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Short circuits

Exploring the broken links of mineral supply chain policies in the electric vehicle industry

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Photo: Forest Watch Indonesia (FWI)

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AidEnvironment is a not-for-profit foundation with 30 years of experience in sustainable value chain development, sustainability assessment, climate change, and ecosystem programs. AidEnvironment generates sustainability impacts in agricultural and forest landscapes across Asia, Africa, and Latin America. AidEnvironment - Not-for-profit sustainability strategy organisation

About Rainforest Foundation Norway:

RFN is a non-profit, non-governmental organization working towards the general objective where the world's large, contiguous rainforest areas are managed in ways that uphold biodiversity, forest ecosystem services and the human rights of indigenous and other forest-dependent peoples and communities. Established in 1989, RFN has over 30 years of experience working on rainforest protection and Indigenous Peoples and Local Communities rights across tropical forest landscapes, engaging with the public, private, and financial sectors. Rainforest Foundation Norway (regnskog.no)

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Executive Summary

Tropical rainforests and Indigenous lands are disproportionately impacted by mining activities. Between 2000 and 2020, 62% of the total direct deforestation related to mining occurred in tropical and subtropical rainforests, despite these areas only having 29% of the world's mining areas. Further, more than half of the minerals needed for the energy transition are located on or near the lands of Indigenous Peoples and local communities, and their extraction is often linked to conflicts and human rights violations.

The automotive industry is an important driver of mineral demand and has been linked to several negative social and environmental impacts of mining operations, including pollution, deforestation, and violations to the right to Free, Prior and Informed Consent (FPIC) of Indigenous Peoples. Increased mineral demand for electric vehicle (EV) production and electrification of the transportation sector exacerbates the risks of generating adverse impacts. Downstream companies have the leverage and responsibility to ensure that their raw material extraction avoids and minimizes negative impacts on people and nature. Introducing adequate due diligence policies and practices can help prevent and mitigate the risks linked to mineral extraction.

This report presents the first assessment of biodiversity and deforestation due diligence practices in mineral supply chains of automakers and EV battery manufacturers. It also examines Indigenous Peoples rights due diligence practices. The companies evaluated include eleven EV automakers (**BYD**, **BMW**, **Ford Motor**, **Geely**, **General Motors**, **Mercedes-Benz**, **Nissan Motor**, **Renault Group**, **Stellantis**, **Tesla**, and **Volkswagen**) and eight EV battery manufacturers (**CATL**, **Farasis Energy**, **LG Energy Solution**, **Northvolt**, **Panasonic**, **Samsung SDI**, **SK Innovation**, and **Sunwoda Electronic**).

The assessment was built upon several frameworks linked to responsible mineral sourcing and reporting, including the OECD Due Diligence Guidance for Responsible Business Conduct. The indicators of the assessment were grouped into three pillars. The first pillar examines companies' policies and commitments for biodiversity, deforestation, and Indigenous Peoples rights. The second pillar examines the implementation of those commitments, including risk assessment and risk management activities. The third pillar focuses on the transparency of the supply chain and reporting of its social and environmental performance.

Results show variation in the performance of companies, with no company being a clear leader across pillars. **BMW** is the best performing company in the policies and commitment pillar, while **Tesla** is the leader in the disclosure pillar and has overall the highest score. In general, automakers performed better than EV battery manufacturers. Out of the 19 companies examined, only seven automakers (**BMW**, **General Motors**, **Mercedes-Benz**, **Renault Group**, **Stellantis**, **Tesla**, and **Volkswagen**) and one EV battery manufacturer (**Samsung SDI**) have a commitment or policy to prevent deforestation from supply chains. None of the companies specify deforestation-free or biodiversity targets for their mineral supply chains. Regarding Indigenous Peoples rights and requirements to respect FPIC, only five companies incorporate FPIC as a requirement in their responsible sourcing policy or supplier code of conduct: **Tesla**, **General Motors**, **BMW**, **Samsung SDI** and **Mercedes-Benz**.

The report shows that environmental risks and impacts, such as deforestation and biodiversity loss, are overlooked in mineral due diligence practices, including risk monitoring and risk mitigation activities. Moreover, mineral supply chains policies and due diligence practices are not consistent between automakers and their EV battery suppliers. Remediation and compensation activities are also scarce across the companies assessed. While conflict minerals such as tin, tungsten, tantalum and gold (3TG) have received the most attention in due diligence practices, frontrunner companies already cover transition minerals (e.g., nickel, cobalt, copper, lithium).

To prevent and avoid adverse impacts on critical ecosystems, companies need to introduce clear and more ambitious biodiversity and deforestation-free commitments to their mineral supply chains. Companies also need to improve due diligence practices to prevent and mitigate adverse impacts on nature and Indigenous Peoples, including improving risk assessment and monitoring frameworks, as well as increase the remediation, compensation, and restauration activities when adverse social and environmental impacts do occur. Across companies, increased supply chain transparency and better disclosure of risks and impacts are necessary.

New and upcoming regulations introducing mandatory due diligence provide a unique opportunity to improve and enhance environmental and social due diligence practices, so as to better manage biodiversity and deforestation risks, and ensure the respect of Indigenous People's rights, including FPIC. Ensuring that the extraction of minerals needed for the energy transition avoids negative impacts on people and nature is essential to have a more responsible automotive industry and a clean and just energy transition.

Main results of the assessment					
(1) Policies & Commitments		(2) Implementation & Management		(3) Disclosure & Performance	
Company	Score	Company	Score	Company	Score
BMW	68 %	**BMW**	73 %	**Tesla**	50 %
Samsung SDI	67 %	**Mercedes-Benz**	73 %	**Volkswagen**	35 %
Mercedes-Benz	63 %	**Tesla**	73 %	**Stellantis**	35 %
General Motors	63 %	**Volkswagen**	70 %	**Samsung SDI**	35 %
Tesla	58 %	**Ford Motor**	70 %	**Ford Motor**	30 %
Volkswagen	53 %	**Stellantis**	60 %	**Mercedes-Benz**	25 %
Stellantis	43 %	**General Motors**	60 %	**General Motors**	25 %
Renault Group	38 %	**Samsung SDI**	58 %	**BMW**	20 %
LG Energy Solution	38 %	**LG Energy Solution**	58 %	**Renault Group**	20 %
CATL	38 %	**CATL**	55 %	**Nissan Motor**	20 %
Farasis Energy	28 %	**Renault Group**	53 %	**Northvolt**	20 %
Ford Motor	23 %	**Farasis Energy**	40 %	**Sunwoda Electronic**	20 %
SK Innovation	23 %	**Panasonic**	40 %	**LG Energy Solution**	15 %
Geely	22 %	**SK Innovation**	35 %	**CATL**	15 %
Nissan Motor	20 %	**Nissan Motor**	33 %	**Farasis Energy**	15 %
Northvolt	13 %	**Geely**	28 %	**Geely**	10 %
Sunwoda Electronic	13 %	**Northvolt**	25 %	**Panasonic**	5 %
Panasonic	10 %	**Sunwoda Electronic**	25 %	**SK Innovation**	5 %
BYD	8 %	**BYD**	15 %	**BYD**	0 %
Average	36 %	Average	49 %	Average	21 %

List of Abbreviations

3TG	Tin, tantalum, tungsten and gold
ASi	Aluminium Stewardship initiative
AFi	Accountability Framework initiative
CAHRA	Conflict Affected and High-Risk Area
EV	Electric Vehicle
FPIC	Free Prior and Informed Consent
IRMA	Initiative for Responsible Mining Assurance
ICE	Internal Combustion Engine
NPI	Net Positive Impact
NNL	No Net Loss
RMAP	Responsible Mining Assurance Process
RMI	Responsible Minerals Initiative
SBTN	Science Based Targets Network
TSM	Towards Sustainable Mining

Photo: Forest Watch Indonesia (FWI)

1. Introduction

Transitioning away from internal combustion engine (ICE) vehicles and electrifying the transportation sector is a necessary step for achieving the climate mitigation targets of the Paris Agreement. The transportation sector contributes with 15% of global greenhouse gas (GHG) emissions (IPCC, 2023). Projections by the International Energy Agency (IEA) indicate that the electric battery and plug-in hybrid vehicles fleet, currently totaling 40 million, must reach around 240 million by 2030 to meet the global climate goals of the Paris Agreement (IEA, 2024). The largest demand in EVs is expected to come from China, Europe, United States, India, and Japan. As the world shifts away from fossil fuels engines and towards the electrification of the transportation sector, mineral demand will increase. The associated expansion of extractive operations has the risk of creating detrimental impacts on biodiversity and land use (Giljum et al., 2022; Sonter et al., 2020).

Mining operations disrupt natural habitats, cause habitat loss, fragmentation, soil erosion, and diminish biodiversity by directly affecting plant and animal species, as well as the livelihoods of local populations. Tropical forests are the biome with the highest biodiversity and carbon values, and they are disproportionately impacted by mining activities. Between 2000 and 2020, 62% of the total direct deforestation related to mining occurred in tropical and subtropical rainforests, despite these areas only having 29% of the world's mining areas (WWF, 2023). The loss of forests creates significant GHG emissions, with approximately 10% of global GHG coming from deforestation alone (IPCC, 2019), and land use change is the most important driver of biodiversity loss (IPBES, 2022). To put this in context, total tropical primary forest loss in 2023 amounted to 3.7 million hectares, which produced 2.4 Gt of carbon dioxide emissions (WRI, 2024). This is roughly equivalent to the annual emissions of 570 million cars, more than double the number of cars on the road in the United States.

Mining activities required to meet the increasing demand for energy transition minerals also pose significant threats to Indigenous Peoples (IPs) and local communities. Local communities and Indigenous Peoples rights to live in a clean and healthy environment are jeopardized by mining activities, as shown by numerous cases of human rights and environmental abuses linked to mineral extraction (BHRRC, 2022). Further, more than half of the minerals needed for the energy transition are located on or near the lands of IPs and local communities (Owen et al., 2023), and are often linked to conflicts and human rights violations (Bebbington et al., 2018; Franks et al., 2014). It is therefore crucial that the rights of IPs and local communities, including the right to Free, Prior, and Informed Consent (FPIC) are respected and protected. Respecting FPIC of IPs and local communities will also allow the prevention and mitigation of important social and environmental risks.

After coal, the minerals with the strongest links to deforestation are gold, bauxite, iron ore, copper, manganese, nickel, zinc, silver, platinum, and cobalt (WWF, 2023). Out of those, bauxite, iron, manganese, and nickel ores stand out for being mostly mined in tropical or subtropical moist forests (Luckeneder et al., 2021). The automotive industry is an important user of these minerals. Bauxite and iron ore are used for the production of aluminum and steel found in vehicles, while nickel, copper, cobalt, manganese, and gold are used for electric vehicle (EV) batteries and other electronic components. This places the automotive industry as the second most important industry driving mining-related deforestation, only after the construction sector (WWF, 2023). Current projections for nickel, cobalt, and manganese indicate that the EV industry will be the main driver of increased demand in the coming decades (Figure 1).

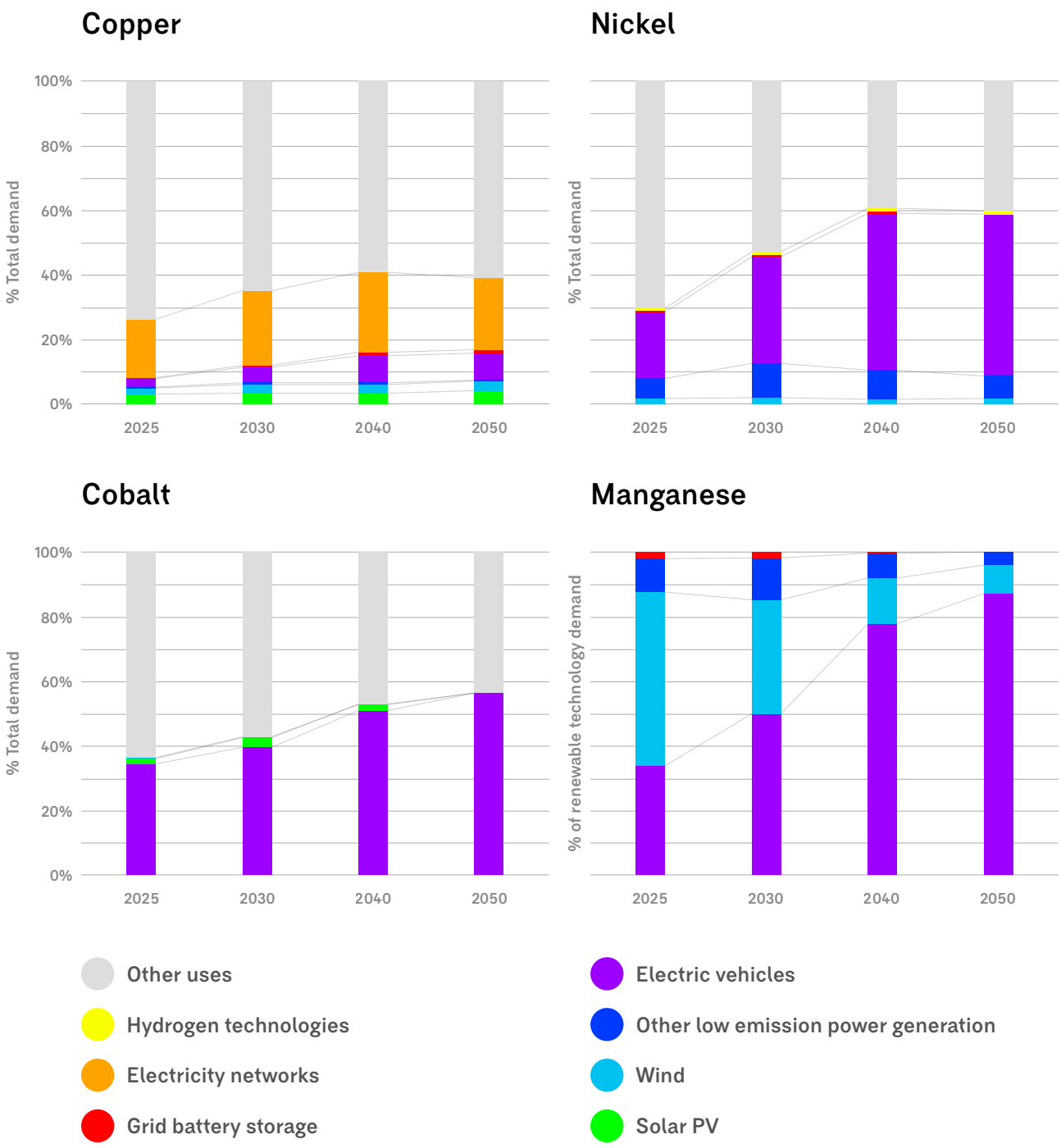


Figure 1. Projected demand of copper, nickel, cobalt, and manganese by different renewable technologies.

Note: Projections are from the International Energy Agency (IEA)'s Stated Policies Scenario: a scenario which assumes that all climate commitments made by governments and industries around the world as of the end of August 2023, including Nationally Determined Contributions (NDCs) and longer-term net zero targets, as well as targets for access to electricity and clean cooking, will be met in full and on time. https://www.iea.org/data-and-statistics/data-tools/critical-minerals-data-explorer

While EVs will help decarbonize the transportation sector, and EV adoption must continue to increase if we are to meet the goals of the Paris Agreement (IEA, 2024; Knobloch et al., 2020), there are ongoing concerns about the negative social and environmental impacts of the mineral demand linked to the automotive industry. Nickel, for example, has received increased public attention due to both its expected steep rise in demand from the EV industry, as well as the significant environmental and social impacts associated to its extraction, including deforestation and FPIC violations. Recent reports by Mighty Earth and Climate Rights International have linked these negative impacts to the value chains of automakers such as **Ford Motor**, **Tesla**, **BMW**, **Mercedes-Benz**, **Toyota**, **Volkswagen**, or **Hyundai** as well as EV battery manufacturers such as **CATL**, **LG Energy Solution**, or **Samsung**. Further, Bloomberg published an investigation in February 2023 exposing **Ford's** supply chain links to the negative impacts of bauxite mining in Brazil. In September 2022, Amazon Watch showed how **Tesla**, **Samsung**, **Volkswagen**, **Ford Motor**, and **General Motors** were supplied by gold refineries that were linked to illegal gold mining in Indigenous territories. Human Rights Watch and Inclusive Development International have shown human rights violations in the aluminum supply chains of many automakers. While these negative impacts are likely to be linked to more downstream users, the lack of transparency in mineral supply chains makes it hard to track impacts to other companies.

It is therefore crucial that companies take effective steps towards better managing the negative socio-environmental impacts underlying the exploitation, processing, and demand for their minerals. Failure to implement the necessary prevention and mitigation measures will carry reputational, financial, and legal risks as rightsholders, consumers, and investors become aware of the social and environmental risks and impacts of mineral extraction. One of the most important tools that companies can use to exercise their leverage and manage these risks is to have adequate and transparent due diligence systems in place. Adequate and transparent due diligence practices are even more important as they become mandatory in new regulations such as the EU Batteries Regulation or the forthcoming EU Corporate Sustainability Due Diligence Directive (CSDDD) (see Box 1).

This report examines current social and environmental due diligence practices of eight EV battery manufacturers (**CATL**, **Farasis Energy**, **LG Energy Solution**s, **Northvolt**, **Panasonic**, **Samsung SDI**, **SK Innovation**, and **Sunwoda Electronic**) and eleven EV automakers (**BYD**, **BMW**, **Ford Motor**, **Geely**, **General Motors**, **Mercedes-Benz**, **Nissan Motor**, **Renault Group**, **Stellantis**, **Tesla**, and **Volkswagen**). Adequate risk-based due diligence expects enterprises to identify, prevent, mitigate, and account for how they prioritize and address actual and potential impacts on people and the environment.

The assessment focuses on evaluating the due diligence practices on biodiversity and deforestation risks, as well as human rights risks, particularly those linked to Indigenous Peoples and local communities. Other environmental risks such as soil, water, or air pollution are not included. Similarly, other human rights risks such as forced or child labour, workers' rights, or health and safety, are not within scope of the analysis.

Box 1. Due Diligence tools and the EU Battery Regulation

In August 2023 the EU adopted the Batteries regulation, which introduces mandatory Due Diligence for EV batteries, for four raw materials: Cobalt, Natural Graphite, Lithium, Nickel. Companies operating in the EU will have to adopt and communicate battery due diligence policies aligned with international standards, and develop management systems in support of the policy, with a chain of custody or traceability system. In February 2025, the EU will publish the guidelines on the application of due diligence obligations in relation to the risk categories. The legislation includes due diligence obligations for risks to "**Community life, including that of indigenous peoples**", as well as risks related to "**Biodiversity, including damage to habitats, wildlife, flora and ecosystems**"

Due diligence is an on-going, proactive, and reactive process through which companies put in place systems and processes to make sure they are able to identify, manage and report on risks in their supply chain. The OECD Due Diligence process involves six steps[1]: (1) Embed responsible business conduct into policies and management systems, (2) Identify and Assess adverse impacts, (3) Cease, prevent and mitigate adverse impacts, (4) Track implementation and results, (5) Communicate how impacts are addressed, and (6) Provide for or cooperate in remediation when appropriate. Relevant international guidelines to build due diligence systems for mineral supply chains include:

- OECD Guidelines for Multinational Enterprises. Updated in 2023, the Guidelines express the shared expectations and principles for responsible business conduct, including Human Rights, Workers Rights, as well as Environment aspects. The Environment chapter (Chapter VI) recognizes how enterprises should avoid and address land, marine and freshwater degradation, including deforestation, in line with objectives of the UN Sustainable Development Goals, and the 2021 Glasgow Leaders' Declaration on Forests and Land Use which seek to halt and reverse forest loss and land degradation by 2030.

- Chinese Due Diligence Guidelines for Mineral Supply Chains. The Responsible Critical Mineral Initiative (RCI) and the China Chamber of Commerce of Metals, Minerals & Chemicals (CCCMC) published the guidelines in 2022. This Chinese Guidelines applies to all Chinese companies engaged in extracting, supplying, procuring, or processing of minerals in the mineral supply chain. The risks addressed in these guidelines are divided into two categories: Type 1 risks and Type 2 risks. The Type 1 risks refer to the risks of contributing to conflict and serious abuse of human rights. Type 2 risks refer to widely concerned environmental and social risks, including violations to the right to Free, Prior and Informed Consent (FPIC) of Indigenous Peoples, and failing to protect biodiversity.

- OECD Handbook on Environmental Due Diligence on Mineral Supply Chains. Published in 2023, the handbook provides practical support to enterprises on the implementation of due diligence for environmental risks, including water, soil, and air pollution, biodiversity loss, or waste management. Importantly, the handbook indicates that when mining operations occur in biodiverse areas, such as forests, wetlands or littoral zones, heightened environmental due diligence must be undertaken.

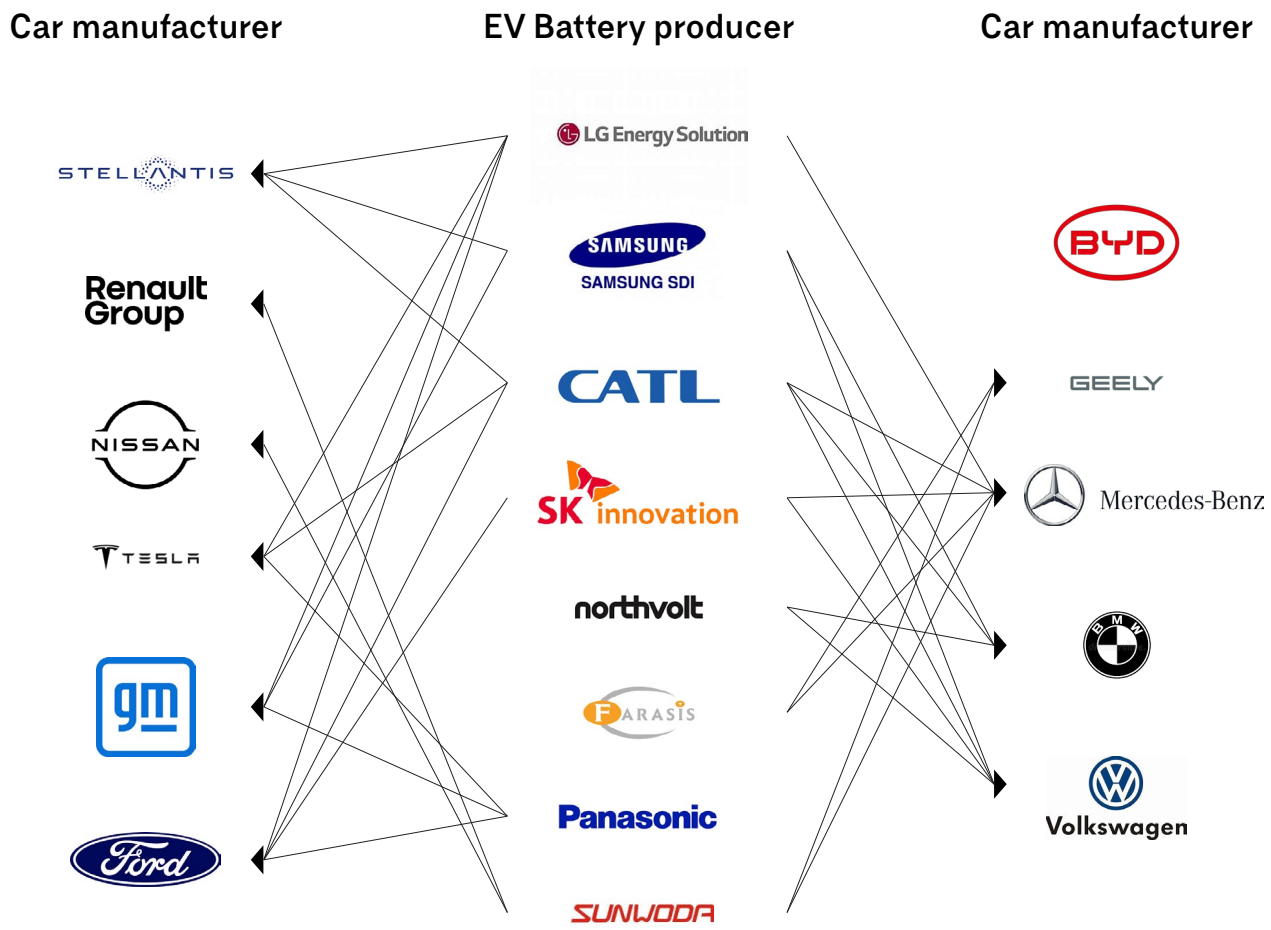
- OECD Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas. This guidance focuses on addressing risks related to i) any forms of torture, cruel, inhuman, and degrading treatment; ii) any forms of forced or compulsory labour, iii) the worst forms of child labour; iv) other gross human rights violations and abuses; v) war crimes or other serious violations of international humanitarian law, crimes against humanity or genocide. This guidance has been widely applied for minerals sourced from conflict areas, including tin, tantalum, tungsten and/or gold (3TG minerals), but does not address environmental risks or Indigenous Peoples rights risks.

1 OECD Due Diligence Guidance for Responsible Business Conduct - OECD

2. Methods

This assessment is the first to investigate biodiversity and deforestation policies in mineral supply chains of automakers, as well as the first to expand the assessment scope on biodiversity, deforestation, and Indigenous Peoples rights to relevant EV battery manufacturers. The analysis covered a total of 19 companies, selected considering both their overall share in the global sales of EV cars and EV batteries, as well as their geographical location. The top 5 EV battery manufacturers and EV automakers were included. **CATL** is the largest EV battery manufacturer, with approximately 34% of the global market in 2022, followed by **LG Energy Solutions** (14%), **BYD** (12%), **Panasonic** (10%), **SK Innovation** (7%), and **Samsung SDI** (5%)[2]. In addition, **Farasis Energy**, **Sunwoda Electronic**, and **Northvolt** were also included in the evaluation[3]. As for automakers[4], the top five manufacturers include **BYD** and **Tesla**, in first and second place respectively, followed by **Volkswagen**, **General Motors**, and **Stellantis**. These five companies are followed by **BMW**, **Geely**, **Mercedes-Benz**, **Renault Group**, and **Nissan** (see Appendix for company list with ISIN Codes).

Figure 2 Customer-supplier relationships between the companies included in the study. (Based on FactSet data and company reports).



2 Top 10 EV Battery Manufacturers in World by Market Share - Electric Vehicle Info (e-vehicleinfo.com)

3 Europe over-reliant on Chinese EV batteries, warns South Korea's SK On (ft.com)

4 The Largest EV Companies in 2023 | The Motley Fool

The scope of the assessment included conflict minerals (tin, tungsten, tantalum, and gold - 3TG) as well as other transition minerals (e.g., nickel, copper, cobalt or lithium). The indicators included in the assessment were based on several frameworks linked to responsible mineral sourcing and due diligence practices, including the OECD Due Diligence Guidelines for Responsible Business Conduct or the OECD Handbook on Environment Due Diligence in Mineral Supply Chains, mining standards such as the Initiative for Responsible Mining Assurance (IRMA), or the Lead the Charge Leaderboard. It also draws from target setting and reporting frameworks such as the Accountability Framework Initiative, Science Based Target Network (SBTN), and CDP Forests (See Box 2). The indicators were grouped into three distinct, yet interrelated pillars:

1. **Policies and Commitments:** This set of indicators focused on evaluating the companies' commitments and policies for responsible sourcing of minerals, with a particular focus on biodiversity, deforestation, Indigenous Peoples rights, and recycling of metals and/or minerals. An additional indicator was included to evaluate the extent to which biodiversity, deforestation, and Indigenous Peoples rights commitments go beyond applicable laws and regulations. Indicators in this pillar correspond to Step 1 of the OECD's Due Diligence (DD) guidelines, which includes embedding responsible business conduct into policies and management systems.

2. **Implementation and Management:** This set of indicators focused on how the company conducts risk assessment and risk management activities, including: risk identification and prioritization, auditing and monitoring of their supply chain risks and impacts, existence of a whistleblower or grievance mechanism to all stakeholders, and risk mitigation and remediation activities. Particular attention was given to whether companies identify, monitor, and mitigate biodiversity, deforestation, and Indigenous Peoples rights risks, as *stand-alone risks*. This pillar is associated with Step 2 of the OECD's DD guidelines of identifying and assessing risks of adverse impacts, Step 3 of ceasing, preventing ad mitigation adverse impacts, and Step 6 of providing and cooperating in remediation actions.

3. **Disclosure and Performance:** These indicators focused on the transparency in company reporting, such as the disclosure of the percentage of minerals that are traced and compliant with company policies, whether the company publicly discloses lists of suppliers or refiners of minerals, raw material origin, and publicly discloses grievance cases and third-party auditing reports. This pillar includes indicators to evaluate Step 4 and 5 of the OECD's DD guidelines, regarding tracking implementation and results and communicating how impacts are addressed.

Each pillar was awarded the same weight in the total score, while the number of points per indicator varied according to the aspects assessed and the level of detail included in each indicator. Partial points were awarded based on the fulfillment of different criteria within an indicator. The total possible score for the assessment amounted to 30 points (Table 1).

The indicators in the assessment were developed **to analyze companies' due diligence practices in relation to mineral sourcing, with a specific focus on biodiversity, deforestation, and Indigenous Peoples rights**. As such, the assessment **does not evaluate the actual impacts that the company causes, contributes, or is directly linked to**. Current levels of disclosure do not allow to make such an assessment. Furthermore, the current assessment does not include a detailed analysis on other environmental risks in mineral supply chains, including soil, water, or air pollution. Similarly, other serious human rights risks, such as forced or child labor, workers' rights, or health and safety, were not the focus of the analysis.

Table 1 – Indicators grouping, including the number of indicators per designated pillar and the total points attributable.

Category of indicators	Number of indicators	Points per indicator	Total points per section	Relationship to OECD 6-step Due Diligence
Governance and Policy/ Commitments (6 indicators)	1.1. Mineral coverage	1.5	10	Step 1
	1.2. Indigenous rights and FPIC	1.5		
	1.3. Deforestation	2		
	1.4. Biodiversity	2		
	1.5. Recycling	1		
	1.6. Beyond legal compliance	2		
Implementation and Management (7 indicators)	2.1. Stakeholder collaboration	1	10	Step 2, 3 and 6
	2.2. Risk assessment, environment	2		
	2.3. Risk assessment, social	1.5		
	2.4. Traceability systems	1		
	2.5. Grievance and remediation	1.5		
	2.6. Risk Mitigation	1.5		
	2.7. Auditing	1.5		
Disclosure and Performance (7 indicators)	3.1. Procurement compliance	2	10	Steps 4 and 5
	3.2.1 Traceability, performance	1.5		
	3.2.2. Traceability, disclosure	1		
	3.3. Supplier disclosure	2		
	3.4. Auditing disclosure	1		
	3.5. Grievance and remediation disclosure	1.5		
	3.6. Continuous improvement	1		
Total	20	30	30	

The assessment was done by reviewing publicly available information on company websites, to ensure transparency in the evaluation. The key documents assessed included company policies, statements, and commitments; Annual reports; Sustainability or ESG reports; Regulatory reports (i.e., Vigilance plan); Supplier Code of Conduct; Global Code of Conduct; Suppliers' Declaration of compliance; Procurement/Purchasing Guidelines; Suppliers' lists; Grievance/Whistleblower mechanisms; Website information (dedicated pages). Consultation with the companies was part of the evaluation. In total, 11 out of the 19 companies provided feedback to earlier versions of this assessment (see Appendix).

For each company, a company profile was generated. The company profile summarizes the results of the analysis and provides extra insight regarding relevant initiatives undertaken by the companies and any supply chain links, such as information on established partnerships and agreements with other companies. The Appendix provides details of the main periods of assessment and consultation of documents/sources for each of the companies, as well as of the revisions undertaken and company engagement. The full assessment matrix and company profiles is available in Rainforest Foundation Norway's website.

BOX 2. Relevant frameworks to set deforestation-free and nature targets in mineral supply chains

Science Based Targets for Nature (SBTN) is a global initiative that aims to establish clear and measurable objectives for the conservation and restoration of nature. It is an ongoing initiative that is developing technical guidance to develop land targets to protect and restore terrestrial ecosystems. It has developed a SBTN Materiality Screening Tool, which allows to screen sector-dependent environmental issues to be covered in upstream as well as own operations, as well as a SBTN High Impact Commodity List, which enables companies to identify the inputs and commodities to focus on during target setting. Currently, the SBTN High Impact Commodity List includes the following minerals: Copper, Gold, Iron, Lithium, Nickel, Bauxite/Aluminum.

Accountability Framework (AFi) is a collaborative initiative to accelerate progress and improve accountability for ethical supply chains in agriculture and forestry. AFi provides consensus-based definitions to guide the achievement of no-deforestation and no-conversion supply chains, as well as guidance as to how to set time-bound commitments for deforestation-free supply chains, including definitions for relevant cut-off dates, target dates and reference dates. AFi also offers step-by-step guidance on how to determine the most appropriate monitoring strategies depending on whether the commodity is directly or indirectly sourced, and the level of traceability. While it is currently used for companies and commodities in the agricultural and forestry sector, the guidance is not commodity-specific, and it is applicable to all geographies.

CDP Forests offers general reporting and target setting frameworks for companies, in the areas of net-zero, deforestation-free, water and plastic. Companies can disclose their environmental information through CDP's corporate questionnaires. Their disclosure framework includes Metals and mining sector as well as automakers and other Transport Original Equipment Manufacturers (OEMs). The disclosure framework on forests is focused on four key forest-risk commodities: timber, cattle products, soy, and palm oil. Companies with activities that include metals or coal mining, metal smelting and refining activities respond to a different set of forests-related questions that include the management of biodiversity impacts, and risks and opportunities related to biodiversity (including No Net Loss commitments, no go areas, etc.).

Photo: Forest Watch Indonesia (FWI)

3. Results

In the following section, we first present the overall findings of the assessment, before delving into each of the three pillar-specific results: policies and commitments, implementation and management, and disclosure and performance.

3.1 Overall findings

Table 2 summarizes the scores obtained for each of the companies in the assessment. Percentage scores ranged from 60%, obtained by **Tesla**, to 8%, obtained by **BYD**. The highest score on the 'Policies and Commitments' pillar was 68%, achieved by **BMW**, closely followed by **Samsung SDI** (67%). In turn, the highest score on the 'Implementation and Management' pillar was 73% and was shared by **Mercedes-Benz**, **Tesla** and **BMW**, followed closely by **Volkswagen** and **Ford**, with 70%. For the 'Disclosure and Performance', **Tesla** has a clear advantage, with 50% in the overall score, while the second best, **Volkswagen** , **Samsung SDI** and **Stellantis**, have a score of 35%.

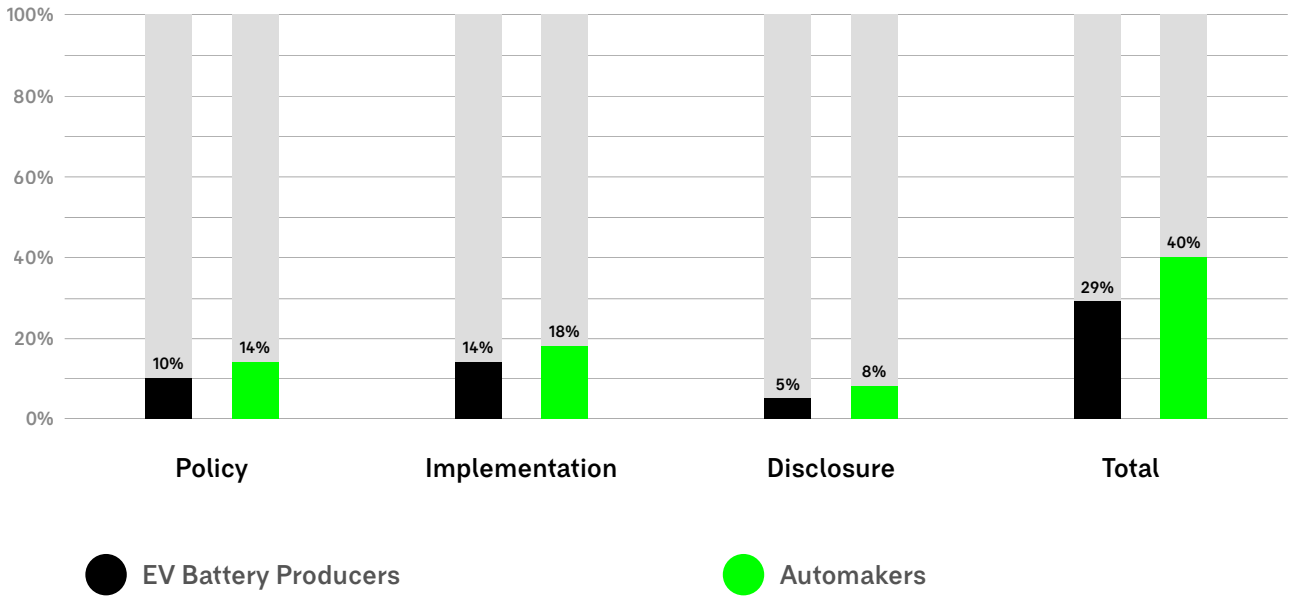
Overall, automakers performed better than EV battery manufacturers: the average score of automakers was 40%, while EV battery manufacturers are more than 10 percentage points behind, with 29% on average. The largest difference between the automakers and the EV battery manufacturers is in the policies and implementation, automakers having an average score of 4% points higher than EV battery manufacturers (Figure 3).

The results show that there is variation in the performance of companies, with no region being a clear leader or laggard. US-based **Tesla** is the best performer, followed by European manufacturers like **Mercedes-Benz**, **BMW** and **Volkswagen**. South-Korean **Samsung SDI** is the top performing EV battery company. **LG Energy Solution** is the second-best performing EV battery manufacturer and is closely followed by the largest battery manufacturer **CATL**. While the Chinese automakers included in this assessment (i.e., **Geely** and **BYD**) are lagging behind in responsible sourcing and due diligence policies, they remain the leaders in the proportion of EV sales and thus in the transition towards the electrification of the transport sector (see Box 3). Improvements in the due diligence policies and practices of these companies has the potential to significantly improve the performance and positive impact of the EV industry.

Table 2 – Scores and percentages obtained by each company in each of the three pillars of the assessment and in total.

All Companies	(1) Policies & Commitments	(2) Implementation & Management	(3) Disclosure & Performance	Total
Tesla	58 %	73 %	50 %	60 %
Mercedes-Benz	63 %	73 %	25 %	54 %
BMW	68 %	73 %	20 %	54 %
Samsung SDI	67 %	58 %	35 %	53 %
Volkswagen	53 %	70 %	35 %	53 %
General Motors	63 %	60 %	25 %	49 %
Stellantis	43 %	60 %	35 %	46 %
Ford Motor	23 %	70 %	30 %	41 %
Renault Group	38 %	53 %	20 %	37 %
LG Energy Solution	38 %	58 %	15 %	37 %
CATL	38 %	55 %	15 %	36 %
Farasis Energy	28 %	40 %	15 %	28 %
Nissan Motor	20 %	33 %	20 %	24 %
SK Innovation	23 %	35 %	5 %	21 %
Geely Automobile	22 %	28 %	10 %	20 %
Northvolt	13 %	25 %	20 %	19 %
Sunwoda Electronic	13 %	25 %	20 %	19 %
Panasonic	10 %	40 %	5 %	18 %
BYD	8 %	15 %	0 %	8 %
Average	36 %	49 %	21 %	36 %

Figure 3- Contribution of each of pillar to the total score obtained (in percentage) of automakers and EV battery manufacturers



Box 3. Company performance in terms of EV production

EVs reduce GHG emissions in the long term as compared to Internal Combustion Engines (ICE) vehicles and it is a key technology to decarbonize road transport (Knobloch et al. 2020). According to the International Energy Agency (IEA), EV sales need to replace those of ICE at the same rate of growth as experienced in recent years (2021-2023) to be on a path in line with the Net Zero Emissions by 2050.

Electric cars are getting cheaper as competition intensifies, but they remain on average more expensive than ICE cars. A rapid transition to EVs and away from ICEs will require bringing to market more affordable models. Ambitious government policies and incentives to promote EV take-up will be critical steps to reduce emissions from the transportation sector.

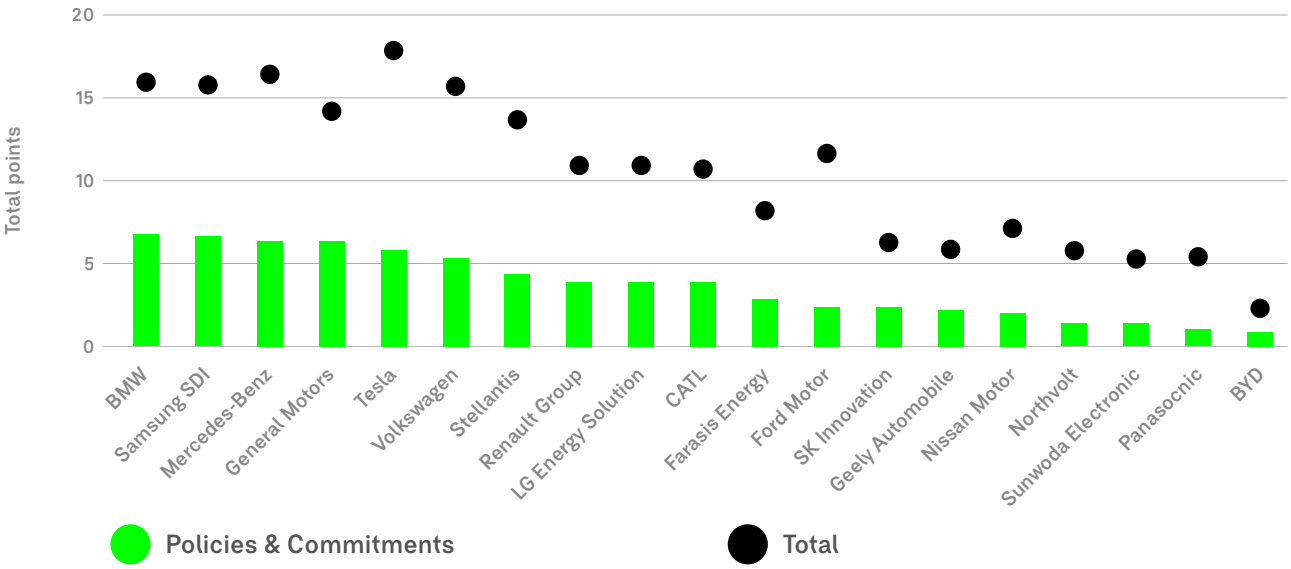
How are different automakers performing on their electrification pathway? Currently, **Tesla** is the only company that produces 100% EVs. After **Tesla**, Chinese companies are leaders in the proportion of EV car sales. Almost half of **BYD**'s (47%) car sales are from EVs, and in 2023 it surpassed **Tesla** as the largest seller of EVs worldwide. A total of 37% and 27% of the sales of **SAIC** and **Geely** are from electric cars. German automakers follow behind, **BMW** leading amongst them with 15%, and **Mercedes-Benz** and **Volkswagen** both with 10%. **General Motors** generates 13% of their car sales from EVs. Other major manufacturers continue to have less than a tenth of their sales as EV, including **Renault Group** (7%), **Stellantis** (7%), **Nissan** (7%), and **Ford Motor** (3%).

Sources: Electric vehicles - IEA, Global EV Outlook 2024 (windows.net), Lead the Charge, Knobloch et al. (2020)

3.2 Policies and Commitments

The companies with the best performance in the Policies and Commitments pillar are **BMW** (68%) and **Samsung SDI** (67%), followed by **Mercedes-Benz** and **General Motors**, both of them obtaining a score of 63%. They are followed by **Tesla** and **Volkswagen**, who share the fourth and fifth place with a total score of 58% and 53% respectively. **Panasonic** and **BYD** have the lowest performance, with 10% and 8% performance (Figure 4). Below we explain some of the main results obtained for key indicators in the pillar.

Figure 4. Total scores obtained for the pillar 'Policies and Commitments'



Coverage of minerals in Responsible Sourcing commitments

All companies have either a due diligence policy or a commitment that includes responsible sourcing of minerals. However, these commitments vary in scope and coverage, and not all are incorporated into responsible sourcing requirements. All companies have commitments or public statement for, at a minimum, responsible sourcing of conflict minerals, which cover tin, tantalum, tungsten, and gold (3TG). These commitments often refer to the OECD's Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (CAHRAs). **Sunwoda Electronic**, **Farasis Energy**, **Northvolt**, **Nissan**, **Renault Group**, **Panasonic** and **BYD** have commitments only as they relate to minerals sourced from CAHRAs and the 3TGs. The rest of the companies (10 out of the 19 examined) extend responsible sourcing commitments to additional geographical regions or raw materials.

Respecting the Free, Prior and Informed Consent of Indigenous Peoples and Local Communities

A total of nine companies mention the need to respect the free, prior and informed consent (FPIC) of Indigenous Peoples, either referencing FPIC in general, or as stated in the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) or with reference to the ILO Convention 169 on Indigenous and Tribal People[5]: **CATL**, **Farasis Energy**, **Samsung SDI**, **BMW**, **Geely**, **General Motors**, **Mercedes-Benz**, **Renault Group**, and **Tesla**. Of those, only five incorporate FPIC as a requirement in their responsible sourcing policy or supplier code of conduct: **Tesla**, **General Motors**, **BMW**, **Samsung SDI** and **Mercedes-Benz**, while only three of those (**Samsung SDI**, **BMW**, **General Motors**) mention as well the UN Declaration on the Rights of Indigenous Peoples in their supplier code of conduct. **BMW** states in their Supplier Code of Conduct that "*the rights of indigenous peoples and local communities shall be respected, promoted and protected throughout the supply chain in accordance with the 'UN Declaration on the Rights of Indigenous Peoples*". Out of the 19 companies examined, 10 companies do not mention FPIC (5 EV battery manufacturers and 5 automakers): **LG Energy Solution**, **Northvolt**, **Panasonic**, **SK Innovation**, **Sunwoda Electronic**, **Nissan Motor**, **BYD**, **Ford Motor**, **Stellantis** and **Volkswagen**.

Deforestation commitments

Companies were evaluated on whether they had general and mineral-specific deforestation-free commitments and targets. Only seven automakers have deforestation-related policies or commitments: **BMW**, **General Motors**, **Mercedes-Benz**, **Renault Group**, **Stellantis**, **Tesla**, and **Volkswagen**. EV Battery manufacturers are significantly lagging in deforestation commitments, with **Samsung SDI** being the only with deforestation commitments. The most ambitious commitments include avoiding conversion of 'natural habitats'[6] or 'natural forests'[7]. **BMW** and **Stellantis** are the companies with the most ambitious deforestation commitments. The **BMW** Group is "*committed to halting deforestation and the conversion of natural ecosystems in supply chains*" and clearly states in their supplier code of conduct that they expect their suppliers to "*protect natural ecosystems and not to contribute to the changing, deforestation, or damage of natural woodland and other natural ecosystems*". They further state that "*where applicable, the guidelines of the High Conservation Value Resource Network (HCV) and the High Carbon Stock Approach (HCSA) are to be applied*". However, they provide no further details on to the applicability of this commitment in terms of commodities, cut-off dates or target dates.

Stellantis also sets ambitious expectations on suppliers by introducing a general no-deforestation

5 The ILO Convention No. 169, which is legally binding for countries that have ratified it, requires State Parties to consult with indigenous peoples with the objective of reaching agreement or consent on proposed measures (see Article 6). ILO Indigenous and Tribal People Convention (No. 169) is ratified by 24 countries, mostly in Central and South America: Ratifications of ILO conventions: Ratifications by Convention.

6 The International Finance Corporation (IFC) Performance Standard 6 defines natural habitats as "areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition". Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources | International Finance Corporation (IFC)

7 As per Accountability Framework definitions: Definitions (English) - Accountability Framework (accountability-framework.org)

requirement for its suppliers through its Responsible Purchasing Guidelines. In their guidelines, **Stellantis** requires suppliers to map their supply chain from the origin of the raw material (where they recognize the mine as a possible site related to deforestation) and to forbid any value chain that would involve deforestation or land conversion. Additionally, **Stellantis** requires suppliers to implement an anti-deforestation policy with a time-bound commitment. With this commitment **Stellantis** states that it "*engages its suppliers globally to set out appropriate monitoring, traceability and action plans related to efforts to avoid deforestation*".

Tesla refers to deforestation in a more general sense, stating in its responsible sourcing policy that **Tesla** will not "*contribute, facilitate or tolerate serious negative/adverse impacts on the environment and biodiversity*", including an explicit mention to deforestation. However, it does not specify what type of deforestation is considered as '*serious negative/adverse impacts*' or to which ecosystems this commitment applies (e.g., natural ecosystems, natural forests, High Carbon Stock areas, Key Biodiversity Areas, Intact Forest Landscapes). **Renault Group** includes halting deforestation as a measure to help the company achieve its goal of carbon neutrality, and it is part of their due diligence risk assessment, but the group has no deforestation policy with respect to mineral supply chains nor includes it in a responsible sourcing policy or supplier code of conduct.

General Motors, **Volkswagen**, **Mercedes-Benz**, and **Samsung SDI** have deforestation policies that emphasize preventing deforestation and/or ecosystem conversion in accordance with applicable laws (i.e., illegal deforestation), and they all include this requirement in a responsible sourcing policy or supplier code of conduct. For example, **General Motors**'s supplier code of conduct indicates *"Suppliers should also protect ecosystems, especially key biodiversity areas, impacted by their operations, and avoid illegal deforestation in accordance with international biodiversity regulations, including the IUCN Resolutions and Recommendations on biodiversity*". **Mercedes-Benz** asks suppliers to "*ensure that its own business activities do not contribute to or benefit from the illegal conversion of natural ecosystems. This also applies to illegal deforestation*". The company further expects suppliers to prepare sourcing guidelines in accordance with the requirements of the Accountability Framework Initiative (AFi) and specifies that in cases where conversion of natural forests is not avoided, the supplier should adopt restoration and/or compensation measures.

None of the companies specified which high-risk minerals are linked to their deforestation commitments (e.g., iron ore, bauxite, copper, manganese, or nickel), or the time-bound targets or geographical areas expected to meet those commitments.

Biodiversity commitments

In terms of broader biodiversity commitments, most companies include a biodiversity commitment or recognize 'biodiversity' as an issue in their due diligence management systems. Biodiversity commitments considered for the evaluation included Net Positive Impact or No Net Loss commitments, adherence to the mitigation hierarchy approach, or avoiding sourcing or extracting from World Heritage Sites, protected areas, Intact Forest Landscapes, Key Biodiversity Areas, or other natural or critical habitats (e.g., wetlands, peatlands, grasslands). As with deforestation, time bound targets to monitor and track these commitments were expected (including baseline and targets dates).

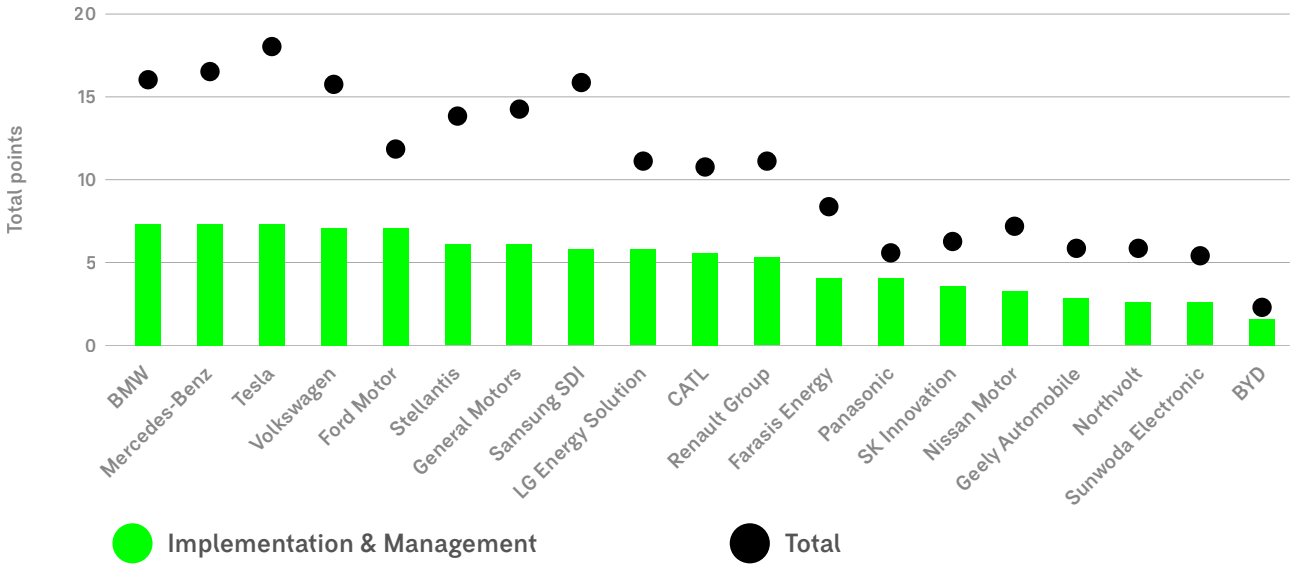
Only seven companies have biodiversity commitments in their responsible sourcing policy or supplier code of conduct: **Tesla**, **Mercedes-Benz**, **General Motors**, **BMW**, **Volkswagen**, **Samsung SDI**, **LG Energy Solution**. Companies that have specific commitments either reference avoidance of key biodiversity areas (i.e., **Samsung SDI**, **General Motors**), or others mention avoiding World Heritage Sites and protected areas in their due diligence policy (i.e., **CATL** and **Farasis Energy**), as the priority for their biodiversity commitments. .

Samsung SDI indicates in its supplier code of conduct that "*The Suppliers shall also protect ecosystems, especially key biodiversity areas, impacted by their operations, and avoid illegal deforestation in accordance with international biodiversity regulations, including IUCN Resolutions*". **BMW**, **Samsung SDI**, **Volkswagen**, **Northvolt**, and **Renault Group** have a mineral-specific commitment, indicating exclusion of deep-sea raw materials from their products, expecting their suppliers to do the same. Similar to the indicator on deforestation, none of the companies have mineral specific, time-bound commitments for their mineral supply chains.

3.3 Implementation and Management

The best performing companies in the Implementation and Management pillar were **Mercedes-Benz**, **Tesla** and **BMW** (73%), followed by **Volkswagen** and **Ford Motor** (with 70%). Of the EV Battery manufacturers, **Samsung SDI** and **LG Energy Solution** have a tie at 58% (Figure 5). Below we highlight scores obtained for indicators related to risk identification and mitigation strategies, as well as the remediation activities in case of adverse/negative impacts or non-compliance from suppliers.

Figure 5. Total scores obtained for the pillar 'Implementation and Management'



Monitoring of Indigenous People's rights, Biodiversity or Deforestation risks

To have full score in the risk identification strategy it was expected to go beyond supplier self-assessments. For example, while many companies are part of Drive Sustainability[8] (**BMW**, **Ford Motor**, **Geely**, **Mercedes-Benz**, and **Volkswagen**), and the supplier questionnaires include questions related to biodiversity/deforestation as well as Indigenous Peoples rights, this was not considered sufficient to have a full score. Overall, we found no clear risk monitoring and assessment strategies for FPIC or the rights of Indigenous Peoples in any company. Adequately monitoring FPIC and community engagement is important as companies need to recognize that FPIC is an ongoing process throughout mining operations. While **Mercedes-Benz**, **BMW**, **Renault Group** and **Volkswagen** include "*Community and indigenous peoples rights*" or "*Threats to Indigenous people and communities*" as a salient risk area, it is not clear how the risk of FPIC violation is monitored in the supplier base or prioritized for each mineral.

8 Drive Sustainability is a partnership of automotive companies working towards improving both their own performance and that of their supply chain by integrating sustainability in the overall procurement process. https://www.drivesustainability.org/vision-and-mission/

Similarly, there was no clear risk assessment and monitoring strategies for biodiversity or deforestation in mineral supply chains. Most companies mention environmental risks in a general way, with no guidelines on what constitutes the 'red flags' for adverse environmental (including biodiversity and deforestation) impacts that will justify enhanced due diligence and risk prioritization. While **Renault Group** and **BMW** recognize biodiversity as a salient risk in their raw materials analysis but does not describe any monitoring strategy or the 'red flags' used for prioritization of risk mitigation activities. **Volkswagen** mentions deforestation risk in its Raw Material Report, but only as it relates to leather. **Mercedes-Benz** mentions environmental risks as a salient risk, but only in relation to impacts on human rights, rather than including environmental risks in general and/or mentioning deforestation and biodiversity as a separate risk category.

Risk mitigation, prevention, and auditing

Most companies mention general actions to be taken in case of non-compliance with their policies on conflict minerals. The most frequent mineral-specific prevention and mitigation measures are related to 3TG minerals and cobalt, and include requesting, expecting, or encouraging conformance to the Responsible Mining Assurance Program (RMAP) assessments of the Responsible Minerals Initiative (RMI). Most companies are part of the RMI, except for **BYD**, **CATL**, **Farasis Energy**, **Northvolt**, **Sunwoda Electronic**, **Geely**, and **Renault Group**.

Explicit mention of mitigation measures for minerals other than the 3TGs (e.g., nickel, lithium, graphite, manganese or copper) are lagging behind, and few companies report on them. The most notable exceptions are **Volkswagen**, **Tesla**, and **Mercedes-Benz** which in their raw materials report or impact report have separate sections for transition minerals and metals (including nickel, cobalt, lithium, but also copper or aluminum).

In terms of risk mitigation actions, very little was specified and reported in terms of the mitigation strategies for environmental (including deforestation and biodiversity risks) and Indigenous rights risks. The OECD Handbook on Environmental Due Diligence for Mineral supply chains highlights that risk prevention and mitigation actions on biodiversity and/or deforestation include using earth observation tools to monitor impacts, ceasing illegal activities, rehabilitating and restoring affected areas, ensuring Environmental Impact and Social Assessments (ESIAs) undertaken to international standards, and refers to the International Finance Corporation (IFC) Performance Standard 6 on Biodiversity.

The most common cross-cutting prevention and mitigation measures is asking for auditing (e.g., with RCS Global). A total of three companies do not mention third party audit reports as a risk mitigation measure (**BYD**, **Geely** and **Sunwoda Electronic**), and six companies do not clearly disclose who is the third-party auditor in their supply chains: **CATL**, **Farasis Energy**, **Northvolt**, **Panasonic**, **Nissan Motor** and **Renault Group**. Only **BMW**, **Ford Motor**, **Mercedes-Benz**, **General Motors**, **Tesla**, and **Volkswagen** explicitly mention conducting third-party audits with mining standards that include Indigenous Peoples and biodiversity criteria, such as the- Initiative for Responsible Mining Assurance (IRMA), Copper Mark, Towards Sustainable Mining (TSM), Responsible Minerals Initiative (RMI) ESG Standard, or the Aluminum Stewardship Initiative. There are however important variations in the scope and performance of these standards, in terms of transparency, multistakeholder participation, and quality of the audits (see 'The way forward' section of this report for a more detailed discussion on the standards).

Grievances and Remediation

Grievances and whistleblowing mechanisms are important tools for risk prevention, mitigation, and remediation activities. All companies have public grievance or whistleblowing tools in place except for **BYD**, **SK Innovation**, and **Sunwoda Electronic**. Most of the grievance mechanisms, however, are general mechanisms that can be used for all kinds of complaints (both internal – for employees, as well as external stakeholders). To have a good scoring, it was necessary to disclose the basic procedural steps by which the grievances were processed. Only

eight companies have a mineral-specific or supply chain-specific grievance mechanism (**CATL**, **Farasis Energy**, **LG Energy Solution**s, **Samsung SDI**, **BMW**, **Ford Motor**, **Tesla**, and **Volkswagen**). One of the best practices for grievance and whistleblowing mechanism includes having a third party operating the mechanism (e.g., **Panasonic** or **Renault Group**).

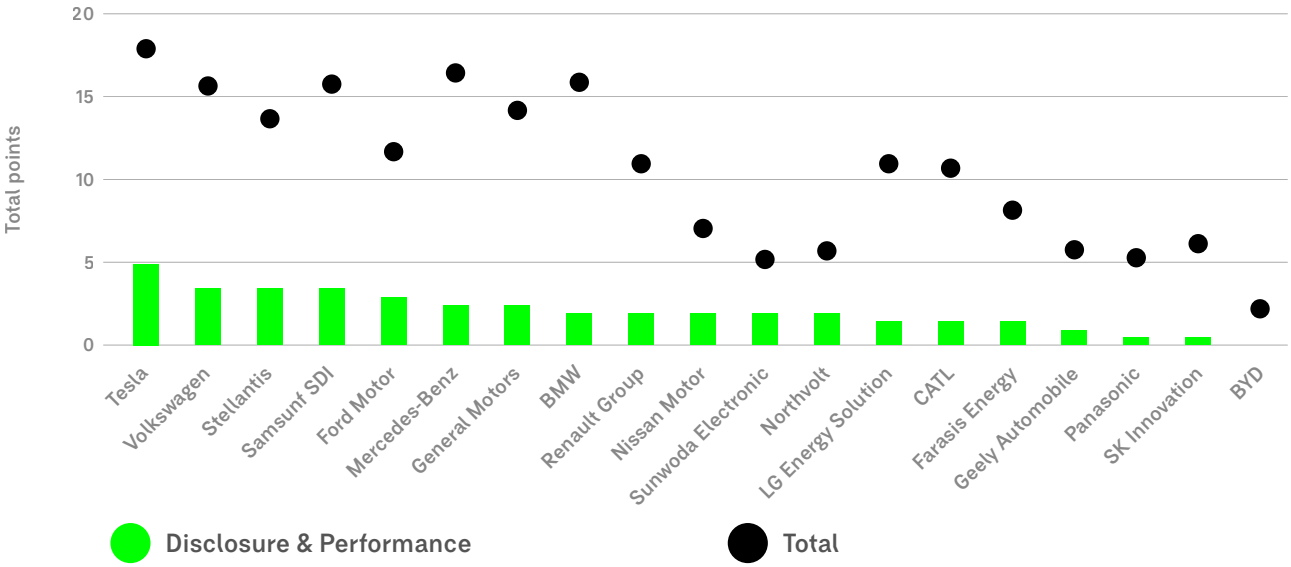
Remediations for affected stakeholders or for adverse environmental impacts is one of the overall low scoring indicators across companies. Remediation is here understood as the concept which goal is "*to restore individuals or groups that have been harmed by a business's activities to the situation they would have been in had the impact not occurred. Where this is not possible, it can involve compensation or other forms of remedy that try to make amends for the harm caused*"[9]. This should not be confused with other forms of compensation that rather consist of "*actions to prevent a non-compliance from recurring*" (and thus classify as risk mitigation actions). Only three companies had more concrete references to this type of remediation process (**Northvolt**, **BMW**, and **General Motors**).

3.4 Disclosure and performance

In general, all companies did worse in the disclosure and performance pillar compared to the other two pillars. Among other things, indicators in this pillar evaluated the mineral-specific disclosure related to the percentage of minerals that can be traced (including chain of custody) by the company to the smelter or refiner level, the percentage of minerals that comply with Indigenous rights, deforestation, or biodiversity policy, the disclosure of audit findings and reports, and the disclosure of suppliers, at the smelter/refiner level or beyond.

Tesla was the clear leader, with a 50% score, as it reports on the percentage of minerals that it directly procures, as well as the suppliers, with audit status and locations. The second best is **Stellantis**, **Volkswagen**, and **Samsung SDI** (35%), followed by **Ford Motor** (30%). Despite having overall good scores in both the Policies and Commitments and the Implementation and Management pillars, **BMW**, **CATL**, and **LG Energy Solution** stand out for having an overall lower score in their disclosure. (Figure 6).

Figure 6. Total scores obtained for the pillar 'Disclosure and Performance'



9 Remediation and grievance mechanisms (businessrespecthumanrights.org)

Supply chain performance and transparency

Only five companies report on the level of compliance (based on audits) achieved in terms of percentage of responsible procurement of minerals regarding the 3TGs: **Samsung SDI**, **Ford Motor**, **General Motors**, **Volkswagen**, and **Tesla**. None of the companies report on the number or proportion of suppliers who comply with other human rights (including Indigenous Peoples rights) and biodiversity or deforestation policies or commitments. This is most likely explained by the current lack of adequate implementation of environmental and Indigenous rights due diligence policies in mineral supply chains.

In terms of supplier disclosure, the companies listed in U.S. stock exchanges (e.g., **Ford Motor**, **General Motors**, **Tesla**) are required to list their 3TG smelters and refiners included in their supply chains to the U.S. Securities and Exchange Commission to comply with the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. **Volkswagen** also discloses 3TG and cobalt suppliers, and **Sunwoda Electronic** leads in supplier disclosure as it is the only EV Battery manufacturer who discloses a list of 3TG suppliers, and cobalt. **Samsung SDI**, **Nissan**, **Renault**, disclose only suppliers of cobalt (not necessarily a complete list), while **Tesla** and **Stellantis** disclose suppliers of transition minerals (e.g., nickel, cobalt, lithium)

Tesla discloses the percentage of minerals that are sourced directly vs. indirectly for some of their supply chains, stating in their impact report that "*45% of nickel is sourced directly from producers, more than 55% of cobalt is sourced directly, and more than 95% of lithium is sourced directly*". Other companies, like **BMW** or **Stellantis**, or **Mercedes-Benz** show evidence of taking additional measures to trace minerals like lithium, cobalt, or bauxite/aluminum.

Disclosure of grievances and audits

With respect to the disclosure on the grievances received, only seven companies report on their grievances, although with different levels of detail: **Farasis Energy**, **Mercedes-Benz**, **General Motors**, **Renault Group**, **Nissan**, **Stellantis**, and **Volkswagen**. **Volkswagen** is the company with the best score, as the Sustainability report provides a breakdown of the complaints received through the grievance mechanism for its supply chains, disclosing the number of reports that were linked to social, compliance, environment, or cross-topic issues; the number of reports that were linked to direct suppliers and those that weren't; and the number of reports per region.

4. The way forward

4.1 Improving due diligence practices

The analysis shows that although many companies have incorporated due diligence practices and policies, there are significant differences between companies' performances. The most frequently covered minerals for due diligence practices are conflict-related minerals, including 3TG and cobalt. Legislations like the United States Dodd-Frank Act and the EU Conflict Mineral Regulation, while important milestones to address human rights risks in responsible mineral governance, have focused on 3TG and minerals sourced from CAHRA's, reinforcing this industry trend. The EU Batteries regulation as well as the EU Corporate Due Diligence Directive will significantly expand the scope of minerals as well as the risks to be included in due diligence practices, providing an opportunity for industry coordination and collaboration.

While there is overall relatively good alignment in the human rights policies across automakers and EV battery manufacturers, there are important gaps between the environmental due diligence policies and commitments of automakers and those of EV battery manufacturers. Environmental due diligence, particularly related to biodiversity and deforestation, as well as the rights of Indigenous Peoples, including the right to FPIC, need to be better incorporated along mineral supply chains. Downstream companies should evaluate the due diligence practices and policies of their upstream suppliers on those issues more carefully, up to control points such as smelters and refiners.

Across companies, there is an opportunity to expand the scope of responsible sourcing requirements and due diligence practices for other minerals, including transition minerals such as nickel, cobalt, and lithium. Such minerals have been flagged as a source of socio-environmental concern (BHRRC, 2022) but overall industry performance and mineral supply chain due diligence remains low. There is also significant scope for improvement in terms of increased disclosure and transparency of supply chain actors, as the EU Batteries Regulation as well as the Inflation Reduction Act (IRA) of the United States introduce requirements for a chain of custody or traceability systems for key minerals. Increased mapping – and its associated disclosure – of supply chain actors will facilitate improvements in due diligence practices, including identification of risks and impacts.

Many companies mention third-party audits while very few report on the results of third-party auditing. While third-party auditing and assurance schemes are a step in the right direction towards more responsible supply chains, there are significant differences across schemes in terms of their transparency and effectiveness to ensure the best social and environmental practices. Evaluations of third-party mining standards by the Lead the Charge Network, Mercedes-Benz or Germanwatch show that common limitations across standards such as the Copper Mark, Responsible Minerals Initiative (RMI), Towards Sustainable Mining (TSM), International Council on Mining and Metals (ICMM) Performance expectations, is that they lack of robust multi-stakeholder governance, flawed or weak audit processes (such as no on-site visits or no inclusion of affected rightsholders), low transparency, or weak assessment criteria.

4.2 Addressing Indigenous Peoples and local communities' rights risks

The results show that there is ample opportunity for companies along the EV mineral supply chains to strengthen their commitment to implement and respect the Free, Prior, and Informed Consent (FPIC) of Indigenous Peoples and local communities,

including the right to withhold consent[10]. This commitment should go beyond demonstrating compliance with applicable national laws and regulations on Indigenous Peoples rights. Companies should commit to respect Indigenous Peoples rights as indicated in the UN Guiding Principles on Business and Human Rights and the UN Declaration on the Rights of Indigenous Peoples (UNDRIP).

Clearly communicating Indigenous rights and FPIC to upstream suppliers is important given that the battery mineral sector's approach to FPIC is not sufficiently ready under current company policies (Sellwood et al., 2023). More companies need to adopt strong FPIC policies that unequivocally avoid proceeding with a project if Indigenous peoples withhold consent. Companies should also increase their efforts and introduce clear strategies and frameworks for *monitoring and mitigating* Indigenous Peoples and local communities' rights risks, as well as cooperate with suppliers to introduce adequate remediation and compensation actions when they have caused, contributed, or are directly linked to adverse social and environmental impacts of raw material extraction.

A common finding across companies is that there is very little disclosure of the actions taken towards remediation of affected rightsholders in their mineral supply chains. Compensation to affected rightsholders, including people who are physically or economically displaced, and an effective grievance redress mechanism that can lead to fair and equitable remediations are essential to mitigate adverse social and environmental impacts of raw material extraction.

While third party auditing and assurance standards can help for the due diligence of Indigenous Peoples and local communities rights, the Lead the Charge assessment of third-party assurance and accreditation schemes indicates that currently only the IRMA standard is contingent on FPIC, and that the Copper Mark includes references to the need to respect the right to FPIC. TSM indicates that mines should aim to obtain and maintain FPIC processes, but the minimum (level B) assessment criteria of the TSM does not include sufficient provisions to ensure effective community participation or FPIC.

While RMI's most frequently used standard RMAP process does not include FPIC (as it is targeted to conflict mineral related risks), its Environmental, Social and Governance (ESG) standard does include the criteria to respect FPIC for mineral processors[11] along the supply chains. Automakers and EV Battery manufacturers should adopt only the best standards that can ensure that supply chains risks related to violations of Indigenous People's rights are avoided. This is particularly important considering how many mineral operations and reserves are overlapping or near Indigenous Peoples lands (Owen et al., 2023).

4.3 Addressing biodiversity and deforestation risks

Downstream companies in the EV industry need to recognize that biodiversity and deforestation are salient risks in their mineral supply chains. To mitigate these risks, companies need to improve current environmental due diligence practices, and introduce methods to identify, prioritize, and mitigate biodiversity and deforestation as standalone risks. The OECD's Handbook for Environmental Due Diligence in Mineral Supply Chains provides a good starting point for defining such actions and measures. Importantly, it also emphasizes that when mining operations occur in biodiverse areas, such as forests, wetlands, or littoral zones, heightened environmental due diligence must be undertaken.

Companies should also adopt ambitious deforestation-free commitments in their mineral supply chains, that include a clear stand for avoiding and reducing, with the ambition of eliminating, the deforestation linked to their mineral supply chains. Focusing on "avoidance" actions and commitments is important because restoration efforts may never truly return biodiversity and ecosystem services to their baseline levels, and the analysis showed that companies are currently clearly underperforming in the undertaking of restauration and rehabilitation activities. Prioritizing mining on degraded land and increased implementation of restoration programs throughout the life cycle of mine can mitigate the biodiversity and deforestation impacts.

10 FPIC as a right for Indigenous Peoples and as best practice for local communities. Areas Where the Free, Prior & Informed Consent of Indigenous Peoples and Local Communities Have Not Been Obtained | Cultural Survival

11 *"Processor includes, but is not limited to, smelters, refiners (fine and crude), processors, treatment units, transformation operations, toll millers, aggregators and recyclers operating in the mineral/metal supply chains"* (RMI, 2021)

Deforestation-free commitments should be expanded so that they clearly include time-bound targets for minerals and, aligned with a risk-based approach to due diligence, be prioritized for minerals carrying the highest deforestation risks[12]. Such deforestation-free commitments should include the avoidance of ecosystems with high risk of being irrecoverable in case of conversion, including Intact Forest Landscapes, High Conservation Value areas, High Carbon Stock areas, Key Biodiversity Areas, or other areas with natural forests and critical habitat[13], as well as areas with high ecosystem integrity. These will be key steps towards more 'ecologically responsible mining' (Sonter et al., 2023). To develop and implement such commitments, some of the lessons learned from soft-commodity supply chains of the automotive industry, such as leather and rubber, can be applied to mineral supply chains. Useful target setting and reporting frameworks include the Accountability Framework Initiative, Science Based Target Network (SBTN), and CDP Forests (See Box 2).

Current minimum requirements across mining standards only include prohibiting operating in legally protected areas and World Heritage Sites. The IRMA mining standard expands those commitments by establishing as a requirement that mining projects should not adversely affect IUCN protected area management categories I-III, and core areas of UNESCO Biosphere reserve. IRMA and the Copper Mark standards also provide protection for some areas that are not necessarily legally designated protected areas, including Key Biodiversity Areas or Ramsar Sites.

Downstream and upstream companies may also develop Net Positive Impact (NPI) and No Net Loss (NNL) commitments. The International Council on Mining and Metals (ICMM) recently adopted five Nature Positive commitments. These include a commitment for No Net Loss of biodiversity at all mine sites at closure against a 2020 baseline, and a commitment to collaborate across value chains to halt and reverse nature loss. This sets an important precedent for the baseline expectations and creates opportunities to increase collaboration between downstream and upstream companies.

Any No Net Loss commitment should adopt clear baseline and target dates, and adhere to the mitigation hierarchy of avoiding, minimizing, restoring, and compensating for negative impacts on natural ecosystems. To date, adherence to the mitigation hierarchy is significantly lacking in the mining industry (IEA, 2023), and a commitment to no net loss is required only by few mining standards, including the Copper Mark, IRMA and TSM (for level AAA rating, but not as a minimum requirement). The RMI's ESG Standard for Mineral Supply Chains includes criteria for the avoidance of adverse impacts on critical habitats and endangered species, as well as protected areas and World Heritage Sites, but it does not mention the mitigation hierarchy or no net loss requirements.

A common limitation across mining standards – and industry practices more generally – is that the methodology, metrics, and data that companies or auditors use to apply the mitigation hierarchy are vague, too flexible, or unclear. For example, current wording across mining standards does not explicitly reference the importance of prioritizing the avoidance and conversion of natural habitats or critical habitats, in accordance with the International Finance Corporation (IFC) Performance Standard 6 (PS6). The IFC PS6 clearly indicates that natural and critical habitats should not be converted or degraded unless: (1) no other viable alternatives within the region exist for development of the project on modified habitat; (2) consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation; and (3) any conversion or degradation is mitigated according to the mitigation hierarchy. Nevertheless, the methods used for biodiversity assessment in Environmental and Social Impact Assessments (ESIA) vary widely, and transparency in the sector is low, making it difficult to evaluate and compare actual performance against the IFC PS6.

No Net Loss and Net Positive commitments thus require increased clarity and transparency in the metrics and data used, and will have to be scrutinized for their consistency with the 2030 and 2050 targets of the Paris Agreement as well as the Global Biodiversity Framework. Downstream companies, upstream companies and mining standards should introduce clearer guidelines and greater disclosure on risk assessments, methodologies used for implementation of the mitigation hierarchy, as well as any progress towards NNL or NPI at the site-level.

12 Including, but not exclusively, gold, iron ore, bauxite, copper, nickel, manganese, or zinc.

13 As per International Finance Corporation Performance Standard 6

5. Conclusions and recommendations

The automotive industry must use its leverage and ensure it is taking all the possible measures to avoid, minimize, restore, and compensate any adverse impacts on critical ecosystem such as rainforests, as well as on the livelihoods of affected rightsholders. Tropical forests are the biome with the highest biodiversity and carbon values, and mining in such critical habitats is particularly worrying if we are to achieve the global commitments towards biodiversity conservation and climate change mitigation. Ensuring that the extraction of minerals needed for our energy transition avoids the destruction of rainforests and other critical habitats is essential to have a more responsible automotive industry and a clean and just energy transition.

The report presents and overview of the due diligence policies, implementation, and disclosure practices related to the biodiversity, deforestation, and Indigenous Peoples and local communities' rights risks in mineral supply chains. Companies can play a key role in preventing and reducing adverse social and environmental risks in their supply chains through improved due diligence practices. Key findings of the report include:

- **In addition to the 3TG, transition minerals require closer attention and must be covered by consistent environmental and social due diligence practices.** 3TG and conflict minerals clearly receive the most attention by companies. Some frontrunner companies already cover transition minerals in their due diligence approaches. It is crucial that a similar level of due diligence is applied to such minerals.

- **Environmental impacts, such as deforestation and biodiversity loss, are overlooked in due diligence practices. Companies must improve their prevention and mitigation actions.** The policies, commitments, and due diligence approaches adopted by most of the companies assessed in relation to mineral supply chains are justifiably focused on human rights violations that pervade in the extraction and processing of minerals. While it is crucial to address these problems, environmental impacts such as deforestation and biodiversity loss should receive more attention as significant forest clearance, especially in key geographies, are associated with mining operations. This assessment made it clear that the environmental impact of critical minerals is underrepresented in companies' due diligence.

- **The rights of Indigenous Peoples, including the right to FPIC are scarcely included in due diligence policies. Companies must increase efforts to better respect and protect Indigenous Peoples and local communities' rights.** Although the focus on human rights abuses is strong, not all issues and groups are as well covered by companies' commitments and due diligence approaches. The companies assessed frequently failed to provide explicit protection of the rights of Indigenous Peoples and local communities (IP & LCs). The absence of stipulations on engagement with rightsholders that are part of this group, especially in obtaining their free, prior, and informed consent (FPIC) as defined by the UNDRIP, was common among the companies assessed.

- **Remediation and compensation activities are scarce. Companies need to increase remediation, compensation and/or restauration activities for the adverse social and environmental impacts.** Despite widespread cases of adverse social and environmental impacts along mineral supply chains, there was little reporting on how companies seek remediation and redress for adverse impacts. In this process, meaningful engagement, and informed consultations with IP & LCs, as well as their inclusion in decision-making processes, are crucial.

- **Increased transparency and better disclosure/reporting practices are necessary to reinforce society-wide collaborative efforts.** Public reporting is essential not only to comply with applicable laws but also to fulfil current best practices, such as those recommended in the OECD Due Diligence Guidance for Responsible Business Conduct. Therefore, all the companies assessed should increase their efforts for supply chain mapping and disclosure. This will enable cross-checking and verification of data and promote and/or reinforce necessary collaborative actions between governments, companies, and civil society.

Ultimately, stopping the expansion of mining operations into forested areas will continue to be the best way to ensure the protection of critical and irrecoverable ecosystems such as tropical rainforests. To prevent and avoid the worst impacts on ecosystems and local populations, increased environmental and social due diligence must be combined with technological advances and circular design, and sourcing choices that reduce the demand for primary raw materials originating from tropical rainforest areas.

Key recommendations

To downstream and upstream companies:

- Adopt time-bound policies and commitments that take a clear stance on avoiding and eliminating deforestation in mineral supply chains.
- Adhere to the mitigation hierarchy of avoiding, minimizing, restoring, and compensating nature and biodiversity impacts, with a clear and strong emphasis on avoiding and minimizing the conversion of natural forests and other critical habitats.
- Conduct enhanced environmental and social due diligence when sourcing or extracting from areas with natural forests and tropical rainforests, with improved monitoring of deforestation and biodiversity impacts.
- Respect and implement the Free, Prior and Informed Consent (FPIC) for Indigenous Peoples and local communities, including the right to withhold consent. Recognize FPIC as an ongoing process in mining operations, and not excluding vulnerable groups.
- Increased disclosure on deforestation, land use change, and adverse impacts on biodiversity from upstream and downstream commercial actors along mineral supply chains (e.g., with AFi, SBTN, or CDP Forests)

To standard setters and assurance schemes:

- Align standard requirements with best international human rights and environmental standards and expectations.
- For biodiversity, introduce standard requirements and criteria that clearly include the avoidance of natural habitats and other critical habitats, aligned with the International Finance Corporation (IFC) Performance Standard 6.
- Include the Free, Prior and Informed Consent (FPIC) as an assessment criterion across standards, and as a minimum criterion for validation and accreditation.
- Ensure auditing and accreditation processes are rigorous, independent and transparent, with adequate requirements for participation from and consultation with local communities, and other key stakeholders.
- Ensure credible standard setting and implementation through systems of multi-stakeholder governance as well as increased transparency and disclosure.

To investors:

- Actively engage with portfolio companies to ensure best social and environmental practices are implemented in mineral supply chains.
- Adopt company expectations that take a clear stance on avoiding and reducing, and with the ambition of eliminating, deforestation linked to extractive assets.
- Adopt company expectations to respect and implement the Free, Prior and Informed Consent (FPIC) for Indigenous Peoples and local communities, including the right to withhold consent.

To governments and policy makers:

- Adopt policies and regulations that make companies liable for the damages caused to the environment, people, and economic activities of the areas.
- Adopt policies and regulatory frameworks that (i) require traceability as well as transparency in mineral supply chains, (ii) include mandatory due diligence requirements, and (iii) the adoption of best environmental and human rights practices, including the right to FPIC.
- Adopt policies and regulatory frameworks that require impact assessments that are transparent, have third-party auditing, and meaningful multistakeholder consultations in mining operations.
- Respect and implement the Free, Prior and Informed Consent (FPIC) for Indigenous Peoples and local communities, including the right to withhold consent. Adopt and ratify ILO Indigenous and Tribal Peoples Convention 169.
- Adopt policies and regulatory frameworks that reduce the overall demand for primary metals sourced from rainforest areas, including the reuse, reduction, and recycling of minerals.

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Appendix

A. Companies and documents reviewed

EV Battery Manufacturer	Headquarters	ISIN
CATL**	China	CNE100003662
Farasis Energy	US/China	CNE1000041T4
LG Energy Solution	Republic of Korea (South Korea)	KR7003550001
Northvolt	Sweden	-
Panasonic	Japan	JP3866800000
Samsung SDI	Republic of Korea (South Korea)	KR7006400006
SK Innovation	Republic of Korea (South Korea)	KR7096770003
Sunwoda Electronic Co.	China	CNE100001260

Automakers	Headquarters	ISIN
BMW AG*	Germany	US0727433056
BYD Co.*	China	CNE100000296
Ford Motor	USA	US3453708600
Geely Automobile	China	KYG3777B1032
General Motors Co	USA	US37045V1008
Mercedes-Benz	Germany	DE0007100000
Nissan Motor Co.	Japan	JP3672400003
Renault Group SA	France	FR0000131906
Stellantis NV	Netherlands	NL00150001Q9
Tesla	USA	US88160R1014
Volkswagen AG	Germany	DE0007664039

Table A1– EV battery and Automotive sector companies included in the assessment. Grey rows indicate company engagement. Notes: **CATL**'s full name is Contemporary Amperex Technology C., Ltd. And **BMW**'s is Bayerischen Motoren Werke AG (only the acronyms were included on the tables due to space limitation).

The indicators were based on several sources linked to mineral sourcing or, specifically, to the aspects assessed, such as benchmarking initiatives, reporting standards, recognized sector-specific standards and certifications, relevant international norms and guidelines, and EU legislative acts focused on the topics at stake. Specifically, these sources were:

- OECD Due Diligence Guidance for Responsible Business Conduct - OECD
- OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (2016, 3rd edition)
- OECD Handbook on Environmental Due Diligence in Mineral Supply Chains | en | OECD
- Chinese Due Diligence Guidelines for Mineral Supply Chains (2nd edition)
- IRMA Standard for Responsible Mining (2018)
- Drive Sustainability Automotive Industry (Guiding Principles and Practical Guidance)
- UN Guiding Principles for Business and Human Rights (2011)
- Accountability Framework Initiative (AFI)
- Lead the Charge Benchmark
- Know the Chain

- Global Battery Alliance (GBA) (Battery Passport Human Rights Rulebook and 10 principles for a sustainable value chain)
- EU Conflict Minerals Regulation (2017)
- EU Batteries Regulation (2024
- Corporate Human Rights Benchmark (2021)
- Global Reporting Initiative (2021) (Mining and Metals Sector Disclosures & GRI Mining and Metals Sector Supplement)
- 2012 Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC – World Bank)

The assessment of the companies was done mostly by resorting to publicly available sources, particularly those directly linked to the companies. Some of the key documents/webpages assessed were:

- Policies, statements, and commitments
- Annual reports
- Sustainability or ESG reports
- Regulatory reports (i.e., Vigilance plan)
- Supplier Code of Conduct
- Global code of Conduct
- Suppliers' Declaration of compliance
- Procurement/Purchasing Guidelines
- Suppliers' lists
- Grievance/Whistleblower mechanisms
- Website information (dedicated pages)

In the initial phase of the analysis, spanning from July to September 2023, 13 companies were assessed – six EV battery manufacturers and seven automakers – and in the second and last phase, occurring from November 2023 to January 2024, six additional companies were assessed – three EV battery manufacturers and three automakers. Considering that there were two phases in this assessment and adjustments were made to some of the indicators included between phase one and phase two, the assessment of the initial group of companies (and their respective scores) were reviewed. Table A2 below provides an overview of the main periods of assessment and consultation of documents/sources for each of the companies, as well as of the revisions undertaken and, if so, the additional documents consulted:

Company	Pre-defined assessment period	Additional revision period	Additional documents consulted
BMW	July - September 2023	November-December 2023	-
BYD	July - September 2023	November-December 2023	-
CATL	July - September 2023	November-December 2023	-
Farasis Energy	November '23 – January '24	-	-
Ford Motor	July - September 2023	November-December 2023	
Geely Automobile	November '23 – January '24	-	
General Motors	July - September 2023	November-December 2023	2021 Corporate Human Rights Benchmark (CHRB) Disclosure
LG ES	July - September 2023	November-December 2023	-
Mercedes-Benz	November '23 – January '24	-	-
Nissan Motor	November '23 – January '24	-	-
Northvolt	November '23 – January '24	-	-

Company	Pre-defined assessment period	Additional revision period	Additional documents consulted
Panasonic	July - September 2023	November– January 2024	Panasonic Integrated Report 2023
Renault Group	July - September 2023	December 2023	Renault Group Group CSR Guidelines for suppliers (Nov 1st, 2023)
Samsung SDI	July - September 2023	December 2023	Samsung SDI Supplier Code of Conduct (October 2023)
SK Innovation	July - September 2023	December 2023	-
Stellantis NV	July - September 2023	January 2024	-
Sunwoda	November '23 – January '24	-	-
Tesla	July - September 2023	November-December 2023	-
Volkswagen	July - September 2023	January 2023	-

Table A2 - Overview of the main periods of company assessment, during which key documents were consulted; additional revision period for companies assessed in phase 1 (July to September 2023); and additional documents consulted due to updates between the two assessment phases.

Additional information was also collected and included in the corresponding company profiles. The aim of this information is to provide extra insight regarding relevant initiatives undertaken by the companies, namely information on established partnerships and agreements with other companies from the sectors approached in this study. This information was, in most cases, obtained from:

- Companies' websites (company history and news sections)
- 2023 Critical Minerals Market Review report (International Energy Agency)
- News articles from reliable sources (i.e., on-line news channels)

The specific sources consulted have been provided in each of the cases through hyperlinks in the texts included in the company profiles.

B. Publicly available sources: Company assessment

BMW

- **BMW** webpage: Anchoring due diligence in the supply chain. https://www.BMWgroup.com/en/sustainability/our-focus/environmental-and-social-standards/supply-chain.html
- **BMW** Group Supplier Code of Conduct. Retrieved from https://www.BMWgroup.com/content/dam/grpw/websites/BMWgroup_com/responsibility/downloads/en/2022/BMW-Group-Supplier-Code-of-Conduct-V.3.0_englisch_20221206.pdf
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- Policy Statement on Respect for Human Rights and Corresponding Environmental Standards. Retrieved from https://www.BMWgroup.com/content/dam/grpw/websites/BMWgroup_com/responsibility/Menschenrechte/BMW_Group_Policy_Statement_Human_Rights_EN.pdf
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CATL

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- **CATL** Code of Conduct. Retrieved from https://www.CATL.com/en/uploads/1/file/public/202207/20220707140236_ck1ve4si5o.pdf
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Farasis Energy

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- 2021 Due Diligence Report: Responsible Sourcing Programme for Cobalt. Retrieved from https://en.farasis.com/upload/newsfile/202106/1624409731o9jbtuke.pdf
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- **Farasis Energy**'s Supplier Code of Conduct: Letter of Commitment. Retrieved from https://en.farasis.com/upload/newsfile/202301/1674876433bmb47bvg.pdf
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Ford

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Geely *Automotive*

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General Motors

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- Human Rights Policy. Retrieved from https://www.gmsustainability.com/_pdf/policies/GM_Global_Human_Rights_Policy.pdf
- Supplier Code of Conduct. Retrieved from https://www.gmsustainability.com/_pdf/policies/GM_Supplier_Code_of_Conduct.pdf
- Global Environmental Policy. Retrieved from https://www.gmsustainability.com/_pdf/policies/GM_Environmental_Policy.pdf
- **General Motors** webpage: Recycling for a sustainable future. https://www.gm.com/stories/batteries-recycling-ev
- 2022 Sustainability Report. Retrieved from https://www.gmsustainability.com/_pdf/resources-and-downloads/GM_2022_SR.pdf
- **General Motors** webpage: Governance, https://www.gmsustainability.com/governance/
- **General Motors**' Code of Conduct. Retrieved from https://investor.gm.com/static-files/265a1dc0-adc5-4d38-ab41-2c58e575692d
- 2021 Corporate Human Rights Benchmark (CHRB) Disclosure. Retrieved from https://www.gmsustainability.com/_pdf/policies/GM_Corporate_Human_Rights_Benchmark_Disclosure.pdf

LG Energy Solution*s*

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