of this study can potentially provide a good starting point for further work to ensure sustainable cobalt procurement in bus batteries, it is recommended that a more thorough and structured assessment be made of tier-1 compliance based on existing supplier audit tools. This can form the basis for further initiatives and engagement efforts to tackle sustainable cobalt sourcing.

The climate and local environmental benefits of electric mobility are significant and electromobility market will continue to grow. In the meantime, demand for conflict-free electric vehicles will also likely increase as public awareness grows. Therefore, working proactively to tackle conflict mineral issues in the cobalt mineral mining sector can shift electrification towards a fully sustainable, conflict-free path.

Given that cobalt has not yet been formalized as part of global or national conflict mineral regulations, value chain actors and buyers in the supply chain need to take initiative to engage



other actors to ensure that raw cobalt extraction is sustainable. This is where Skånetrafiken can play a valuable role.

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