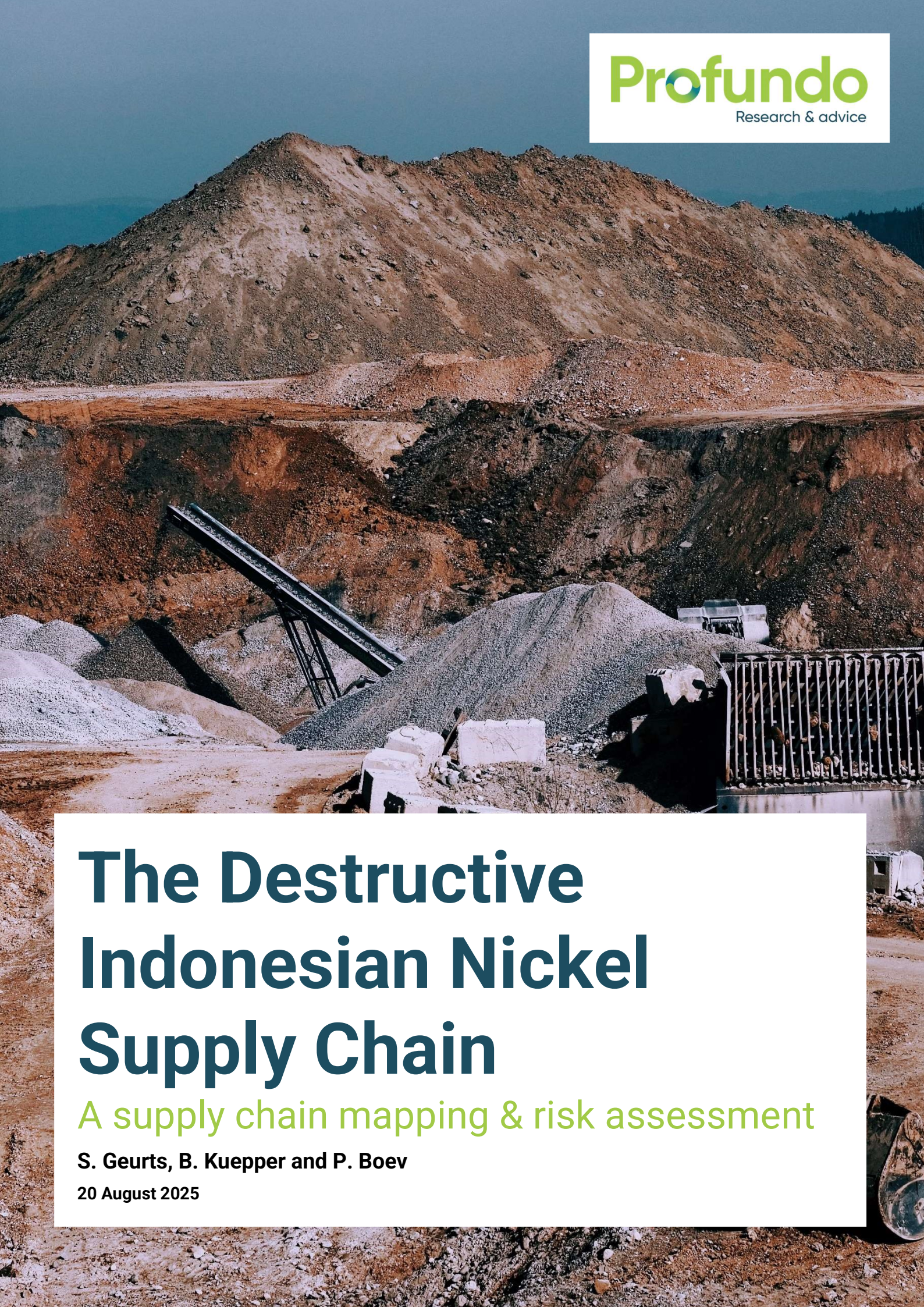

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Research & advice

The Destructive Indonesian Nickel Supply Chain

A supply chain mapping & risk assessment

S. Geurts, B. Kuepper and P. Boev

20 August 2025

About this report

This report has been commissioned by CNV Internationaal.

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Summary

Nickel is a highly versatile mineral with diverse applications in stainless steel, nickel-based alloys, and nickel electroplating, ranging from consumer goods to transport, energy, and construction. In the transition away from fossil fuels, nickel plays a key role in electric vehicle (EV) batteries and renewable energy technologies.

However, its extraction and processing raise serious human rights and environmental concerns, particularly in Indonesia, the world's largest nickel producer. This research aims to map Indonesia's nickel supply chain, enhancing transparency and offering strategic recommendations to help companies address social and environmental risks while ensuring ethical and sustainable sourcing. The supply chain mapping focuses on links between nickel industries in Morowali, Central Sulawesi, and downstream uses in EV manufacturing, wind and solar power.

Supply chain links with the renewable energy and automotive sectors

The results indicate many (potential) links between nickel processing companies at PT Indonesia Morowali Industrial Park (IMIP) and PT Vale Indonesia (PTVI), via their international shareholders, EV battery makers and EV car makers, as well as a number of links of steel via car part manufacturers. While many of these links do not definitely confirm that nickel from IMIP and PTVI ends up in EV cars, they suggest a high likelihood of connections between the Morowali nickel industry and EV battery and car manufacturers, based on documented business relationships and the overall significance of Indonesia in the global nickel value chain.

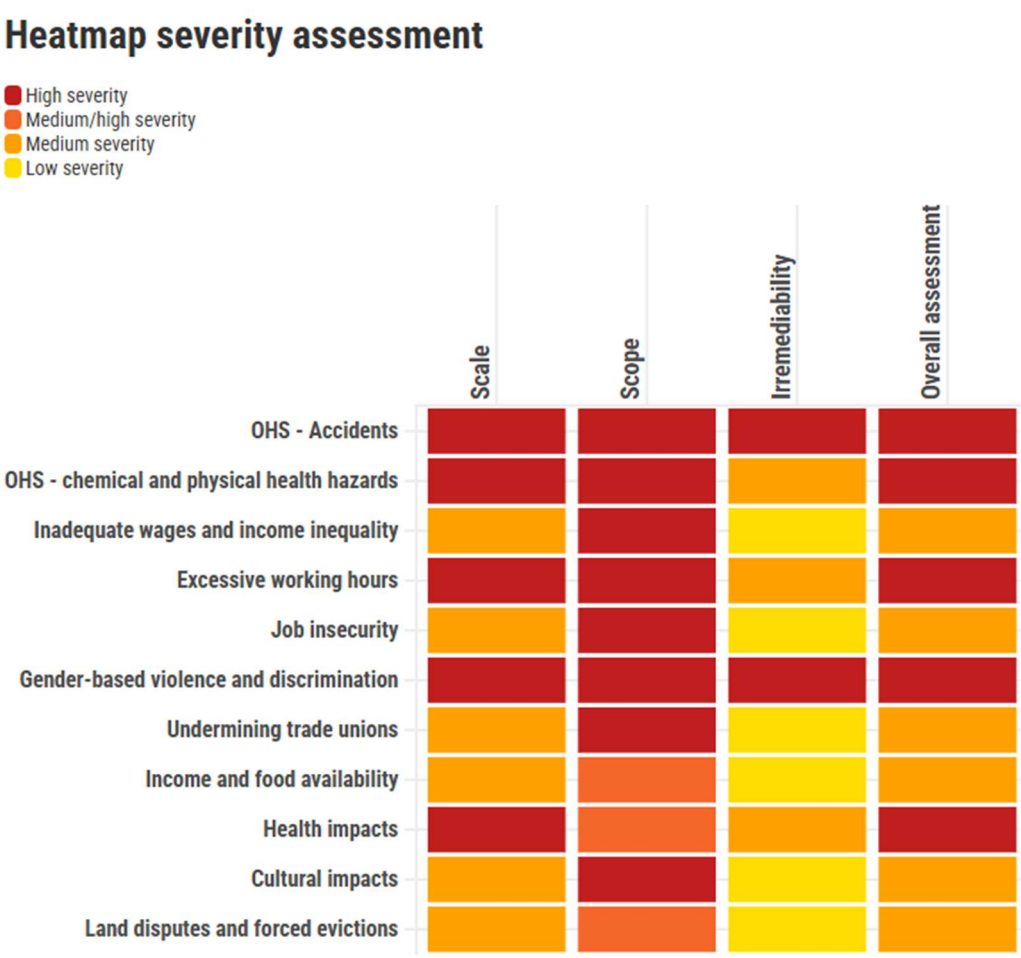
Car manufacturers include Tesla, Volkswagen, BMW, Hyundai, Stellantis and Volvo, while battery makers with likely links are CATL, LG Energy Solutions, CNGR, SK On, Samsung SDI, and Ningbo Shanshan, among others.

For renewable energy technologies, this is a different story. This sector appears to be more opaque, both downstream and upstream, with several processing steps and companies rarely disclosing their supply relationships publicly.

However, owing to Indonesia's important role in nickel mining and processing and massive foreign – particularly Chinese – investments in establishing local refining and battery manufacturing facilities in recent years, the likelihood of Indonesian nickel entering the supply chains of industries relying on nickel-containing products is considered high.

Social risk assessment

The social risk assessment shows that structurally poor working conditions have severe detrimental effects on workers at Indonesian nickel production sites. These conditions pertain to Occupational Safety and Health (OSH), wages and income inequality, working hours, job insecurity, gender-based violence and discrimination, and the undermining of trade unions. Additionally, polluted water from runoff sediment, deforestation, air pollution, and forced evictions caused by nickel mining and production activities harm the surrounding communities. A severity assessment shows the gravity of human and labour rights violations in the Indonesian nickel supply chain.



Source: Profundo.

Strategic recommendations

Drawing on the findings from the supply chain research and social risk assessment, strategic recommendations can be provided for companies in the renewable energy and EV sectors as key stakeholders to limit social and environmental risk and improve ethical sourcing. This guidance can help companies operating in the EU market navigate regulatory compliance, due diligence, traceability, sustainability and ethical sourcing within the context of the Indonesian nickel industry and EU regulations.

In early April 2025, The European Parliament adopted the EU Commission's "Stop-the-clock" initiative, part of the Omnibus Package, postponing many corporate sustainability reporting and due diligence obligations, as well as the deadline for transposing CSDDD into national legislation of the member states. At the same time, many recommendations for companies – both mandatory and voluntary – remain valid. Therefore, **companies must still adhere to due diligence obligations, monitor environmental and human rights risks, track indirect supplier issues raised by civil society reports, maintain robust sustainability practices, and comply with the EU Batteries Regulation, which remains in effect regardless of the Omnibus package's progress.**

Furthermore, companies are recommended to:

- **Implement human rights due diligence processes** throughout the organisation
- **Conduct regular, independent audits** of mining, smelting and refining operations
- Enhance transparency in their mineral supply chain by **publicly disclosing suppliers** involved in mineral mining, refining, smelting, and battery/parts production

- Even if a company uses only a small amount of nickel, the industry's overall impact on workers, local communities, and the environment in Indonesia is significant and **should be traced and addressed.**
- **Assign clear Board responsibility** for and oversight of respect for social and environmental rights.
- Adjust business operations or activities to prevent and reduce negative impacts and address systemic issues.
- **Monitor the implementation and the results** of all due diligence activities and prevention and mitigation measures taken, and communicate externally about this.
- **Provide for or cooperate in remediation** when the company has identified it has caused or contributed to actual negative impacts.

Measures that can be taken to prevent and mitigate adverse impacts related to a supplier relationship include:

- **Work with suppliers** on corrective action plans with clear goals.
- **Provide training and support** to improve practices.
- **Encourage sector-wide collaboration** on impact prevention.
- **Help suppliers access financing** for improvements.
- **Use purchasing power** to demand ethical practices or disengage if violations persist.
- **Push for renewable energy** and stop new coal plant projects.
- **Support remediation efforts** and responsibly disengage if necessary.
- **Follow OECD guidelines** to enhance leverage through industry collaboration.

Abbreviations

BTIIG	Baoshuo Taman Industry Investment Group
CATL	Contemporary Amperex Technology
CLW	China Labour Watch
CRM	Critical Raw Materials
CRMA	European Union Critical Raw Materials Act
EU CSDDD	European Union Corporate Sustainability Due Diligence Directive
EU CSRD	European Union Corporate Sustainability Reporting Directive
EV	Electric Vehicle
FSPNI	Morowali Indonesian National Federation of Workers' Unions
GNI	PT Gunbuster Nickel Industri
IEA	International Energy Agency
IHIP	PT Indonesia Huabao Industrial Park
IMIP	PT Indonesia Morowali Industrial Park
JV	Joint Venture
LGES	LG Energy Solution
MHP	Mixed Hydroxide Precipitate
NPI	Nickel Pig Iron
OSH	Occupational Safety & Health
OSS	PT Obsidian Stainless Steel
PPE	Personal Protective Equipment
PTVI	PT Vale Indonesia
RKEF	Rotary Kiln-Electric Furnace
SBSI	Morowali Indonesian Prosperous Labour Union
SMM	Sumitomo Metal Mining
SOP	Standard Operating Procedure
SPIM	Morowali Industrial Workers Union
SRM	Strategic Raw Materials
VCL	Vale Canada

Definitions

Metal alloy: A substance that combines more than one metal or mixes a metal with other non-metallic elements.

Ferronickel: An alloy of iron and nickel used in making nickel steels.

Nickel pig iron (NPI): A low-grade ferronickel invented in China as a cheaper alternative to pure nickel to produce stainless steel. The production process utilises lateritic nickel ores instead of pure nickel.

Nickel electroplating: A technique of electroplating a thin layer of nickel onto a metal object. The layer can be decorative or provide corrosion and wear resistance.

Lithium-ion batteries: A type of rechargeable battery that stores energy by reversibly inserting Li^+ ions into electronically conductive solid materials.

NMC batteries: Nickel-containing lithium-ion batteries, containing differing degrees of nickel according to the type (Low-nickel includes lithium nickel manganese cobalt oxide (NMC) 333, NMC442, and NMC532. High-nickel includes NMC622, NMC721, NMC811, lithium nickel cobalt aluminium oxide (NCA), and lithium nickel manganese cobalt aluminium oxide (NMCA)).

NCA batteries: Nickel-containing lithium-ion batteries.

LFP batteries: Lithium-ion batteries without nickel.

Introduction

Nickel is used in a large number of applications, including as a key raw material for the production of electric vehicle (EV) batteries and renewable energy technologies. While nickel plays an important role in the energy transition away from climate-damaging fossil fuels, the nickel industry itself has various harmful consequences. Nickel mining and refining raise serious concerns regarding human rights abuses, including forced labour and violations of the right to freedom of association (FoA). Moreover, environmental issues like deforestation, soil erosion, and water pollution have emerged as significant challenges for local communities and ecosystems.

Indonesia is the largest producer of nickel globally, and its nickel mines and processing hubs have faced international scrutiny due to allegations of worker exploitation, poor labour conditions, human rights violations and significant environmental degradation.

These issues present significant risks for companies in the renewable energy and electric vehicle (EV) sectors, which rely on sustainable and ethical supply chains to meet increasing consumer and regulatory demands. In the EU, the upcoming Corporate Sustainability Due Diligence Directive (CSDDD), makes it imperative for companies sourcing nickel from Indonesia to have a comprehensive understanding of their supply chains.

Against this background, this research seeks to map the supply chain of nickel originating from Morowali, Central Sulawesi, Indonesia. By doing so, it aims to enhance transparency and traceability, shedding light on the key social and environmental risks associated with nickel production in Indonesia. Additionally, the study offers strategic recommendations to companies on how to effectively engage with their suppliers, strengthening their influence and fostering collaboration. This approach is especially important given the intricate connections within the nickel supply chain, ensuring that businesses can navigate these relationships responsibly and sustainably.

The methodology applied in this research is discussed in Chapter 1. Subsequently, Chapter 2 provides the results of the supply chain analysis, while Chapter 3 details the key relevant EU regulations and the social risk assessment. Finally, Chapter 4 provides strategic recommendations to companies and for future research.

1

Methodology

The methodology details the scope of this research in terms of companies and geographies and contains the methodology for the supply chain research and social risk assessment.

1.1 Scope

The research focuses on the Indonesian nickel supply chain and its connections to the end products sold by the renewable energy and automotive sectors on the EU market. Geographically, the study focusses on the following industrial areas in Morowali and North Morowali, Central Sulawesi:

- PT Indonesia Morowali Industrial Park (IMIP)
- PT Indonesia Huabao Industrial Park (IHIP)
- PT Vale Indonesia (PTVI), and
- PT Gunbuster Nickel Industri (GNI).

In the renewable energy and automotive sectors, nickel is used mainly in batteries for EVs and solar energy storage, stainless steel and nickel-based alloys. According to the Nickel Institute, nickel is used in all clean energy technologies. Considering the high number of companies active in these supply chains, the leading companies manufacturing electric cars (EVs), wind turbines and solar panels active in the European market are prioritised in this research.

For EVs, the following companies and their brands are selected:

- Volkswagen Group: e.g. Volkswagen, Škoda, Audi, Porsche
- Stellantis: e.g. Citroën, Fiat, Opel, Peugeot
- Tesla
- BMW Group
- Geely-Volvo

For wind turbines, the following companies are included:[1]

- Vestas Wind Systems
- Nordex
- Siemens Gamesa Renewable Energy
- Enercon
- General Electric

For solar panels, the following companies are included:

- Hanwha Q CELLS Technology
- Iberdrola
- SunPower Corporation (now Complete Solar)
- JinkoSolar
- Lightsource BP Renewable Energy

All these companies were contacted and offered to participate in the research by providing feedback on several questions related to their nickel supply chains. The objective and research processes were explained, and confidentiality was offered. However, none of the companies shared details on its supply chain beyond generic information.[a,2]

In addition, the member companies of the Dutch Renewable Energy Agreement (REA) have been contacted for this research. Out of the two replies, one company provided names of some of their main suppliers of wind towers, wind foundations, (gas) turbines and heat pumps. These links were considered in the supply chain research, though no connections with upstream nickel suppliers could be established. Therefore, they are not further described in the supply chain mapping of the four Morowali industrial parks.

1.2 Supply chain research

The supply chain research aims to identify links between the four upstream nickel mines and processing hubs in Indonesia and renewable energy and EV sectors active in the EU market, focussing on the last three years (2022—2024).

The business structure and operations of these upstream actors in Indonesia are profiled, including information on their ownership structure and the key shareholders, as far as public data availability allowed. Where ownership structures are more complex these are illustrated with charts. The profiles pay particular attention to the participation of mid- and downstream companies in upstream operations through joint ventures and investments. This is, for example, the case for PTVI, with both Brazilian Vale (via Vale Canada) and Sumitomo (Japan) holding stakes and nickel offtake agreements.[3]

The journey of the mineral through each stage of mining, processing, distribution, and integration into intermediate and final products in the renewable energy and automotive sectors are traced. This mapping includes transportation and export routes, with a particular focus on routes supplying the European market.

Profundo mapped the supply chain to the extent that data availability allows. Mineral supply chains are marked by opacity and discrepancies between and gaps within datasets are common. If assumptions or estimates are used to bridge these gaps or ambiguities, this is clearly stated. For example, links between two supply chain stages can often be made, but data allowing to link several stages is limited, especially at the downstream end of the supply chain, where nickel is used in a wide range of intermediate and finished products and companies rarely provide transparency on their suppliers.

A wide range of sources are considered, including but not limited to:

- The annual reports and websites of the companies involved at different supply chain stages, their owners, clients, and related companies are widely screened for information on possible supply chain links. Moreover, press releases about investments, agreements, and suppliers' awards sometimes provide useful additional information.
- Statistical and production databases, such as Eurostat, IEA data (Global Critical Minerals Outlook), and the Open Database on global coal and metal mine production
- Data published by the USGS, the British Geological Survey and other national agencies
- Statistics published by industry bodies (e.g. the International Nickel Study Group, World Stainless Association)
- Shipment data

[a] BMW Group explains in its response that it has no direct supply relationships with nickel suppliers. The company points to its Supplier Code of Conduct and Code on Human Rights and Working Conditions that outline the Group's social and environmental purchasing conditions. Moreover, it mentions its membership in the Initiative for Responsible Mining Assurance (IRMA) and Responsible Minerals Initiative (RMI), and its aim to increase the use of recycled nickel and other minerals.

- Other grey literature, research reports and media articles. Links mentioned in media sources, such as reports of government officials announcing new investments, are cross-checked in company documents and websites.

1.3 Data limitations

The mapping of links with upstream nickel production was limited by the fact that only one REA member company disclosed concrete supply relationships. Generally, manufacturers disclose limited, if any, information regarding their supply chain relationships. Sourcing geographies are more likely to be revealed, and Indonesia is often mentioned due to its important role as a nickel producer. Among EV carmakers, Tesla is the only one that mentions some nickel suppliers in its 2023 impact report, and Stellantis published a supplier list in 2022. Selected parts suppliers or customers of parts manufacturers are, at times, identified from company reporting or media articles.

Identifying links also depends on the availability and access to shipment data. Profundo obtained access to Indonesian export data of selected relevant nickel-containing intermediary products. Since the major shareholders of IMIP, IHIP and GNI are Chinese companies, Chinese export data is also of interest to inform the analysis but is not accessible, because original custom data has been discontinued since 2018.

These Chinese companies are likely exporting a large share of nickel-containing intermediary products like nickel-cobalt, nickel matte or ferronickel to China for further processing and distribution.[4]

It is important to note that the presented current and future supply chain links are indirect due to the different processing steps for the production of the final product and the global character of international supply chains. One or more additional supply chain steps mean that exposure is likely, but it cannot be said with certainty whether these EV and renewable energy companies are (or will be) exposed to nickel from the *specific* industrial areas and supplying mines, as supply chain relationships are usually not exclusive.

1.4 Due hearing

The companies mentioned in relation to the suggested trade links in this report were contacted and given the opportunity to review the results and provide input on the findings. In total, 20 companies were contacted twice.

Out of the 20 companies, only four responded. The responses included general references to the company's human rights policies, annual reports, or the company's policy that prevents sharing of details on their (direct) supplier's business relationship. The responses did thus not provide specific details. Therefore, no alterations were made, and no references to the responses have been made throughout the report.

The following companies were contacted:

- Tesla
- Volkswagen Group
- Stellantis
- BMW Group
- Geely-Volvo
- CNGR
- GEM
- CATL
- Nextera Energy
- Mercedes-Benz
- Fluence Energy

- Flexgen Power Systems
- Depcom Power
- Ford
- Jindal Stainless
- POSCO
- Thyssenkrupp Materials
- Nikel Stainless Steel Industry and Trade
- Panasonic
- Carl Spaeter

1.5 Social risk assessment

The social risk assessment entails an in-depth analysis of key social risks associated with nickel production in Indonesia. This assessment is based on existing research, assessment reports, case studies, and other relevant sources.

The assessment starts with an analysis of the key EU regulations, including the EU CSDDD, the EU CSRD, and the Battery Act, and their requirements for mid- and downstream companies putting nickel products from Indonesia on the EU market. The social risks identified are integrated and discussed. Companies that currently meet the CSDDD's threshold criteria are identified.[b] Based on the social risk analysis, a severity assessment (scale, scope, and irremediability) is conducted using a heatmap. This is based on research reports, so no direct engagement with local rights-holders was conducted.

As a result, high-level conclusions can be drawn on how the end products of the renewable energy and EV sectors meet regulatory and consumer demands for sustainability and ethical sourcing.

1.6 Strategic recommendations

Given the supply chain links as well as hurdles encountered when trying to do so, strategic recommendations for companies in the renewable energy and EV sectors as key stakeholders to limit social and environmental risk and improve ethical sourcing are drafted. Drawing on the findings from the supply chain research and risk assessment, this includes:

- Compliance with EU regulations;
- Steps to improve supply chain traceability;
- Best practices for addressing social and environmental risks;
- Approaches for leveraging supplier relationships to drive improvements.

[b] The CSDDD datahub is available at https://www.somo.nl/csddd-datahub/#look-for-company.

2

Supply chain links with the renewable energy and automotive sectors

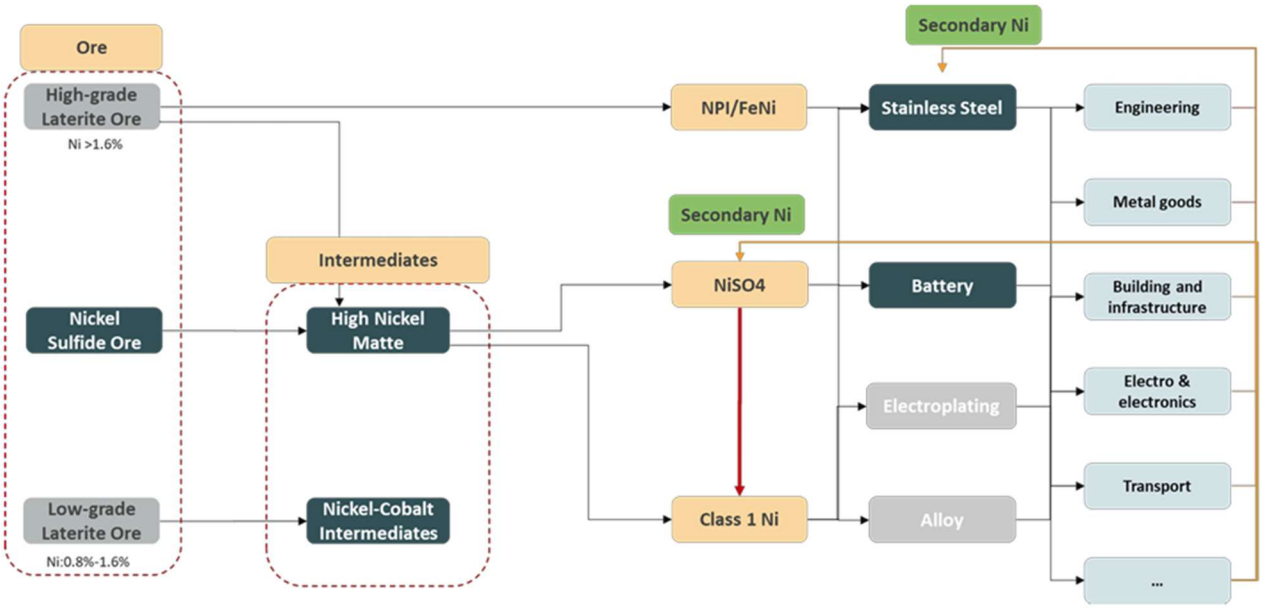
The findings reveal numerous (potential) links between nickel processors at IMIP and PTVI, via their international shareholders, EV battery producers, and EV manufacturers, as well as connections in the steel supply via car part suppliers. While many of these links do not definitively prove that nickel from IMIP and PTVI is used in EVs, they strongly suggest ties to the Morowali nickel industry, supported by known business relationships and Indonesia's central role in the global nickel supply chain. The renewable energy sector is even more opaque, with limited public reporting on supply chains. Even where direct supply flows cannot be traced, Indonesia's position as the top global nickel supplier and Central Sulawesi's mining significance make it highly likely that nickel from this region ends up in products on the European market.

2.1 Overview of the nickel supply chain and Indonesia's role

2.1.1 Nickel supply chain

Nickel, the fifth most common mineral on earth, has versatile physical and chemical properties that make it crucial in a large variety of products. Its supply chain consists of several steps from nickel ore mining to final products (Figure 1).

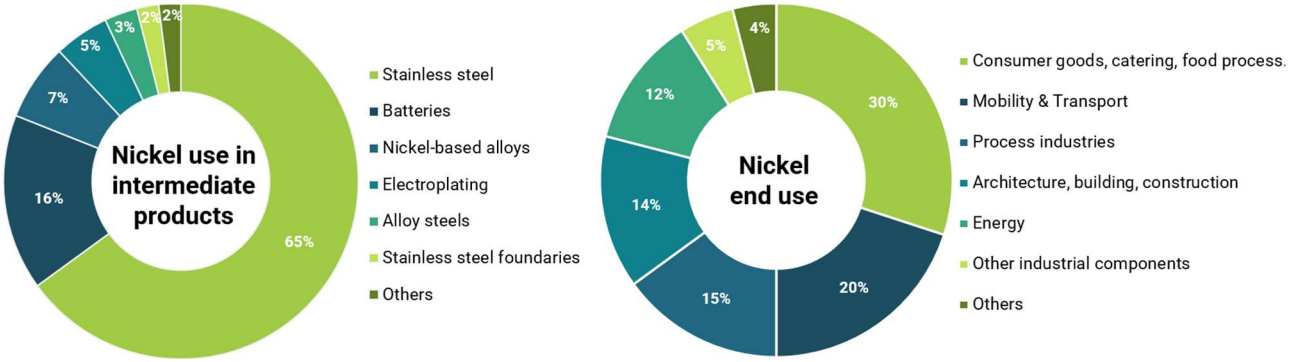
Figure 1 Nickel supply value chain stages



Source: SMM, in: International Nickel Study Group (2024), *The World Nickel Factbook 2024*, p. 33.

Nickel's main intermediate application, accounting for around two-thirds of its use, is alloying with other metals to produce stainless and heat-resisting steels (Figure 2). Nickel enhances corrosion resistance in metals and, thus, extends product lifespan. Ferronickel, an alloy consisting of about 35% nickel and 65% iron, is key to the production of stainless steel.[5] Nickel-containing steel grades account for around 80% of stainless steel production globally, particularly Type 304 (8% nickel) and Type 316 (11% nickel).[6]

Figure 2 Main uses of steel in intermediate and end-use products



Source: Nickel Institute (n.d.), viewed in March 2025.

In line with these versatile intermediary applications, a wide variety of nickel-containing end products use stainless steel, nickel-based alloys and nickel electroplating.[7]

In the renewable energy sector, nickel is used, among others, in wind and solar power and for electric vehicle (EV) manufacturing. Nickel use in the battery sector is growing rapidly, driven by its role in various battery types such as nickel-cadmium, nickel-metal-hydride, and especially lithium-ion batteries. Demand has surged due to the high energy density of nickel-rich cathodes, a trend expected to continue with the rise of high-nickel chemistries. Battery production accounts for about 15% of nickel's current use; however, the volume is expected to increase if the market for EVs grows as predicted.[8] Batteries are also gaining in importance for storing energy produced by solar panels, particularly in off-grid systems.[9]

While there are various types of lithium-ion batteries, Lithium Iron Phosphate (LFP) and Lithium Nickel Manganese Cobalt Oxide (NMC) are the dominant lithium-ion battery chemistries in energy storage, accounting for 80% of the market. These batteries owe their popularity to their compactness, lightweight, and high energy density. They require little maintenance, have long lifespans, and charge rapidly.[10] NMC batteries contain nickel to varying degrees, while LFP batteries do not. Other nickel-containing lithium-ion batteries are lithium nickel cobalt aluminium oxide (NCA) batteries, which are used in around 7% of EVs globally.[11]

According to the International Energy Agency (IEA), LFP batteries for EVs have gained market share due to their lower production costs, supplying 40% of the global EV market in 2023. LFP production and usage are largely concentrated in China, where it was used in two-thirds of EV sales in 2023. In contrast, LFP batteries account for less than 10% of EV sales in Europe and the United States, where high-nickel chemistries continue to dominate. Nickel-containing batteries were used in around 53% of EVs globally in 2023, which accounted for 96% in the U.S. and 97% in Europe.[12]

Expected use of NMC vs. LFP batteries

IEA projects modest growth in the market share of LFP for cars due to its increasing use in China and entry-level models, though nickel demand for EVs is still expected to grow by 47%-210% between 2030 and 2040 for two different policy scenarios.[13]

In 2021, Tesla announced a switch from nickel-based batteries to LFP batteries for its standard-range EVs.[14] Its Master Plan foresees that nickel-based batteries will be included in Model S/X, Cybertruck and Semi Heavy, while LFP batteries will be used in Model 3/Y and Semi Light.[15] Therefore, a considerable part of Tesla vehicles still contains nickel-based batteries, though less than before. Other carmakers such as Ford and BMW also announced plans to use LFP batteries in their EVs. Ford is already utilising LFP batteries for some of its cars and is planning on expansion,[16] while BMW is planning to launch LFP models in 2025.[17]

The same types of batteries are used for energy storage purposes. The IEA forecasts LFP batteries, known for their safety and low cost, to lead the utility-scale storage market by 2040. Higher-cost, energy-dense NMC 111 and 532 batteries will mainly serve home energy storage needs, gradually transitioning to NMC 622 and 811 variants, following trends in the EV sector but with a delay due to technology transfer and cost reductions.[18] Vanadium flow batteries (VFBs) are projected to enter the market by 2030, gradually expanding their role in large-scale renewable energy storage. Two alternative battery storage scenarios show contrasting impacts on material demand by 2040:[19]

- Faster adoption of wall-mounted home energy storage would increase NMC battery demand and result in a 75% increase in nickel, manganese, and cobalt demand;
- Earlier than expected commercialisation of vanadium flow batteries for utility-scale storage would reduce reliance on LFP batteries. This shift would lower demand for nickel, cobalt, and manganese by about 20% in 2040.

A shift towards LFP batteries for stationary storage is visible, including for solar and wind power. However, a substantial part of batteries for EVs and energy storage sold in Europe and the U.S still contain nickel. It is therefore worth investigating which lithium-ion batteries are used and supplied to companies.

In wind turbines, stainless steel alloys are used in safety-critical features such as ladders, control panels, and fasteners. However, the most important use of nickel in wind power will be in comparatively small quantities to increase the strength and improve the toughness of low-alloy steels, that is, their ability to absorb mechanical energy without fracturing. According to estimates, each wind turbine contains around 2 tons of nickel.[20] In solar energy, nickel silicide contacts improve the panels' energy conversion efficiency. Moreover, nickel alloys used in the frames and mounts of solar panels contribute to durability and longevity in harsh weather conditions and help protect panels from corrosion.[21]

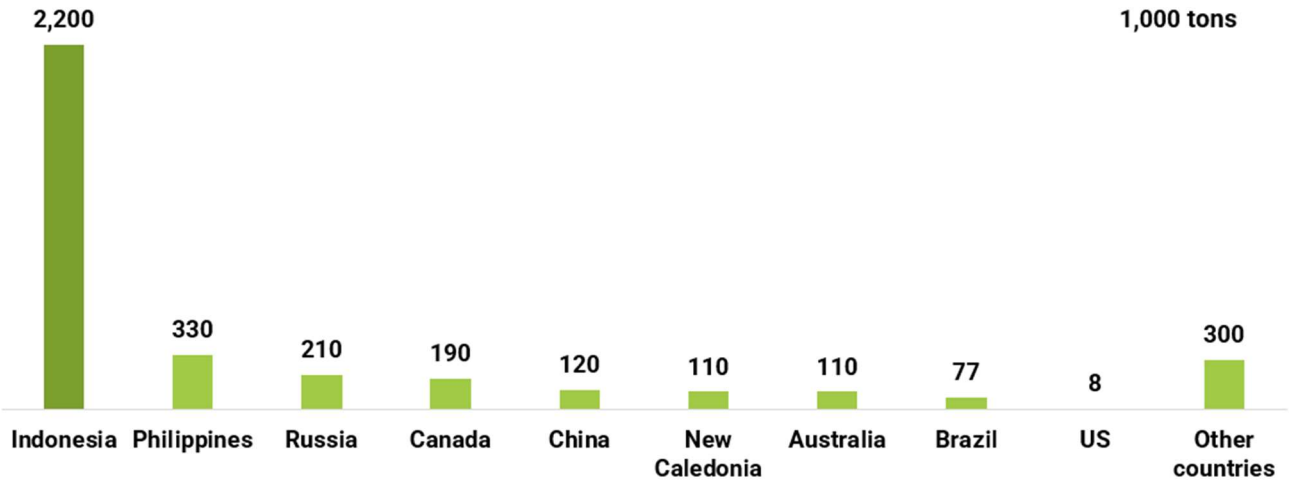
2.1.2 Nickel origins

Indonesia is the leading country globally for both reserves[c] and mine production, accounting for around 40% and 60%, respectively (Figure 3).[22] Moreover, only Indonesia saw a significant increase in nickel ore production by more than 100% during the five years from 2019 to 2023, while production in the other leading countries stagnated.[23] Following the country's 2020 ban on raw nickel ore exports, the country has seen a surge in nickel mining and processing, with output more than tripling. This rapid growth has led to an excess supply of (semi-)processed nickel in the global market, causing a global price drop and forcing some miners outside Indonesia to shut down. The

[c] A reserve is the economically mineable part of a measured and/or indicated mineral resource, with resource, in turn, referring to a concentration or occurrence of solid material of economic interest.

imbalance between mining output and smelter demand is raising concerns in international markets, and Indonesia is seen as a key contributor to the nickel price slump in early 2024.[24]

Figure 3 Nickel mine production by country (2024, 1,000 tons)

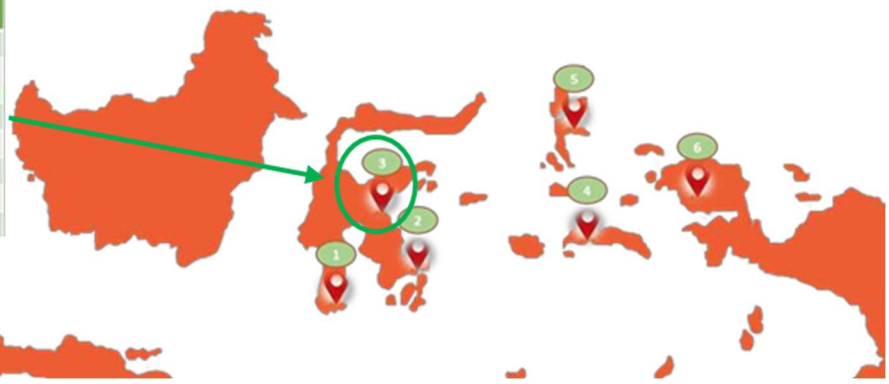


Source: US Geological Survey (USGS) (2025), *Mineral Commodity Summaries: Nickel*, p. 125.

Within Indonesia, Central Sulawesi, the location of the industrial areas considered in this research, is one of the main production regions, with 117 nickel mining companies in 2023 (Figure 4).

Figure 4 Nickel Mining Companies in Indonesia (2023)

No	Province	Nickel Mining Companies	KK (Kontrak Karya)
1	South Sulawesi	4	1
2	Southeast Sulawesi	155	1
3	Central Sulawesi	116	1
4	Maluku	1	
5	North Maluku	53	
6	West Papua	2	
TOTAL		330	3



Note: Mining contract.
Source: International Nickel Study Group (2024), *The World Nickel Factbook 2024*, p. 16.

2.1.3 Role of Indonesia in global nickel trade

Owing to Indonesia's ban on exports of nickel ore that aims to strengthen domestic processing capacity, its exports of nickel ores and concentrates are negligible.[25] However, looking at the global trade of nickel products, Indonesia is the world's leading exporter of ferronickel alloys (more than 90% of global exports in 2023) and nickel mattes and nickel oxide sinters (80% of global exports). Its main trading partner for both products is China, receiving the majority of exports of both products. In turn, Indonesia accounted for more than 90% of China's 8.4 million tons of ferronickel imports and almost 70% of the nickel mattes imports in 2023.[26]

The following sections aim to map concrete links between the selected nickel industry parks in Central Sulawesi and the European market for EVs and renewable energy products. Establishing such links is hampered by a lack of transparency along these supply chains. However, Indonesia's

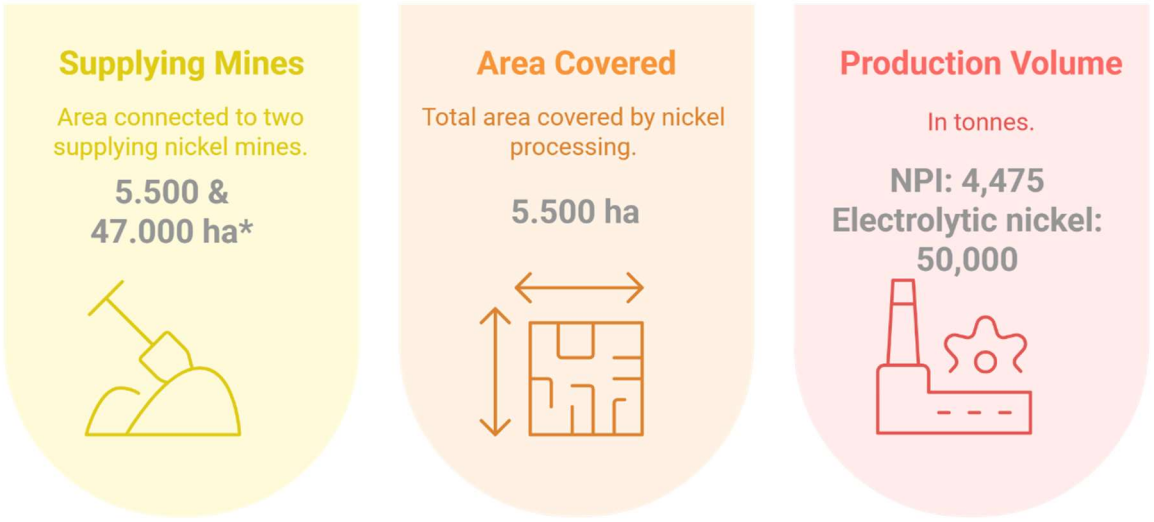
important role in supplying nickel to international markets, its large share in Chinese imports, and China's important role as a producer and supplier of EVs, EV parts, and renewable energy products make it highly likely that Indonesian nickel is present in these products sold on the European market.

2.2 PT Indonesia Morowali Industrial Park (IMIP)

2.2.1 Profile

Located in the Morowali province, Central Sulawesi, the Indonesia Morowali Industrial Park (IMIP) is dedicated to processing nickel ore into intermediate and final products that support global supply chains. Among Indonesia's largest nickel-based industrial areas, IMIP hosts the operations of more than 50 companies[27] and covers an area of roughly 5,500 hectares[28] as part of three industrial clusters in addition to supporting industries.[29] These industrial clusters are stainless steel, carbon steel, and raw materials for electric vehicle batteries, while the supporting industries range from coal power plants, manganese, silicon, chrome, lime, coke, and other factories to other supporting facilities such as ports and airports.[30]

Figure 5 IMIP - Overview nickel processing



* There may be additional supply from other nickel mines.

Source: Profundo.

The stainless-steel cluster processes nickel ore into nickel pig iron (NPI) and subsequently into stainless steel. There are 54 NPI smelter furnace lines with a total NPI production of 4,475 tons per year, while the stainless-steel production capacity reaches 15.6 million metric tons per year.[31] The EV battery cluster produces around 50,000 tons of electrolytic nickel per year, among other battery materials.[32] Two mines are identified for supplying nickel ore to IMIP smelters. These are PT Bintang Delapan Mineral and the Hengjaya Nickel Mine. The first is owned by Bintang Delapan and the second by Nickel Industries, both invested in IMIP companies (see Figure 6 and Figure 7).[33]

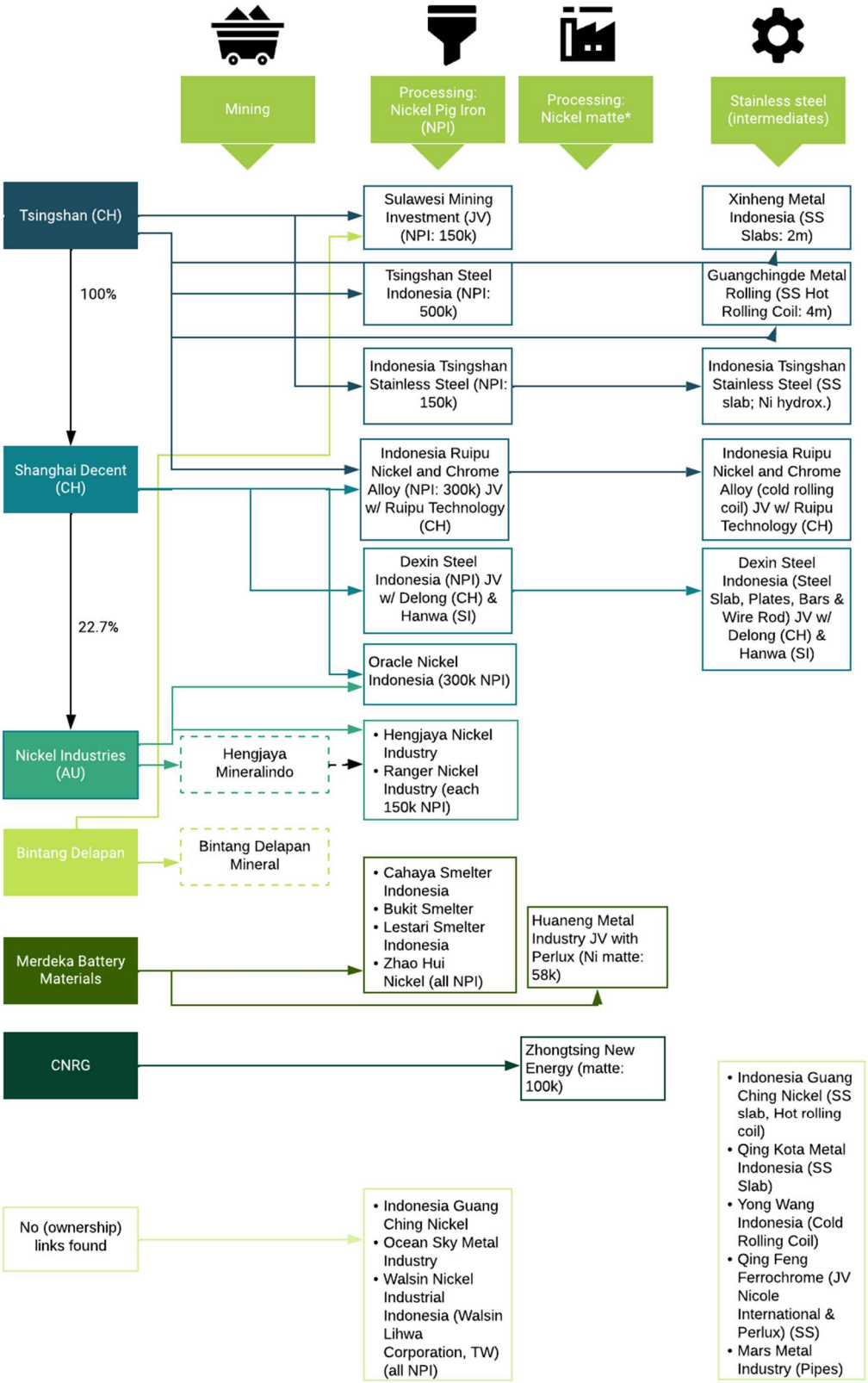
As of 2022,[d] PT IMIP is a joint venture between **Shanghai Decent Investment Group** (49.69%), a subsidiary of **Tsingshan Group (CN)**, a stainless-steel manufacturer and nickel producer, **Bintang Delapan Group (ID)** (25.31%), an Indonesian company active in mining, oil & gas and chemicals,

[d] No annual reports were found of Tsingshan Group and Bintang Delapan Group or the companies' website content containing this information. Therefore, secondary sources were cross-checked and used, containing data from 2022.

and **Sulawesi Mining Investment** (25%). **Sulawesi Mining Investment**, in turn, is a joint venture between **Shanghai Decent Investment Group** and **Bintang Delapan Group**. Therefore, Shanghai Decent Group effectively holds 66.25% of the shares, and Bintang Delapan Group holds 33.75% in IMIP.[34]

According to IMIP, there are currently 52 companies operating in the area ("tenants").[35] Thirty-seven companies involved in nickel processing are shown in Figure 6 and Figure 7, for stainless steel and EV batteries, respectively. Other companies produce coke, gas, lithium hydroxide, and electrolytic aluminium, among other things, and are therefore not relevant to this study.

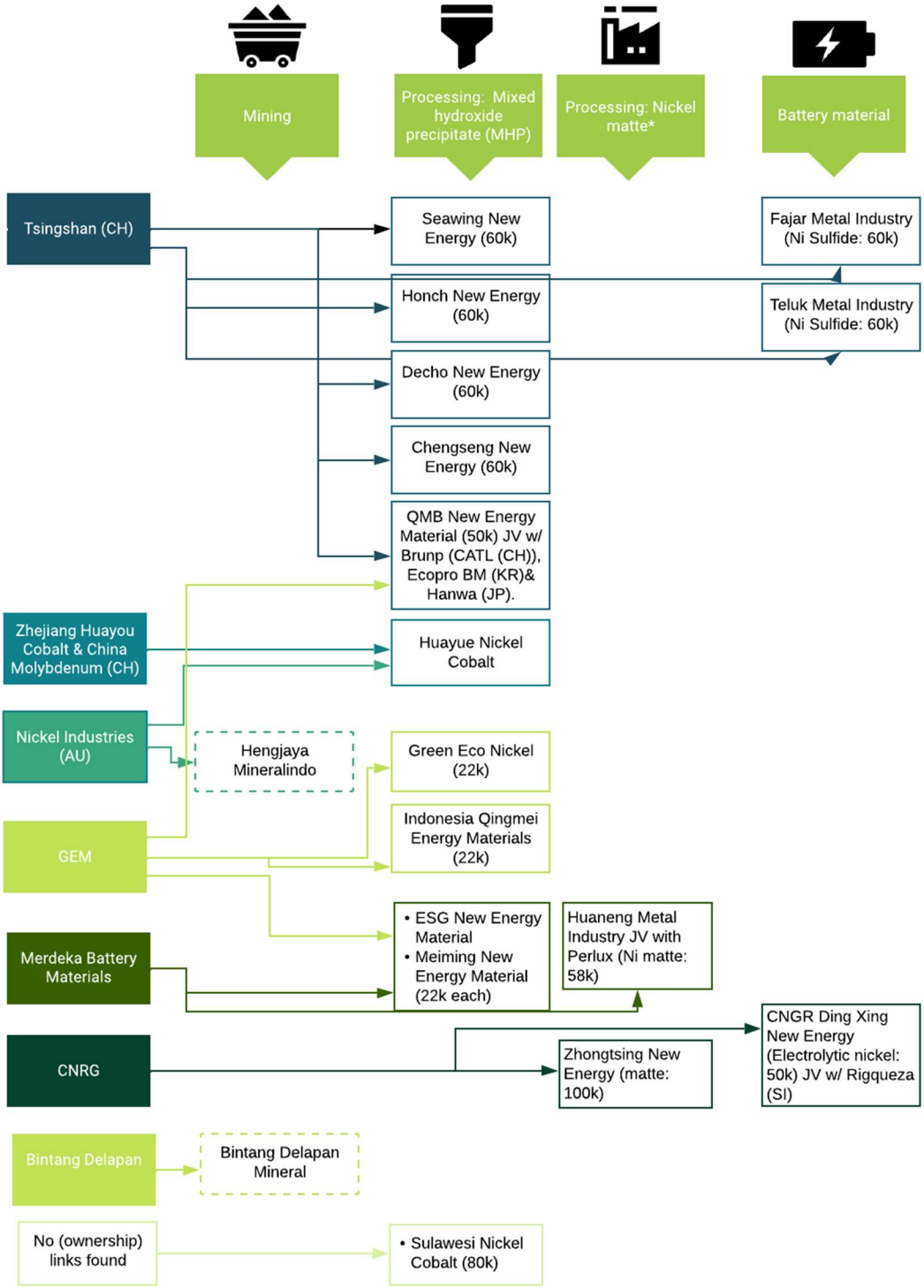
Figure 6 Key players IMIP nickel supply chain – stainless steel cluster



Source: IMIP (n.d.), "About us – Industrial cluster", online: https://imip.co.id/tentang-kami/; IMIP (n.d.), "Tenants", online: https://imip.co.id/tenant/, viewed in February 2025.

Note: dotted lines represent mines that supply ore but are not located in the IMIP area. Important to note that the list is not exhaustive but shows the identified key players. All figures in tons capacity per year. * Although not mentioned by the IMIP website, nickel matte may also be used for stainless steel.

Figure 7 Key players IMIP nickel supply chain – EV battery cluster

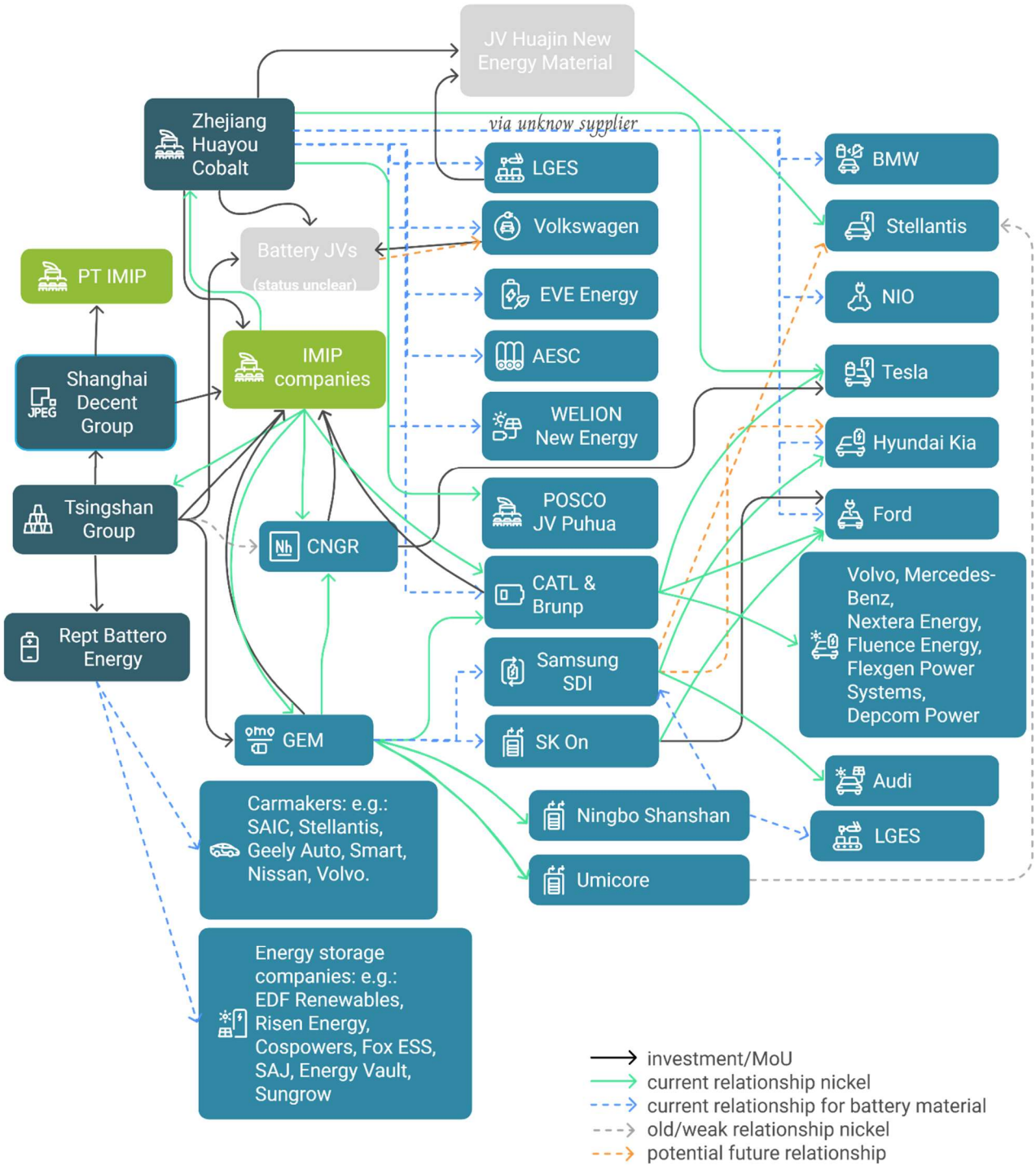


Source: IMIP (n.d.), "About us – Industrial cluster", online: https://imip.co.id/tentang-kami/; IMIP (n.d.), "Tenants", online: https://imip.co.id/tenant/, viewed in February 2025.

Note: dotted lines represent mines that supply ore but are not located in the IMIP area. Important to note that the list is not exhaustive but shows the identified key players. All figures in tons capacity per year. * Although not mentioned by the IMIP website, nickel matte may also be used for stainless steel.

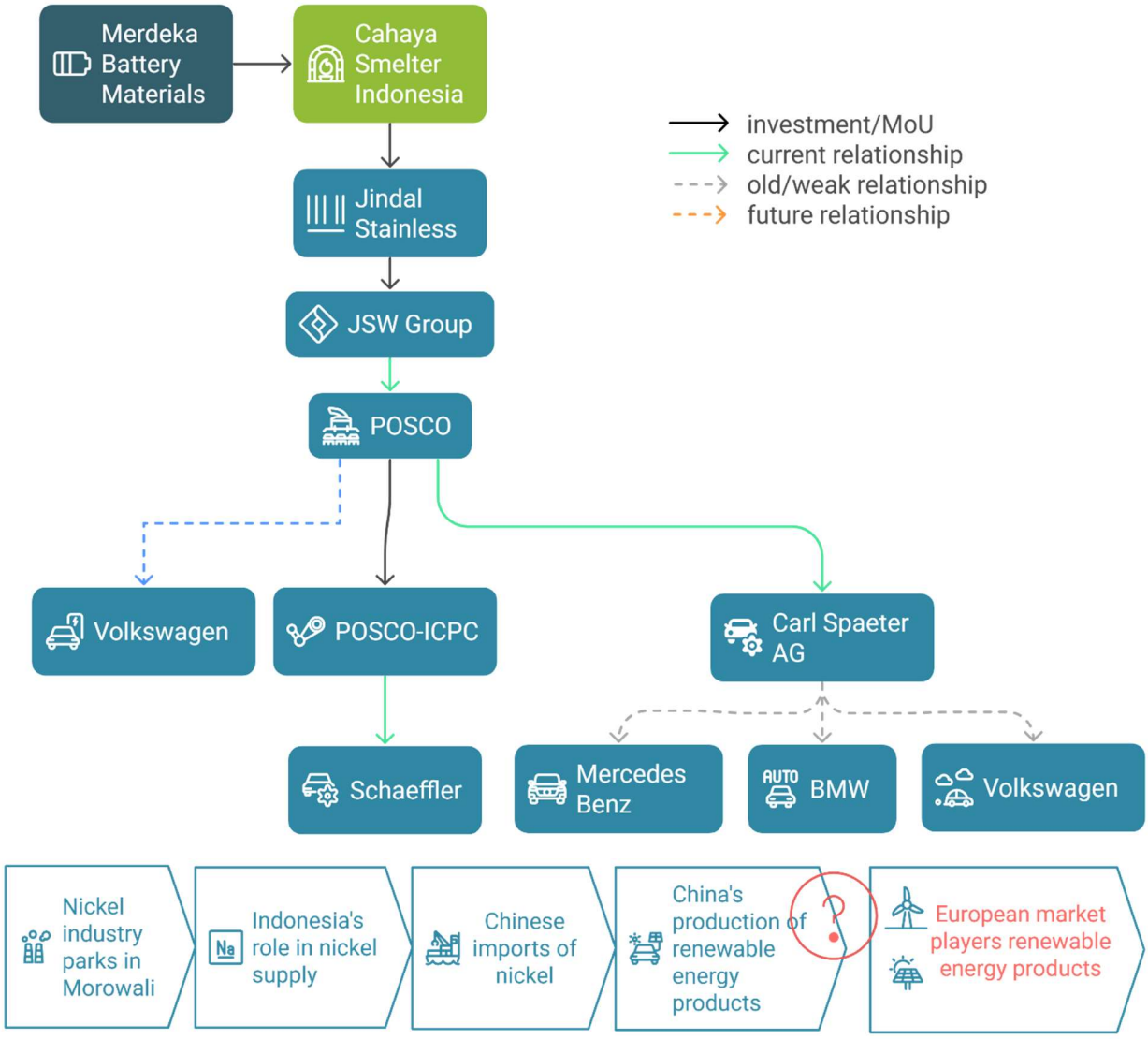
2.2.2 Mid- and upstream supply chain links

Figure 8 Potential current and future EV / energy storage battery supply chain exposure to IMIP nickel



Source: Profundo.

Figure 9 Potential current and future automotive and renewable energy technology supply chain exposure to IMIP nickel



Source: Profundo.

2.2.2.1 CNGR

Both **CNGR China** and **CNGR Indonesia** are mentioned by **Tesla** as direct nickel suppliers (refiners).[36] CNGR produces battery precursors and is involved in IMIP via its subsidiary **Zhongtsing New Energy**, which produces nickel matte, with a production capacity of 100,000 tons per year. In addition, its JV with **Rigqueza** (SI), **CNGR Ding Xing New Energy**, located in IMIP, produces electrolytic nickel. This company's production capacity is 50,000 tons per year.[37]

Indeed, Indonesian export data suggests that in 2024, CNGR in China received around 18,700 tons of ferronickel from Zhongtsing New Energy and 4,600 tons of MSP from CNGR Ding Xing New Energy.[38]

2.2.2.2 GEM

GEM (CN), a battery material manufacturer, is involved in IMIP via three JVs and two subsidiaries (see Figure 7):

- QMB New Energy Material: JV with **Tsingshan** (CN), **Brunp (part of CATL**, CN), **Ecopro BM** (KR) and **Hanwa** (JP).[e]
- Green Eco Nickel
- ESG New Energy Material: JV with **Merdeka Battery Materials (ID).**
- Indonesia Qingmei Energy Materials
- Meiming New Energy Material (ID): JV with Merdeka Battery Materials

According to Indonesian export data, GEM in China and Hong Kong received around 102,000 tons of MHP from QMB New Energy Material in 2024.[39]

In its Annual Report 2023, GEM states that it established strategic cooperation with global customers, including EcoPro, **Samsung SDI** (KR)**, SK On** (KR) and **CATL** (CN).[40] However, it remains unclear which battery material is supplied to each of the companies, so a nickel supply chain link cannot be confirmed. GEM additionally mentions on its website that its main customers of nickel products are **Brunp** (subsidiary of CATL)**, CNGR** (see 2.2.2.1)**, Hunan Changyuan, Shanshan, and Umicore** (BE)**.**

By being GEM customers, these battery (material) makers may be exposed to nickel from IMIP. However, no direct supply chain links between IMIP and these battery makers could be established or confirmed from shipment data. Therefore, the following analysis only suggests possible exposure.

CATL

CATL is a Chinese battery maker serving a large customer base among which are EV car makers as well as energy storage batteries.

According to Indonesian export data, Hong Kong Brunp and CATL received around 17,000 tons of MHP from QMB New Energy Material in 2024.[41]

Furthermore, US import data[f] suggests the following links, between January and December 2024, relevant to the automotive and renewable energy sectors:[42]

- **Volvo** received 547 shipments of lithium-ion batteries from CATL in China, with a total weight of roughly 12,000 tons.
- **Nextera Energy** (US, owner/operator of wind parks and solar plants): received 206 shipments from CATL in China of ithium-ion batteries “installed in cargo transport unit” with a total weight of roughly 40,000 tons.
- **Tesla**: No shipments for 2024 were recorded, while in 2023, Tesla received more than 450 shipments from CATL China of lithium-ion batteries with a total weight of roughly 70,000 tons.
- **Mercedes-Benz**: 45 lithium-ion battery shipments from CATL in China, with a total weight of roughly 2,800 tons.
- **Fluence Energy** (US, battery storage): 39 lithium-ion battery shipments from CATL in China, with a total weight of roughly 4,000 tons.
- **Flexgen Power Systems** (US): 61 shipments from CATL in China of lithium-ion batteries “installed in cargo transport unit” with a total weight of roughly 11,000 tons.
- **Depcom Power** (US, Koch Industries, renewable energy): received 206 shipments from CATL in China of ithium-ion batteries “installed in cargo transport unit” with a total weight of roughly 40,000 tons.
- **Ford**: 2 shipments from CATL in China of lithium-ion batteries with a total weight of roughly 75 tons.

[e] Hanwa has a strategic partnership agreement with Honda (2022) for EV battery materials.

[f] It is estimated that around 9% of the value of extra-EU imports in EVs is shipped from the US, while 49% comes from China, 19% from South Korea and 11% from the UK.

CATL has a production facility in Germany, though only one shipment was recorded between Jan 2023 – December 2024, supplying 210 kg of lithium-ion batteries from China to Germany, via Turkey. The absence of more data is likely due to the lack of recent Chinese export data and no import data for European countries.[43]

These CATL customers may be exposed to nickel from IMIP through CATL's subsidiary Brunp and its shareholding in QMB New Energy Material, and as a customer of GEM.

Minmetals New Energy Materials Hunan (formerly Hunan Changyuan)

Minmetals New Energy Materials Hunan (formerly Hunan Changyuan, CN) is a Chinese battery material manufacturer. **Axens** (FR) reported in October 2023 that it had signed a MoU with Hunan Changyuan to produce battery materials in France, which is scheduled to be operational in 2027, to serve the local EV market.[44]

Ningbo Shanshan

Ningbo Shanshan (CN) is a producer of lithium-ion battery material, including nickel-containing ternary cathode material precursors. The company reports that its major customers are lithium battery manufacturers **LG Chem, BYD**[g]**, and Samsung SDI**.[45] However, it remains unclear which battery material is supplied to each company, so a nickel supply chain link cannot be confirmed.

Samsung SDI

Samsung SDI (KR) supplies EV batteries to various automakers, including recently two **Audi** models. Furthermore, the battery maker recently signed a contract with **Hyundai Motor** to supply its sixth-generation prismatic batteries, known as P6, over seven years starting in 2026.[46] In July 2023, **Stellantis** announced plans for a second battery plant in the US, together with Samsung SDI under their current JV StarPlus Energy.[47] Stellantis manufactures car brands **Chrysler, Citroën, Fiat, Jeep, Opel and Peugeot**, among others.

SK On

SK On is a Korean battery maker. The company collaborates with **Ford** in their JV **BlueOval SK**, which manufactures batteries in the US.[48]

Umicore

Umicore (BE) is a materials technology company that produces battery materials for EVs and renewable energy solutions.[49] In 2022, **Stellantis** mentioned Umicore in Finland as one of its nickel suppliers and may therefore be exposed to nickel from IMIP via GEM's activities in Indonesia; however, this could not be confirmed as Stellantis specifically mentions the refinery in Finland.[50] **Volkswagen** also cooperates with Umicore in their joint company PowerCo, which announced a new European JV named IONWAY in 2023, to produce EV cathode materials.[51]

2.2.2.3 Jindal Stainless

Indonesian export data suggests that Jindal Stainless (IN) received 1,900 tons of ferronickel from Cahaya Smelter Indonesia in 2024,[52] which is located in IMIP and owned by Merdeka Battery Materials (ID). **JSW Group (Jindal South West Steel)** and Korean steelmaker **POSCO** signed an MoU in 2024 to build an integrated steel plant in India, and to drive cooperation in battery materials.[53] India export data suggests that in 2023, a total of 5 shipments of hot rolled wire rods with a value of US$ 1 million was shipped from JSW Steel to POSCO International in Korea.[54] Therefore, a potential indirect link for stainless steel between POSCO and Cahaya Smelter

[g] BYD is an integrated Chinese company with activities in batteries and electronics, EVs, renewable energy and rail transit.

Indonesia (IMIP) via JSW Group, the parent company of Jindal Stainless, could exist, but this cannot be confirmed.

In turn, POSCO announced in 2020 that it will directly supply Volkswagen with 'indexing wheels', which is a forged product used in the transmission systems of plug-in hybrid EVs.[55] Nickel is likely used as an alloy for the steel.

According to a May 2024 article on POSCO's website, **POSCO-ICPC** supplies Schaeffler in **India**.[56] While it is known that Schaeffler is a leading supplier of automotive brands and, therefore, likely supplying production facilities in India, supply links in or from India could not be confirmed. Carl Spaeter AG, one of Germany's largest metal sheet-cutting companies, reportedly supplies to car manufacturers such as **Mercedes Benz**, **BMW**, and **Volkswagen**.[57] In 2023/24, Carl Spaeter received cold-rolled steel valued at around US$ 4 million from **POSCO Maharashtra** (India).[58]

However, since this is an indirect link, no conclusions can be drawn on whether these cars and parts contain stainless steel from Cahaya Smelter Indonesia. However, given this potential link, they may be exposed to nickel from IMIP via stainless steel produced by JSW Steel and POSCO.

2.2.2.4 Rept Battero Energy (Tsingshan Group)

Rept Battero Energy (Rept) is an EV battery company that is part of **Tsingshan Group,** which, in turn, has a majority stake (66.25%) in PT IMIP via its subsidiary Shanghai Decent Group (see 2.2.2.5). According to Rept, the company "cooperates" with carmakers **Yutong**, **Dongfeng Trucks**, **Sany**, **King Long**, **Zeekr**, **SAIC**, **Stellantis**, **SGMW**, **Geely Auto**, **Smart**, **Nissan**, **Volvo**, among others.[59] Rept has, additionally, "partners" with energy storage companies **EDF Renewables**, subsidiary of **EDF Group** (FR), **Risen Energy** (CN, with a virtual office in Spain), **Cospowers** (CN, with an office in Germany), **Fox ESS** (CN, with a Benelux office in NL), **SAJ** (CN, witch global offices), **Energy Vault** (CN) and **Sungrow** (CN, with global offices), among others.[60]

As a Tsingshan Group company involved in battery production, Rept Battero Energy and its customers may be linked to the supply of nickel from IMIP.

2.2.2.5 Tsingshan Group

Tsingshan has an effectively majority stake (66.25%) in PT IMIP via its subsidiary **Shanghai Decent Group**. Nickel Industries, of which around 20% of the shares are held by Shanghai Decent entities,[61] reports that it agreed to sell all its nickel pig iron (NPI) and MHP to Tsingshan group companies.[62] According to Tsingshan Group, its subsidiary Tsingtuo Group is responsible for a number of stainless steel innovations it has developed since 2016, which are used in end-user products of the well known brands Apple and Zwilling cookware.[63]

In 2021, Tsingshan signed agreements to provide nickel matte, which is used to make batteries for electric vehicles (EVs), to **Huayou Cobalt** and battery materials maker **CNGR Advanced Material** within a year.[64] It is unclear whether Tsingshan is still supplying nickel matte to these companies.

In 2022, **Volkswagen Group China** signed two MoUs with Huayou Cobalt and **Tsingshan Group** to set up two JVs to secure a sustainable supply chain of battery raw materials for new energy vehicle growth in China. The JVs are focusing on nickel and cobalt raw material production.[65] Considering Tsingshan Group's majority ownership of IMIP via Shanghai Decent Group, this business relationship may expose VW to nickel sourced from IMIP in the future. The carmaker does not disclose its suppliers but states that *"[f]or the Volkswagen Group, EV batteries are by far the largest field where nickel is required, and we did not directly source any nickel for this use in 2023. Our main sourcing countries for nickel are Australia, China, Papua New Guinea, **Indonesia** and New Caledonia (France)."*[66] According to S&P, VW today sources about 95% of its nickel from Indonesia.[67]

Although the supply chain analysis reveals only some potential links, it is likely that at least a portion of these solar panels and wind turbines contain nickel from IMIP. This is based on the fact that Tsingshan Group is one of the largest stainless steel producers in China, with an estimated

25% market share,[68] and that stainless steel is commonly used in wind turbines and for solar panel mountings. Moreover, in 2023, 98% of EU partners' imports of solar panels and 29% of wind turbines were sourced from China.[69]

2.2.2.6 Zhejiang Huayou Cobalt

Huayou manufactures lithium-ion battery materials and new cobalt materials and presents five nickel projects in Indonesia on its website, among which the Huayou HPAL project in IMIP (Sulawesi): "***Huayue Nickel Cobalt*** *is currently the largest HPAL project in the world that has started production.*"[70]

Indonesian export data suggests that in 2024, Huayue Nickel Cobalt exported around 273,000 tons of Mixed Hydrogen Precipitate (MHP) to Huayou Hong Kong.[71]

Huayou mentions in its 2023 Annual Report that it entered the supply chain of Japanese car makers and expanded its activities in the European and American markets in relation to EV supply chains. The company states that its "*main products have covered the global power battery brand enterprises such as* ***LGES, CATL, Volkswagen, EVE Energy, AESC*** *and* ***WELION New Energy***" and are "*widely used*" in EVs by **Tesla**, **BMW**, **Stellantis**, **NIO**, **Volkswagen**, **Hyundai Kia** and **Ford**.[72] While it is likely that nickel is involved, this is not certain for each and every one of these relationships.

Indeed, **Stellantis** mentions Huajin New Energy Materials (Quzhou, CH) as one of its nickel suppliers, which is a JV between LGC and Huayou (51%) producing EV battery material[73], as well as Zhejiang Huayou Cobalt, in 2022.[74]

Tesla disclosed the names of six nickel suppliers (mines and refiners) in its 2023 Impact Report. Both **Huayou Indonesia** and **Huayou China** are mentioned as direct suppliers (refiners).[75] Huayou is involved in IMIP via its JV **Huayue Nickel Cobalt**, which has a production capacity of 70,000 tons of Nickel Cobalt (or MHP) a year.[76] According to the Coordinating Minister for Maritime Affairs and Investment, Luhut Binsar Pandjaitan, Tesla also signed nickel purchase contracts from Zhejiang Huayou in 2022.[77] This is also mentioned in a Bloomberg report[78], but could not be confirmed by Tesla documentation.

Furthermore, the company states that it *"signed long-term ternary precursor supply agreements with* ***POSCO Chemical*** *and* ***Puhua Company****; on the basis of consolidating its strategic customers such as* ***LGC, POSCO****, and* ***L&F****, the Company strengthened the relationship with LGES battery chain, and at the same time entered the high-value supply chain such as* ***SDI and Ecopro****."*[79] Ternary precursors contain nickel.

In March 2022, **Volkswagen Group China** signed two MoUs with Huayou Cobalt and Tsingshan Group to establish joint ventures (JVs) aimed at strengthening China's battery value chain and securing raw material supplies. Alongside the Indonesian JV focused on nickel and cobalt battery raw materials, the agreement also includes a JV with Huayou in Guangxi, China, for refining nickel and cobalt sulfates, as well as precursor and cathode material production.

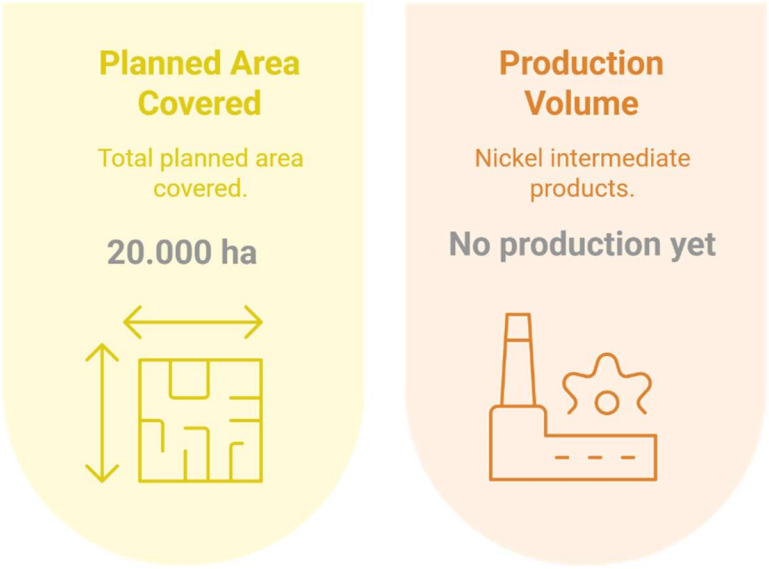
Huayou's activities in the IMIP industrial area may expose its clients to IMIP.

2.3 PT Indonesia Huabao Industrial Park (IHIP)

2.3.1 Profile

Located in the Morowali province, Central Sulawesi, the Indonesia Huabao Industrial Park (IHIP) is engaged in the processing of nickel ore into intermediate products for the stainless steel and battery industries. In June 2024, it was reported that the planned area covers 20,000 hectares and is part of the "One Belt, One Road Initiative". IHIP is 51% owned by Zhensi Indonesia Industrial Park (part of Zhenshi Holding Group, CN), 10.28% is held by Beijing Shengyue Oriental Investment (CN), 27.45% by Kejayaan Emas Persada (ID), and 11.27% by Himalaya Global Investment (UK).[80] Zhenshi Holding Group is the leading investor, though it does not publish any information on IHIP on its website.[81]

Figure 10 IHIP - Overview nickel processing



Note: no information was found suggesting the smelters are operational yet.

Source: Profundo.

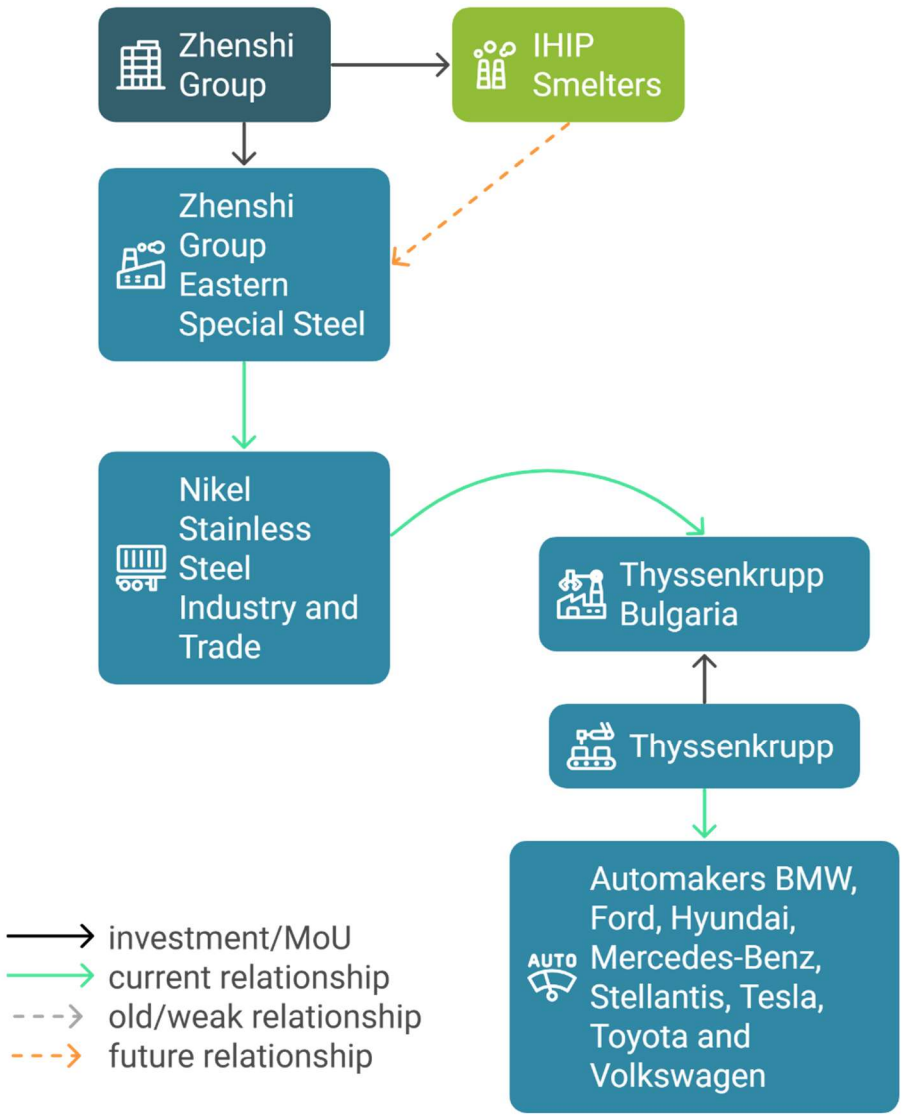
Media articles reported in December 2023 that the construction of a power station and related nickel smelters was almost finished and planned to be inaugurated in March 2024.[82] The power station was constructed by Baoshuo Taman Industry Investment Group (BTIIG), owned by Zhenshi. However, in June 2024, media reported on land-grabbing practices by BTIIG and, allegedly, not having the proper permits. The facilities do not seem to be operational yet.[83] In June and July 2024, community protests were reported against the company claiming a village road (near Tondo and Topogaro Villages) as the company's hauling road.[84]

Zhenshi Group is a China-based company involved in fiberglass fabrics for wind energy, special steel (including stainless) and new composite materials, among others. The Group has international facilities in Indonesia (Yashi Indonesia), Turkey (Hengshi Turkey), Spain (Zhenshi Spain, involved in the sales of composite materials, fiberglass and fiberglass reinforced materials, new building materials), Egypt and the US. The Group's subsidiary, Yashi Indonesia Investment, is located in Indonesia Weda Bay Industrial Park (IWIP) and operates four nickel iron smelting production lines.[85]

2.3.2 Mid- and upstream supply chain links

Since the IHIP smelters do not seem to be operational yet, all supply chain links identified are relationships that Zhenshi, the majority shareholder of IHIP, has via its other subsidiaries, and that may be exposed to nickel from IHIP *in the future*.

Figure 11 Potential future EV / energy storage battery supply chain exposure to IHIP nickel



Source: Profundo.

2.3.2.1 Thyssenkrupp Materials

Thyssenkrupp Materials (Thyssenkrupp) is a manufacturer of stainless steel and other steel products with facilities worldwide. A potential, indirect link for stainless steel between Thyssenkrupp Bulgaria and Zhenshi Group Eastern Special Steel (CH), via Nikel Stainless Steel Industry and Trade (TR) could exist, but this cannot be confirmed. Shipment data suggests that, between January 2022 and December 2024, **Nikel Stainless Steel Industry and Trade** (TR) received five stainless steel shipment (close to 520 tons) from **Zhenshi Group Eastern Special Steel** (CN). In turn, shipments were recorded between **Nikel Stainless Steel Industry and Trade** (TR) and **Thyssenkrupp Bulgaria** (BG), containing roughly 1,320 tons of stainless steel.[86]

According to the International Council of Clean Transportation (ICCT), the Thyssenkrupp is a major steel supplier in Europe for automakers **BMW, Ford, Hyundai, Mercedes-Benz, Stellantis, Tesla, Toyota and Volkswagen**, among others.[87]

Since this is an indirect link, no conclusions can be drawn on whether these cars contain stainless steel from Zhenshi. However, given this potential link, they may be exposed to nickel from IHIP *in the future*, via stainless steel produced by Zhenshi and shipped to Thyssenkrupp.

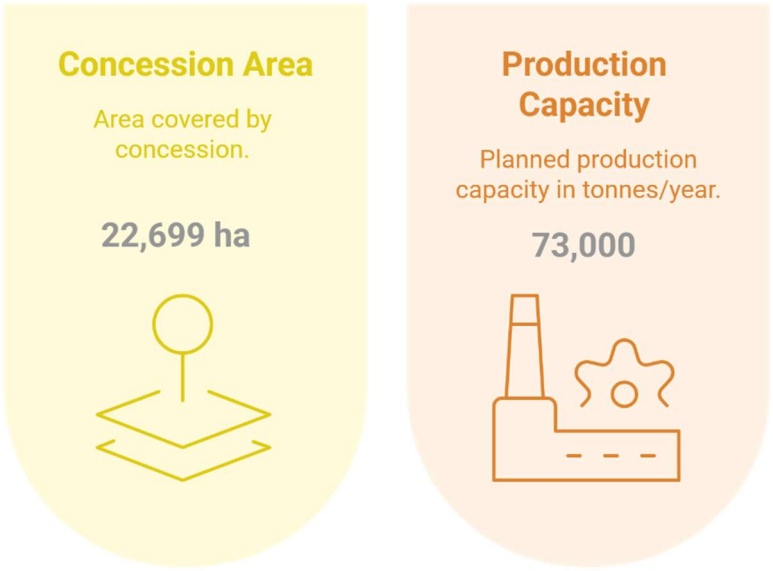
2.4 PT Vale Indonesia

2.4.1 Profile

PT Vale Indonesia (PTVI) develops three nickel projects in Sulawesi, on a concession area totalling 118,017 hectares across South Sulawesi (Sorowako, 70,566 hectares), Central Sulawesi (Morowali, 22,699 hectares, North from IMIP industrial park) and Southeast Sulawesi (Pomalaa, 24,752 hectares).[88]

PTVI mines nickel ore only in the open-pit mine located in Sorowako. In addition, PTVI develops nickel mining and processing in Bahadopi and Pomalaa.[89] Production totalled 13.5 million (metric) tons of nickel ore in 2023.[90] The processing plant in Sorowako has a daily production capacity of 180-216 tons of nickel in matte.[91] Nickel matte production reached 70,728 tons in 2023.[92]

Figure 12 PTVI - Overview nickel processing Morowali



Source: Profundo.

As of July 2024, the company's shares are held by **Vale Canada** (VCL, a wholly-owned subsidiary of Canadian Vale Base Metals (VBM), which in turn is a subsidiary of Brazilian mining company Vale S.A., 33.9%), **Mineral Industri Indonesia** (Persero, 34%), **Sumitomo Metal Mining** (SMM (JP) 11.5%),[93] and the remaining 20.65% is publicly held.[94] Vale Indonesia's nickel products are exported to VCL and SMM as part of a long-term agreement,[95] with VCL having the right to 80% of nickel matte production and SMM to 20%.[96]

PTVI states in its Annual Report 2023: "*With our expertise in nickel processing and commitment to technological innovation, PT Vale is ready to meet the demand for high-quality nickel products that support the growth of the electric vehicle industry.*"[97]

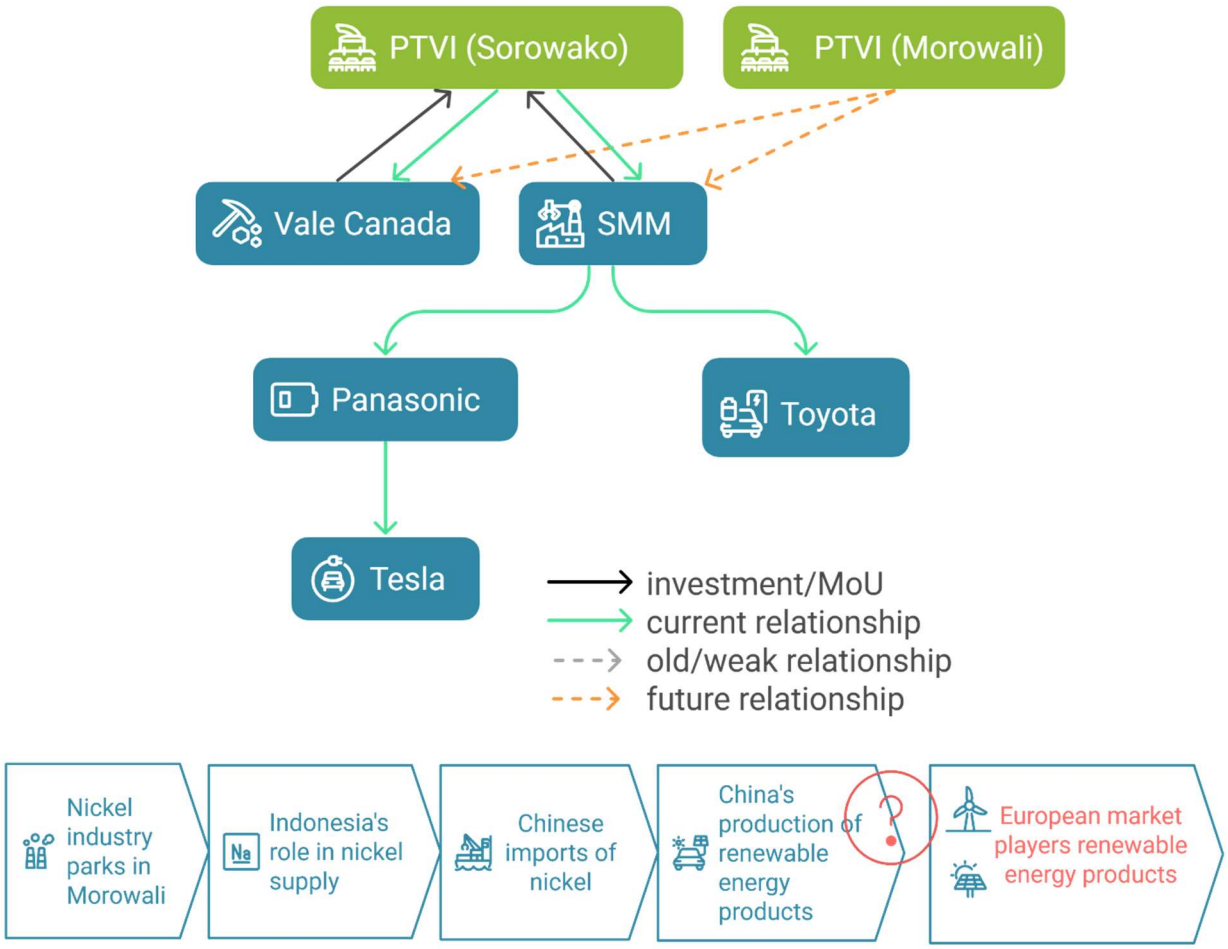
In Morowali, the company is developing more nickel mining and processing facilities (**Fout! Verwijzingsbron niet gevonden.**), with a projected production output of 73,000 tons of nickel in ferronickel. The mining locations are in Bungku Timur and Bahodopi Districts, while the processing facilities are in Sambalagi Village, Bungku Pesisir District. The RKEF smelter in Sambalagi Village

is a joint undertaking between Vale and **Taiyuan Iron & Steel** (TISCO, CN) and **Shandong Xinhai Technology** (Xinhai, CN). Media reports that until September 2024, the construction of the Morowali project has shown considerable progress in the third quarter of 2024 and reached 70% completion at the end of 2024.[98] PTVI indicates that it aims for the project to be completed in 2025-2026.[99]

Due to this situation, the following findings refer to PTVI's Sorowako activities.

2.4.2 Mid- and upstream supply chain links

Figure 13 Potential current and future EV / energy storage battery supply chain exposure to PTVI nickel



Source: Profundo

2.4.2.1 Vale Canada (VCL)

VCL produces critical minerals for electric vehicles and renewable energy in Canada, the U.K., Brazil, Japan, and Indonesia.[100] The company is owned by VBM (CA), one of the world's largest producers of sourced nickel, copper, cobalt, and platinum group metals. A clear link with PTVI exists, as 80% of nickel matte from Sorowako is sold to Vale Canada.[101] Indeed, Indonesian export data suggests that VCL received at least 64,700 tons of nickel matte from PTVI in 2024.[102] Vale Canada may be exposed to nickel from Morowali in the future.

2.4.2.2 Sumitomo Metal Mining (SMM)

SMM is a Japanese mining, processing and battery materials manufacturer. The company established an in-house nickel supply chain from mineral ore to battery materials, including mining,

smelting (using the HPAL technology), refining (processing into nickel sulfate from intermediates), and battery materials production (cathode material for batteries).[103]

There is a clear link with PTVI via SMM's stake in **PTVI**, and 20% of nickel matte produced by PTVI is sold to SMM.[104] More specifically, PTVI supplies nickel matte and nickel ore to SMM's **Niihama Nickel Refinery** (JP), which produces electrolytic nickel using nickel matte.[105] This refinery produces nickel sulfate and nickel chloride, which are processed into battery materials and nickel powder in SMM's **Isoura plant**. Niihama Refinery also directly supplies customers with electrolytic nickel.[106] Indonesian export data suggests that SMM received at least 18,100 tons of nickel matte from PTVI in 2024.[107]

SMM plans to expand the production capacity of cathode materials for secondary batteries for electric vehicles in Besshi District (where the Niihama Nickel Refinery and Isoura Plant are located, among other operations) and the Harima Refinery, valued at JPY 35.5 billion.[108]

Recent media articles point to **Panasonic** as a customer.[109] Panasonic, which is responsible for around 10% of global EV battery output,[110] supplies nickel-cobalt-aluminum (NCA) cathode materials for lithium-ion batteries used in **Tesla** EVs.[111]

SMM's stake in PTVI may expose the company and its customers to nickel from Morowali in the future.

2.4.2.3 Tesla

In 2018, SMM announced that it would concentrate on two primary customers for its battery materials: Toyota and **Panasonic**. At the time, Panasonic was already identified as a supplier to Tesla.[112] Reports of battery supply chain connections between Panasonic and Tesla date back to 2013.[113]

Shipment data suggests that **Panasonic** shipped lithium-ion batteries from Japan to **Tesla** in the US with a total volume of around 43,500 tonnes between Jan 2023 and August 2024.[114] Despite Tesla's switch from nickel-based batteries to lithium iron phosphate (LFP) batteries for its standard-range EVs,[115] its Master Plan outlines that nickel-based batteries will still be included in Model S/X, Cybertruck and Semi Heavy, while LFP batteries will be used in Model 3/Y and Semi Light.[116] As a result, a significant portion of Tesla vehicles will continue to feature nickel-based batteries, albeit at a reduced level. This is further confirmed by recent reports about next-generation EV battery sets produced by Panasonic for Tesla.[117] Due to SMM's direct link with PTVI and its apparent supply chain relationship with Panasonic, Tesla may be exposed tonickel from Morowali in the future.

2.4.2.4 Toyota

The supply chain link from SMM to Panasonic also extends to automaker **Toyota**. Until March 2024, Panasonic operated a battery joint venture with Toyota under the name Primearth EV Energy. However, as of 1 October 2024, Primearth has become a wholly-owned Toyota subsidiary and renamed Toyota Battery.[118]

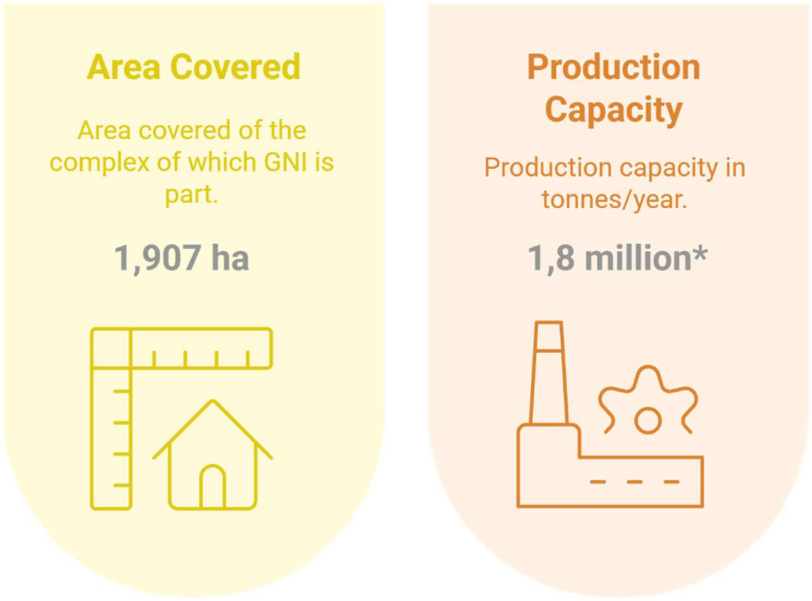
A press release from March 2020 confirmed a relationship between SMM and **Toyota**, to whom SMM supplied lithium nickel manganese cobalt oxide (NMC) as cathode material for lithium-ion batteries used in the **Toyota** Yaris model.[119] Another indication is SMM's announcement in March 2024 of its plans to build recycling plants for lithium-ion batteries for which it, among others, concluded a partnership agreement with Toyota, suggesting an continued supplier relationship.[120] Moreover, SMM and Toyota received a patent on secondary battery and lithium-ion secondary battery development in June 2024.[121] Because of these indications of supply chain relationships between SMM and Toyota, also via Panasonic, and SMM's direct link with PTVI, Toyota may be exposed to nickel from Morowali in the future.

2.5 PT Gunbuster Nickel Industri (GNI)

2.5.1 Profile

Established in 2019, PT Gunbuster Nickel Industri (GNI) is located in North Morowali (Central Sulawesi) and has a nickel smelter using Rotary Kiln-Electric Furnace (RKEF) smelter technology that produces NPI for export.[122] It is part of the Virtue Dragon Nickel Industry complex, which covers 1,907 hectares, supported by ports.[123] The GNI facility has an annual capacity of 1.8 million tons and started operating in December 2021.[124]

GNI - Overview nickel processing



* Only a small part is currently operational.

Source: Profundo.

GNI is affiliated with nickel miner, smelter, and refiner Jiangsu Delong Nickel Industry (CN), one of China's largest steel producers that went bankrupt in 2024.[125] In a press release from February 25, 2025, GNI states that, although the company is currently undergoing changes in management and the transition may cause inconvenience to some parties, the company's operations continue to run as usual.[126] However, according to media, GNI has postponed payments to energy suppliers and is struggling to purchase nickel ore for production. Of the 20 initial production lines, only a few have been operational since early 2024.[127]

The potential closure of GNI could lead to mass layoffs, affecting thousands of employees and their families who rely on the smelter for their income. Due to limited job opportunities in the region, many of these workers may struggle to find alternative employment, potentially leading to economic hardship and social unrest.[128]

PT GNI's problems illustrate the Indonesian nickel industry's challenges

Indonesia's nickel industry, after a rapid rise during recent years and large investments particularly by Chinese companies, is now struggling with serious challenges due to a combination of internal and external pressures. PT GNI, one of the country's largest smelters, is emblematic of this crisis—struggling financially amid the collapse of its parent company, Jiangsu Delong Nickel, and facing delayed supplier payments and operational uncertainty. The broader nickel industry is suffering from a nickel price slump, a result of oversupply driven by Indonesia's strong push to develop downstream capacity, weak demand from key markets like China, and competition from alternative battery chemistries. An ore shortage and high transport costs have further squeezed profit margins, forcing many smelters to scale back or even halt operations in recent months.[129]

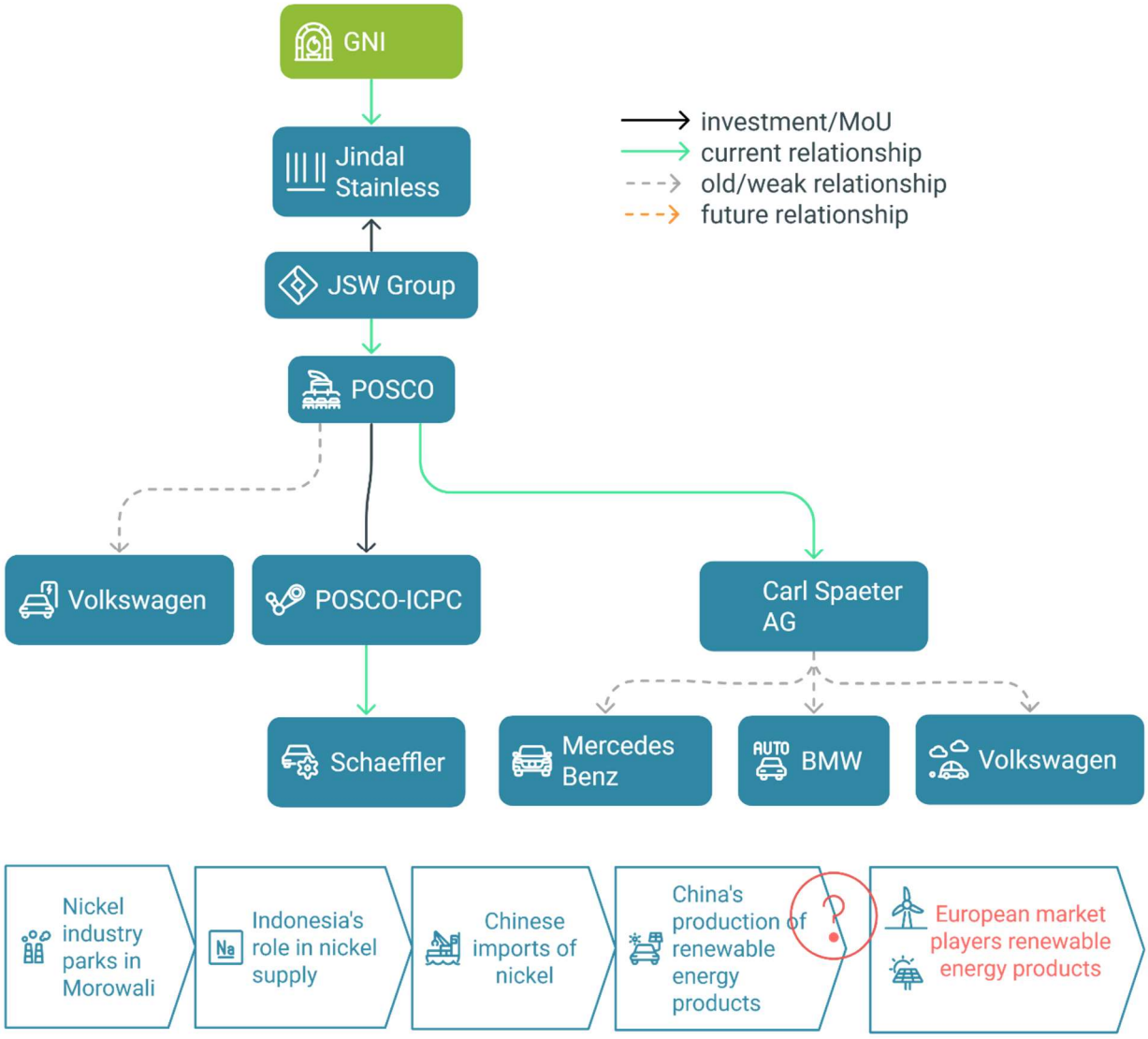
To address these challenges, it was reported in March 2025 that the Indonesian government-backed BPI Danantara is considering acquiring GNI, aiming to stabilise operations and reinforce Indonesia's role in the global battery supply chain. Analysts see the industry's future hinged on a market rebound—particularly in stainless steel and EV demand—without which many smelters may remain unprofitable.[130]

2.5.2 Mid- and upstream supply chain links

GNI announced in December 2021 that it signed a preliminary agreement with PT Aneka Tambang (ANTAM, ID) to cooperate on the long-term supply of nickel.[131] MIND ID, ANTAM's parent, confirms this collaboration from mining the ore to selling it to the smelter, as well as a new smelter project to be developed.[132] However, no updates are provided by the companies and ANTAM does not mention GNI in its annual report. It does report GNI in its list of trade receivables, which indicates GNI is a customer of ANTAM.[133] However, because ANTAM has nickel smelters operating in-house, it remains unclear whether it also sells ferro-nickel from GNI's smelter.

According to media, "*[p]roducers shipping nickel products from Indonesia to Europe include Gunbuster Nickel Industry, owned by China's ailing Jiangsu Delong Nickel Industry Co., and local firm PT Trimegah Bangun Persada, better known as Harita Nickel, according to people familiar with the matter.*"[134]

Potential current and future steel for cars supply chain exposure to GNI nickel



Source: Profundo

2.5.2.1 Jindal Stainless

Indonesian export data suggests that Jindal Stainless (IN) received 10,000 tons of ferronickel from GNI in 2024[135] **JSW Group (Jindal South West Steel)** and Korean steelmaker **POSCO** signed an MoU in 2024 to build an integrated steel plant in India, and to drive cooperation in battery materials.[136] India export data suggests that in 2023, a total of 5 shipments of hot rolled wire rods with a value of US$ 1 million was shipped from JSW Steel to POSCO International in Korea.[137] Therefore, a potential indirect link for stainless steel between POSCO and Cahaya Smelter Indonesia (IMIP) via JSW Group, the parent company of Jindal Stainless, could exist, but this cannot be confirmed.

In turn, POSCO announced in 2020 that it will directly supply Volkswagen with 'indexing wheels', which is a forged product used in the transmission systems of plug-in hybrid EVs.[138] Nickel is likely used as an alloy for the steel.

According to a May 2024 article on POSCO's website, **POSCO-ICPC** supplies Schaeffler in **India**.[139] While it is known that Schaeffler is a leading supplier of automotive brands and, therefore, likely supplying production facilities in India, supply links in or from India could not be confirmed. Carl

Spaeter AG, one of Germany's largest metal sheet-cutting companies, reportedly supplies to car manufacturers such as **Mercedes Benz**, **BMW**, and **Volkswagen**.[140] In 2023/24, Carl Spaeter received cold-rolled steel valued at around US$ 4 million from **POSCO Maharashtra** (India).[141]

However, since this is an indirect link, no conclusions can be drawn on whether these cars and parts contain stainless steel from GNI. However, given this potential link, they may be exposed to nickel from GNI via stainless steel produced by JSW Steel and POSCO.

3

Social risk assessment

Poor working conditions have detrimental effects on workers at Indonesian nickel production sites. These conditions pertain to Occupational Safety and Health (OSH), wages and income inequality, working hours, job insecurity, gender-based violence and discrimination, and the undermining of trade unions. Additionally, polluted water from runoff sediment, deforestation, air pollution, and forced evictions caused by nickel mining and production activities harm the surrounding communities. A severity assessment shows the gravity of human and labour rights violations in the Indonesian nickel supply chain.

3.1 Introduction

Social risks pertain to both internal and external stakeholders and include employees, customers, vendors, suppliers, and the nearby community, and may also extend to the global community.[142] In relation to social risks associated with nickel production in Indonesia, key stakeholders are employees and the nearby and wider community.

International human rights standards, such as the OECD Guidelines and the Danish Institute for Human Rights, recommend that businesses conduct human rights risk assessments as part of due diligence. When addressing all impacts at once is not feasible, a severity assessment helps prioritise them.

This chapter starts by analysing the key EU regulations, including the European Union Corporate Sustainability Due Diligence Directive (EU CSDDD), the European Union Corporate Sustainability Reporting Directive (EU CSRD), and the EU Batteries Regulation, and discussing their requirements for mid- and downstream companies putting nickel products from Indonesia on the EU market. Then, the social risks associated with nickel production in Indonesia are discussed and subsequently assessed based on severity.

3.2 Key EU regulations

3.2.1 Corporate Sustainability Due Diligence Directive (CSDDD)

The CSDDD (Directive 2024/1760) entered into force on 25 July 2024. This legislation's key objective is to *"[…] foster sustainable and responsible corporate behaviour in companies' operations and across their global value chains."*[143] The rationale behind it is to tackle the social and environmental impacts of major companies both in the EU and outside of the Union, and in particular in the Global South.

Several types of companies are included in the CSDDD scope:

- Large EU limited liability companies & partnerships: +/- 6,000 companies - >1000 employees and >EUR 450 million turnover (net) worldwide.
- Large non–EU companies: +/- 900 companies - > EUR 450 million turnover (net) in EU. The Directive contains provisions to facilitate compliance and limit the burden on companies, both in scope and in the value chain.

- Small- and medium-sized enterprises (SMEs): The proposed rules do not cover micro companies and SMEs. However, the Directive provides supporting and protective measures for SMEs, which could be indirectly affected as business partners in value chains.

Obligations under the CSDDD involve identifying and addressing both potential and actual negative impacts on the environment and human rights within the company's own operations, its subsidiaries, and, when relevant, the operations of its business partners in the value chain. Furthermore, the Directive requires large companies to develop and implement climate transition plans. Such plans must be in line with the Paris Agreement's goal of achieving climate neutrality by 2050 and comply with interim targets set under the European Climate Law.

Companies are expected to bear the costs associated with CSDDD implementation, including the costs of establishing and maintaining the due diligence system and the costs of adapting their business activities along the value chain to the due diligence obligations and implementing transition plans. In addition, Member States are expected to ensure that '*victims get compensation for damages resulting from an intentional or negligent failure to carry out due diligence*.'[144]

The EU Commission explains that "*Member States have to transpose the Directive into national law and communicate the relevant texts to the Commission by 26 July 2026. One year later, the rules will start to apply to the first group of companies, following a staggered approach (with full application on 26 July 2029)*."[145] Member States are expected to designate an authority 'to supervise and enforce the rules' and ensure proportionate penalties for non-compliance, including fines.

The CSDDD does not specifically mention Critical Raw Materials or Strategic Raw Materials (CRMs or SRMs). However, its mandate covers all sectors, including those involved in the extraction, processing, and use of these raw materials. This means that companies in the scope of the CSDDD (large EU and non-EU entities) dealing with CRMs and SRMs are required to conduct due diligence to demonstrate that their operations and value chains do not contribute to negative environmental and human rights impacts.

3.2.2 Corporate Sustainability Reporting Directive (CSRD)

The CSRD entered into force on 5 January 2023. In practice, the directive will be implemented in several stages, with the first entities having to report on the 2024 financial year for reports published in 2025. Overall, the following pashing in schedule has been agreed:

- For financial years starting on or after 1 January 2024 (i.e. with publication in 2025): large undertakings which are public-interest entities exceeding on their balance sheet dates the average number of 500 employees during the financial year;
- For financial years starting on or after 1 January 2025 (i.e. with publication in 2026): the other large undertakings (i.e. large undertakings which are not "public interest entities exceeding on their balance sheet dates the average number of 500 employees during the financial year");
- For financial years starting on or after 1 January 2026 (i.e. with publication in 2027):
    - SMEs (excluding micro-undertakings) with transferable securities admitted to trading on an EU-regulated market;
    - Small and non-complex institutions provided they are either large undertakings or SMEs excluding micro-undertakings) with transferable securities admitted to trading on an EU-regulated market;
    - Captive insurance undertakings and captive reinsurance undertakings provided that they are either large undertakings or SMEs (excluding micro-undertakings) with transferable securities admitted to trading on an EU-regulated market.[146]

The CSRD envisages a double materiality approach. That is, a company must report both on how environmental and social issues can affect its performance (financial materiality) and on how the company's activities impact the environment and society. The Directive also significantly expands the number of material ESG topics companies must report on.

In addition, the CSRD makes it obligatory for companies to seek external independent assurance of the material sustainability information they report. From the first year of CSRD coming into force, limited assurance becomes mandatory; the requirements are expected to expand to reasonable assurance in the future, however, no specific date is currently envisaged.[147]

The EU Commission adopted a delegated act introducing European Sustainability Reporting Standards to harmonise reporting expectations and practices and provide guidance for companies covered by the CSRD requirements.

3.2.3 EU Batteries Regulation

The new Batteries Regulation entered into force on 7 August 2023, repealing the former Batteries Directive. In 2024 and beyond, the EU work will focus on the *"[…] application of the law in the Member States, and the redaction of secondary legislation (implementing and delegated acts) providing more detailed rules."*[148]

The EU Batteries Regulation complements the EU Critical Raw Materials Act (CRMA) by setting specific requirements for battery production and recycling. The Regulation states that "*[…] some of the raw materials used in battery manufacturing […] are considered to be critical raw materials for the Union, […], and their sustainable sourcing is required for the Union battery ecosystem to perform adequately.*"[149]

The Batteries Regulation envisages due diligence obligations, making it mandatory for an economic operator that places a battery on the Union market to develop a battery due diligence policy. Such policy should be based on "*[…] internationally recognised due diligence standards and principles, such as those in the United Nations Guiding Principles on Business and Human Rights, the Ten Principles of the United Nations Global Compact, the United Nations Environment Programme (UNEP) Guidelines for Social Life Cycle Assessment of Products, the International Labour Organisation (ILO) Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, the Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises and the OECD Due Diligence Guidance for Responsible Business Conduct.*"[150] Due diligence obligations must cover a range of social and environmental issues, including "*[…] human rights, human health and safety of persons as well as occupational health and safety, and labour rights, on the one hand, and on the environment, in particular on water use, soil protection, air pollution, climate change and biodiversity, as well as protection of community life, on the other.*"[151] The key social issues in scope include:

- occupational health and safety,
- child labour,
- forced labour,
- discrimination,
- trade union freedoms,
- community life, including that of indigenous peoples.

The due diligence obligations apply to the value chain, including the nickel mining sites. The regulation states that the obligations with respect to the identification and mitigation of social and environmental risks associated with raw materials used in battery manufacturing should contribute to the implementation of UNEP Resolution 4/19 on Mineral Resource Governance, which recognises the important contribution of the mining sector towards the achievement of the 2030 Agenda and the Sustainable Development Goals[152].

According to the EU Batteries Regulation, from February 18, 2027, EV and industrial batteries exceeding 2 kWh must have a digital battery passport. This passport will provide detailed information about the battery's composition, sustainability, and handling instructions, accessible via a QR code.[153]

3.2.4 Potential Impacts of the Omnibus Proposal

In February 2025, the European Commission introduced the Omnibus Package, a series of proposals aimed to *"[…] cut red tape and simplify EU rules for citizens and businesses'* in order to *'regain competitiveness and unleash growth'."*[154] The package was designed to simplify and streamline administrative burdens, particularly for small and medium-sized enterprises (SMEs), by raising reporting thresholds, postponing deadlines, and focusing due diligence on direct suppliers.

On 3 April 2025, the European Parliament adopted the EU Commission's "Stop-the-clock" initiative, part of the Omnibus Package. This means that the implementation dates for many corporate sustainability reporting and due diligence obligations, as well as the deadline for transposing the due diligence provisions, are postponed. The adoption came just two days after the Parliament voted to approve an urgent procedure, enabling the directive to bypass committee-level discussions and proceed directly to a plenary vote.[155] The key changes already approved are as follows:

- Member states will have an extra year – until 26 July 2027 – to transpose CSDDD into national legislation.
- The one-year extension will also apply to the first wave of businesses to be affected, namely: EU companies with over 5,000 employees and net turnover higher than €1.5 billion, and non-EU companies with a turnover above this threshold in the EU. These companies will only have to apply the rules from 2028.
- Application of social and environmental reporting would be postponed by two years for the second and third waves of companies.[156]

Overall, the European Parliament appears to be heavily divided over the proposed package, and it is not yet clear when and to what extent all the proposed changes may be adopted, with some experts saying the legislative process may take a year to fully complete.[157]

Table 1 summarises the key proposed changes.

Table 1 Omnibus Package and the Value Chain Due Diligence Obligations

CSDDD Requirement	Omnibus Proposal	Potential Impact
Value chain scope	• Legal mandate for due diligence ONLY at the level of DIRECT business partners, and NOT the entire value chain. • Implied obligation to go beyond Tier 1 ONLY where there is a complaint, credible NGO or media reports about harmful activities. • Due diligence effectiveness relies SOLELY on codes of conduct with direct suppliers and contractual cascading.	• The most severe impacts are rarely present in Tier 1. • Aligning the value chain scope with German law repeats mistakes made where Tier 1 suppliers are overloaded with information requests. • NGOs and media become de facto enforcers and need to carry out the due diligence themselves.
Due diligence duty	• Due diligence NO LONGER an ongoing obligation and the tracking of its effectiveness would now take place as little ONLY every 5 years. • REMOVES duty to terminate the business relationships in the case of actual and potential adverse impacts and replaces it with 'SUSPEND' activities.	• Companies will no longer monitor and address risks in real-time. • Companies can exploit the lack of obligation to terminate relationships, ignoring human rights or environmental violations.
Stakeholder engagement	• Narrows to "RELEVANT" stakeholders, limiting the scope of stakeholders companies need to engage with.	• If due diligence is limited to Tier 1 (direct suppliers only), this further narrows

CSDDD Requirement	Omnibus Proposal	Potential Impact
	• LIMITS to those stakeholders that have a link to the specific stage of the due diligence process being carried out.	scope of stakeholders that companies engage with. • Results in very limited engagement with truly impacted stakeholders.
Legal harmonisation	• PROHIBITS EU Member States introducing legislation that goes further than CSDDD	• CSDDD is intended as a minimum standard, but the proposal establishes a legal ceiling. • This ceiling is lower than current international standards such as the UNGPs and OECD.

Source: Van der Heide, M. et al. (2025), *EU Omnibus Unveiled: Key implications for CSDDD, CSRD & EU Taxonomy*, World Benchmarking Alliance.

If adopted, the package may considerably dilute CSDDD requirements and have a significant impact on the environmental and social sustainability of nickel production in Indonesia

Perhaps the most important implication of the proposed 'simplification' of CSDDD under the omnibus proposal would be the exclusion of the upstream value chains from due diligence obligations. Under the original CSDDD text, EU companies and large non-EU companies supplying the EU market would have to conduct due diligence up to the mining sites and ensure that the relevant environmental and social criteria are met, including for human and labour rights. If the omnibus changes are approved, in most cases, only direct suppliers (for example, nickel concentrate or metallic nickel) will have to meet the EU green and social requirements.

However, mining operations in Indonesia are often many tiers removed from the EU buyers (e.g., through smelters, refiners, and battery makers). Due diligence on indirect suppliers is only triggered if plausible information suggests a risk - vague and reactive wording, which essentially sifts the responsibility of identifying ay such risks from companies to the civil society. Under the omnibus proposal, annual monitoring is reduced to once every five years, making it even more difficult to monitor and react to any on-the-ground violations in an efficient and timely manner. In addition, under the omnibus package, civil liability is removed.

The Omnibus Package also proposes significant changes to the CSRD aimed at simplifying reporting obligations and reducing administrative burdens. Specifically, it suggests delaying the initial reporting deadline under CSRD by two years (from the initially planned financial year 2025 to 2027) and raising the threshold for mandatory reporting from companies with over 250 employees to those exceeding 1,000 employees. For companies engaged in the nickel supply chain from Indonesia to the EU, these changes imply a temporary reduction in reporting obligations, potentially exempting smaller entities from mandatory sustainability reporting. However, larger companies remain obligated to disclose sustainability data and impacts, particularly given the environmental scrutiny around Indonesian nickel production. Despite the regulatory easing, companies will need to maintain transparent sustainability practices due to ongoing market expectations and investor pressures regarding responsible sourcing and environmental accountability.

Table 2 Proposed Omnibus changes to CSRD

Element	Prior Requirement	Omnibus Revision
CSRD Firm Size	Companies with 250+ employees and EUR 50m turnover	Only companies with >1,000 employees and either EUR 50m turnover or EUR 25m balance sheet total remain in scope
CSRD Number of Companies Covered	>50,000	<7,000
CSRD Third-Country Undertaking Threshold	EUR 150m turnover	Raised to EUR 450m turnover
CSRD Value Chain Reporting	Companies are required to obtain data from all suppliers where feasible and reasonable	Not required to obtain data from non-CSRD companies; limitations placed on data requests for SMEs connected to voluntary SME reporting standard
CSRD Assurance	Limited assurance required, transitioning to reasonable assurance	Remains limited assurance; reasonable assurance requirement removed
CSRD Reporting Deadlines	Set deadlines for first disclosures and audits	Delays of up to two years for wave 2 and 3 companies
Double Materiality	Required (financial and impact materiality)	Retained
ESRS Sector-Specific Standards	Mandatory sector-specific standards to be introduced	Scrapped

Source: D. A. Carlin and Company (2025), *Omnibus changes to the EU Sustainability Reporting*.

While the Omnibus Proposal does not explicitly amend the EU Batteries Regulation, its emphasis on harmonisation and simplification across sustainability legislations suggests potential indirect effects:

- First, the development of detailed guidelines for the Batteries Regulation's due diligence requirements has been paused, awaiting the outcomes of the Omnibus Proposal. This delay introduces uncertainty for businesses preparing to comply with the regulation's due diligence obligations.
- Secondly, If the proposal leads to a standardised approach to due diligence across EU directives, the specific obligations under the Batteries Regulation might be revisited to ensure consistency, potentially altering the scope or depth of due diligence required for battery-related materials.

3.2.5 Companies meeting the CSDDD's threshold criteria

Based on the (potential) supply chain links identified in Chapter 2, as well as the companies active in the renewable energy sector that are in scope for this research, but for which no links with suppliers could be established, 0 shows the companies that fall under the criteria of compliance with the CSDDD.

Table 3 Selected companies meeting the CSDDD's threshold criteria

Corporate group	Country		Corporate group	Country
AB Volvo Group	Sweden		Sk Battery Manufacturing	Hungary
Bayerische Motoren Werke (BMW)	Germany		Stellantis	The Netherlands
Hanwha Q Cells	Germany		Tesla	United States of America
Hyundai Motor Company	South Korea		Toyota Motor Corp.	Japan
Iberdrola	Spain		Trafigura Group	Singapore
JA Solar	China		Vattenfall	Sweden
Jinkosolar (Switzerland)	Switzerland		Vestas Wind System	Denmark
Kia Corporation	South Korea		Volkswagen	Germany
LG Chem	South Korea		General Electric Company	United States of America
Mercedes-Benz Group	Germany		ThyssenKrupp	Germany
Mitsubishi Corporation	Japan		ENERCON Global	Germany
Nordex	Germany		Siemens Energy	Germany
Posco Holdings	South Korea		Sungrow Power Supply	China
Schaeffler	Germany		Umicore	Belgium

Source: SOMO (n.d.), "CSDDD Datahub", online: https://www.somo.nl/csddd-datahub/#about-data-csddd, viewed in April 2025.

3.3 Labour impacts

Poor working conditions have detrimental effects on workers in Indonesian nickel production sites. These working conditions pertain to Occupational Safety and Health (OSH), wages and income inequality, working hours, job insecurity, gender-based violence and discrimination and the undermining of trade unions.

3.3.1 Occupational Safety and Health

- **Accidents**

The dreadful OSH conditions at Indonesian nickel production sites have been widely documented. According to Sembada Bersama Indonesia, a labour activist organisation, and reported by TuK Indonesia, 104 workplace accidents occurred across Indonesia's nickel smelters, resulting in 107 fatalities and 155 injuries between 2019 and 2025.[158] China Labour Watch (CLW) reports 68 workplace incidents recorded across selected companies, including PT IMIP, PT Obsidian Stainless Steel (PT OSS), and PT GNI. These incidents involved 120 reported injuries and 77 reported deaths. However, CLW admits that this data does not fully capture all work-related injuries and fatalities that have occurred at these facilities.[159] CLW publishes a full list of all accidents and its victims online for reference. The overview shows that 43 of the 68 accidents took place at IMIP, 11 at GNI, 13 at other locations in Sulawesi and the last one in West Kalimantan.[160]

The latest incident, on 16 February 2025, took place in the NPI production facility of PT Ocean Sky Metal Industry (located in IMIP), where a worker died after his head was crushed while cleaning hardened material from the londer at the smelter.[161]

Over the years, workers and unions have repeatedly demanded better OSH standards at IMIP. In 2019, the Morowali Industrial Workers Union (SPIM) called for improved OSH governance, a review of standard operating procedures (SOPs), and stricter labour inspections due to frequent workplace accidents. They also urged local authorities to take OSH issues more seriously.[162]

Despite these efforts and increasing attention to the numerous labour rights violations in Indonesian nickel production, IMIP is still notorious for repeated and deadly accidents at the workplace.[163] Workers are repeatedly blamed for recurring accidents, even though they have frequently asked for regular maintenance of work equipment. Moreover, workers indicate that many accidents are not reported as IMIP tries to cover them up, and workers who do report accidents are threatened and penalised for "*leaking company secrets*".[164] The recurring industrial accidents at IMIP highlight the severity of safety issues, for example at the PT Indonesia Tsingshan Stainless Steel (ITSS) smelter. A furnace that exploded on 24 December 2023 erupted again on 13 June 2024, leaving two workers with burn injuries:

"Even after 33 days in the hospital, eight operations, and more than a year of recovery, La-Taha still does not have full use of his hand. Burns have left it a gnarled mess; like his scarred torso, it also itches and cramps. All this is the legacy of an explosion at a nickel smelter owned by Indonesia Tsingshan Stainless Steel, a subsidiary of the Chinese steel and nickel behemoth Tsingshan Group. The explosion on Dec. 24, 2023, killed 21 workers and wounded 38 others as they went about their day's work in the Indonesia Morowali Industrial Park (IMIP) in the country's Central Sulawesi province."[165]

GNI has also been faced with international scrutiny after accidents and protests at its facility. In December 2022, a furnace exploded at a smelter and lead to the tragic death of two workers:

"*[T]wo crane operators burned to death in December 2022 after being trapped in their cab when a furnace blew up. One of them, Nirwana Selle, had often posted upbeat TikToks of her work at the plant. A video of the accident that killed her went viral on social media."*[166]

These deaths triggered protests by the workers who presented their demands regarding the issues of non-compliant personal protective equipment (PPE), dust in the warehouses, damaged working equipment, the delivery of rules and information informally, and wage issues, among others, to management. When these demands were ignored, another protest was organised in January 2023.[167] However, this protest resulted in the loss of two lives and nine injuries: "*Chinese and Indonesian workers fought each other with crowbars and sticks after another dispute over safety and wages spiralled out of control. Two people died."*[168] A worker reports that:

"The occupational safety (K3) here is still lacking, to be honest, it's very insufficient. The masks provided are just the usual thin, three-layered medical masks. Ideally, we should be given industrial masks, especially in a place like mine where it's dusty, it's crucial. But when asked, they say the supplies are not ready yet, still being shipped. So, are we supposed to wait until something happens before they arrive? We only get one (three-layered medical mask) per day"[169]

- **Other health hazards**

Apart from accidents, workers at IMIP face serious chemical and physical health hazards. IMIP companies currently employ more than 90,000 workers. Chemical hazards include:[170]

- *Nickel dust and fumes*: Workers receive respirators and N95 masks, but distribution is inadequate, and many find them uncomfortable due to heat and humidity. At Indonesia Weda Bay Industrial Park (IWIP), Halmahera, thick ore dust has caused accidents, including workers being run over by loaders due to poor visibility. Workers argue that dust control should be managed through engineering solutions, not just PPE. Also, studies show that N95 masks are only 60% effective against PM2.5 microns. Furthermore, Long-term exposure to nickel dust and fumes can cause asthma, cancer and bronchitis.

- *Coal:* At IMIP, coal is used as the main fuel for power plants and smelters and many of the workers are exposed to coal dust, which can cause upper respiratory tract infections and even black lung after long-term exposure.
- *Asbestos*: According to workers, asbestos is used in several IMIP facilities. Inhaling asbestos leads to lung disease, which can develop into pulmonary fibrosis and an increased risk of lung cancer. Globally, around 200,000 people die from diseases caused by asbestos.
- *Sulphur:* According to workers, sulphur is used in several IMIP smelters, from which the smell spreads to other working areas. Sulphur can cause respiratory issues.

Source: Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.41.

Physical hazards frequently faced by IMIP workers include:[171]

- *Heat*: Workers in the ore-smelting furnace and in the steel moulding areas are exposed to very high temperatures, which causes them headaches.
- *Noise*: especially in the coal crusher areas and moulding areas for stainless steel, noise can reach between 92-100 decibels. Often, the companies do not provide noise protection and workers need to buy these themselves, running the risk of not hearing instructions or warnings.

In addition, research reports on low quality food provided at the canteens, inadequate toilets and clean water, which affects women disproportionally, and poor health care facilities for workers.[172]

3.3.2 Wages and income inequality

According to recent research, two Indonesian workers at nickel processing facilities earned IDR 7.1 million and 8.59 million in November 2023 and January 2024, respectively, depending on overtime worked (the first worked 45 overtime hours while the latter worked 64 excess hours). This wage consists of a basic wage, fixed and non-fixed allowances, overtime payments, and bonuses, minus deductions for insurance, pension and absence. The basic wage varies between workers and may even differ per month. For one interviewed worker, this amounted to IDR 3.15 million one month, and less the next. Many workers receive a basic wage that is below the Morowali Regency Minimum Wage of IDR 3,489,319 (as of 2024).[173]

Other research reports comparable wages of between IDR 3 million and 7 million a month.[174] Due to Morowali's relative remoteness, prices for basic needs such as accommodation, food, transport, and cooking gas are relatively high, so real wages are low, and workers are struggling to make ends meet.[175]

At IMIP, factors such as education, positions, length of service, and competence are part of non-fixed allowances. According to trade unions, however, these factors should be part of the fixed wage paid to workers. Also, the company diverts part of the basic wage to housing allowances, which is perceived as not in line with regulations and results in a lower received wage.[176]

Subcontracted workers receive a wage of between IDR 170,000 and IDR 200,000 per day. However, their wages are also subject to certain deductions for facilities provided by the employer, such as housing, transport, healthcare insurance, and payments to the Worker's Social Security Agency.[177] Subcontracted construction workers are the worst off. According to Foreign Policy, many of them have no access to compensation in case of workplace accidents, despite falls and injuries being common. Safety harnesses are provided but they must pay for other safety equipment, such as helmets, gloves, boots, and masks, out of their own pockets.[178]

Chinese workers at IMIP are reported to earn at least IDR 25 million, which is more than four times the wage received by Indonesian workers. For example, at VDNI in Sulawesi, a smelter owned by Jiangsu Delong, Chinese workers supposedly receive wages of around IDR 30 - 35 million. Also, Chinese workers typically get supervisory positions. This inequality has been a source of anger for local workers towards Chinese workers, who feel discriminated against and exploited.

Seemingly contradictory, there is also evidence of Chinese workers being exploited. The Gecko project reports on Chinese workers' complaints of delayed wages:

"In May [2024], workers confronted managers at Gunbuster Nickel Industry claiming that their wages hadn't been paid for five months. Workers were allegedly then threatened with arrest. In one video posted on Chinese social media at the time, workers confronted a supervisor wearing a Gunbuster uniform, who said he "had no money" to give them. According to Li, these reported practices—coercion, deception, abuses of power and restrictions of movement—arguably meet the definition of modern slavery."[179]

Furthermore, Chinese workers' passports were allegedly taken by their employers, and their visas did not allow them to work formally in the country, leaving them with an irregular immigration status in Indonesia. Interestingly, this supposedly happened at VDNI (owned by Jiangsu Delong), too.[180] It appears that the companies also discriminate against Chinese workers.

3.3.3 Working hours

IMIP has three possible work schedules. The first is an 8-hour non-shift schedule, where workers work mornings only, six days a week, totalling 48 hours. The second is an 8-hour, 3-shift schedule, where workers rotate shifts, work 52 hours a week, and occasionally have a 12-hour shift for schedule adjustments. The third is a 12-hour, 2-shift schedule, requiring 60 hours per week with more than one day off, unlike the other two schedules, which allow only one day off per week.[181] In addition, there is no or limited time for breaks, with some workers even reporting eating lunch while continuing their work.

These excessive working hours are very harmful to the workers' physical and mental health. A worker interviewed who works a 12-hour, 2-shift schedule, said:

"I take paracetamol almost every week, especially during night shifts, because I get headaches easily. Several times, I have felt like I was going to faint at work; the work is demanding and the workplace is hot"[182]

Subcontracted workers work longer hours, typically between 9 and 12 hours a day, without a day off until the project or work contract is completed. Their wages are calculated on a daily basis, and they are not paid during leave. Due to their precarious position, some subcontracted workers quit before the project is finished and take new jobs either at IMIP or at other smelters in Morowali regency, such as PT Wanxiang Nickel Indonesia and Huabao Industrial Park.[183]

The situation is not better for Chinese workers. Testimonies of Chinese workers at IMIP suggest the withholding of wages, long working hours, unpaid overtime, the seizure of their passports, and

the inability to leave the industrial park, even during holidays. Some workers describe IMIP as a prison.[184]

At GNI, it is reported that overtime is often not registered and compensated with overtime wages. According to the company's policy, one day contains 7 working hours and 1 additional hour of mandatory overtime. In reality, workers often work more than 8 hours in a day, on average 2-3 excess hours, which will than not be counted as overtime by management.[185]

3.3.4 Job insecurity

At IMIP, recruitment of Indonesian workers is mostly centrally organised by IMIP management, while for Chinese workers, this is organised through subcontractors. According to subcontracted workers interviewed, some signed contracts with written job descriptions, while others did not sign a contract and were provided their job descriptions verbally. Furthermore, their contracts are usually short-term, for less than 1 year and a half.[186]

Even though workers sign contracts with each company they work for, they are often placed to work at a different company within the IMIP industrial area. Workers can face job insecurity when they are placed, but without jobs, so they only receive their basic wage. This situation can occur when union organisers are perceived by management as taking too many union organising permits or when workers refuse work orders. For example, according to interviews, workers have refused job orders from Chinese supervisors to operate heavy equipment because the risks involved in operating this equipment are high. In response, the Chinese supervisor who insisted on operating the machine requested that the worker be transferred; however, in his new division, the worker was punished by not receiving any work orders.[187]

Furthermore, as further described in section 3.3.6, workers who engage in unions face the threat of being laid off. Since union members or leaders frequently need to leave work to provide services to the members, they need to work excessive hours to compensate for the loss of working hours, which impacts their health. These are often reasons for management to terminate their employment contracts.[188]

3.3.5 Gender-based violence and discrimination

IMIP workers are predominantly male, but around 6,500 workers are female. Female workers primarily hold control room positions but are often assigned additional production tasks without equal pay. Gender bias is prevalent in recruitment, especially through labour brokers, who charge higher fees for women and claim job placements for them are more difficult to secure.[189]

Gender-based violence remains a serious issue, with perpetrators of violence or sexual harassment rarely facing consequences. Incidents are often handled through informal "familial resolutions", failing to ensure a safe and supportive workplace for female employees.[190] Although IMIP management has stated that sexual harassment is not tolerated, according to female workers who were interviewed, harassment takes the form of catcalling and physical touching, and frequently occurs on the crowded bus or while waiting at the bus stop. While IMIP provides buses from the main gate to each company, no separate spaces for men and women are organised.[191]

Women also struggle to access basic rights, such as menstrual leave and nursing spaces. While they receive three months of maternity leave, the lack of lactation facilities forces many to wean their babies early, often before returning to work.[192] At IMIP, interviews with workers indicate that most women workers do not take menstrual leave because there are complicated requirements for it, such as having to provide a statement from the IMIP clinic that they are on their period.[193] Inadequate sanitation and hygiene facilities within the IMIP industrial park create additional concerns for female workers.

Research shows that women working night shifts, regardless of the industry, face a higher risk of coronary heart disease and breast cancer. Consequently, requiring women to work night shifts, as is the case at IMIP, increases their vulnerability to occupational diseases, accidents, and even

sexual harassment. In one case at PT Qing Feng Ferrochrome, a five-month pregnant worker was assigned to night shifts, violating Indonesian Labour Law No. 13/2003.[194] Female workers are also required to work excessive working hours, averaging 52 hours per week, which results in exhaustion and health issues combined with their domestic responsibilities.[195]

3.3.6 Trade unions

Indonesia ratified ILO Convention (KILO) No.87 on freedom of association in 1998, but the number of unions and their number of memberships fluctuated over the years. This is due to various factors pertaining to more flexible employment relations that hinder union consolidation, an increasingly repressive government and lax enforcement in labour disputes, companies engaging in union busting, and authorities failing to hold companies accountable for restricting or suppressing workers' rights to organise. Union busting refers to actions by employers or governments aimed at obstructing trade unions' fundamental activities and functions within a workplace.[196] The first "form" is to prevent workers from exercising their rights to establish or join a union. For example, the local government in North Morowali delayed the registration of the union's organisation at GNI, as the company was not willing to accept a union until the completion of PT GNI's Smelter 3. This was combined with the threat to workers that their employment contract would not be renewed after finishing if workers were found to be union organisers.[197]

The second form of union bursting entails weakening existing unions, such as imposing sanctions and dismissals of union leaders and members. For example, a union activist describes:

"It is now easy to move workers from one department to another. The company just needs to make an invoice, submit it to IMIP, then it's done… There was a member who was asked first when he wanted to be transferred to another department: 'Is anyone here a union member?' When management found out he was a union member, he would not be given a job order"[198]

Along the same line, workers at IMIP face obstacles in exercising their rights to unionise, bargain collectively, and protest workplace conditions. The United Labour and People's Alliance (Alliance)—comprising the Morowali Industrial Workers Union (SPIM), the Morowali Indonesian Prosperous Labour Union (SBSI), and the Morowali Indonesian National Federation of Workers' Unions (FSPNI)—has played a central role in advocating for workers' rights in the past years.

At IMIP, union leaders and workers faced major retaliations after demonstrations. In August 2020, a mass demonstration by the Alliance led to a meeting where the government assured no retaliation, yet just two days later, rumours spread that IMIP planned to dismiss those involved. On 14 August 2020, three union leaders were fired for their activism, accused of provoking demonstrations and disrupting production. This led to a strike, which took place from 22 to 25 August. Subsequently, a government-mediated meeting secured agreements on worker recalls and leave but failed to resolve union bans and leader dismissals. Two of the SBSI members who were fired without severance pay won lawsuits in 2018, yet PT IMIP refused to pay, blocking court bailiffs from enforcing the ruling.[199]

3.4 Community impacts

Polluted water from runoff sediment, deforestation, air pollution, and forced evictions caused by nickel mining and production activities have detrimental effects on the surrounding communities.

3.4.1 Income and food availability

Mining has also impacted food security, as land conversion from agriculture to mining has reduced local food production, causing food prices to rise when floods disrupt logistics. Access to clean water has become a major issue, with rivers once used for drinking now contaminated by mining activities. In Bahodopi and Weda, residents must now buy drinking water, as natural water sources have become unusable due to sediment pollution and river damming for smelter construction.[200]

In Raja Ampat, where nickel mining has expanded in the past five years, waste runoff from the mining activities flows into the water, contaminating the water and ruining downstream marine ecosystems. Local communities who rely on subsistence fishing for food and tourism-related activities for income have noticed decreased water quality since mining started on the island.[201]

On Kabaena island, South Sulawesi, local livelihoods have been impacted as well. Depending on fish to feed their families, fishers are now struggling to catch fish. The reason is that the water is polluted with runoff sediment from the mines and no fish can survive there. Fishers now have to travel further to catch any, using expensive petrol, and end up with smaller catches that earn them less. Furthermore, communities on land are also feeling the effects of mining, as sugarcane, palm, and clove trees struggle to grow. Residents report that water sources essential for crops have been contaminated by mining activities, affecting both food production and income.[202]

Morowali was previously also rich in marine resources. However, since IMIP started operating, fishing activities have been disrupted. Fishermen in Gemaf and Lelilef, coastal villages located near IWIP, say that their catch has decreased considerably since the construction of IWIP:

"Before the mining, the fish stock was abundant, the sea was clear. Now, I can't catch fish near [IWIP]. The water is dirty, and the security chases us away. The water pollution is from mining. There is oil in the water from the machines. Also, hot water from the power plants is polluting the ocean. Sometimes the water is reddish. We used to row our boats close to the shore to fish, now we have to go further out. It's more dangerous to go further out and we have to calculate the tides. It's also more expensive. The fish are the same size. But we worry about the fish being polluted."[203]

Apart from impacting fishing, polluted water also impacts farming activities, and deforestation affects traditional hunting activities.[204]

Source: Misbahul Aulia – Unsplash.

Furthermore, the frequency and intensity of floods have increased close to mining areas. In Morowali and the Weda nickel processing area, severe floods in July 2020 cut off transportation in Bahodopi. Earlier floods in 2015 and 2010 destroyed homes, submerged villages, and devastated crops. Local residents link the increasing frequency and severity of floods to mining activities, which have led to deforestation, river diversion, and reduced water absorption. In August 2020, heavy rains caused the Ake Sake River to overflow, flooding roads and halting operations at IWIP.[205] Currently, the Bahodopi district near IMIP in Morowali, is confronted with heavy rains and wind, which resulted on severe floodings in the villages of Lalampu and Labota. Walhi Central Sulawesi, an Indonesian environmental NGO, relates these floodings to the widespread

deforestation as a result of nickel operations in the region, which exacerbates the intensity of the floodings.[206]

3.4.2 Health impacts

Since the mines opened on Kabaena Island, South Sulawesi, residents have reported a surge in health issues, including itchy skin, sore throats, and rashes. Many villagers avoid bathing or washing clothes in the water, as doing so often leads to skin irritation.[207]

Also, air pollution from the burning of coal as a fuel for nickel processing operations causes serious health issues for residents. IMIP's coal storage facilities, located 271 meters to 1.3 km from nearby villages, were initially unfenced and exposed. Following community complaints about coal dust, IMIP built high fences and a coal dome, but dust exposure persists. According to a union official in a village 500 meters away, their office must be swept three times daily to clear accumulating coal dust. In the Bahodopi district where IMIP is located, the impact of this dust is increasing yearly. According to research, the number of cases of upper respiratory tract infections increased from 13,081 cases in 2022, to 55,527 cases in 2023.[208]

Experiences by a local resident of Bahodopi village near Weda Bay Industrial Park (IWIP), Moluccan, illustrate the impacts:

"If the wind blows west, the roof of this house is all black because of the coal, there are many more sick people, usually catching a cold and coughing. To cover the cost of going to the hospital, we usually pool money because we cannot afford it ourselves. We also never received assistance from the government, be it Jamsosda (Regional Social Security), KIS (Healthy Indonesia Card), or others, including companies, we never received any assistance"[209]

According to research by the Memorial University of Newfoundland and the Indigenous Sorowako Association (KWAS) into the health impacts on residents around PT Inco/PTVI operations in 2006, communities located closer to the nickel mines and smelter experienced higher rates of asthma, rhinitis, and skin tumours compared to Malili, a more distant community. Studies found a strong correlation between dust accumulation in homes and increased health risks, including asthma, high blood pressure, heart disease, and anaemia in adults. Additionally, nighttime air pollution levels were linked to higher rates of diabetes and seasonal allergies in children, highlighting the potential health hazards of nickel mining and smelting.[210]

3.5 Cultural impacts

The rapid expansion of the nickel industry in Central and East Halmahera is endangering the traditional livelihoods of both coastal and forest communities. Indigenous groups like the Sawai and Tobelo, who have long depended on farming and fishing, are losing their ancestral lands to mining operations. Villages such as Lelilef have turned into economic centres, drawing workers from across Indonesia and China, resulting in cultural shifts and environmental harm.[211]

Despite increasing pressure, many residents refuse to sell their land, seeing it as an essential connection to their heritage. Meanwhile, other residents such as those in Lelilef, have sold their land and transitioned to a capitalist economy, leaving traditional subsistence farming behind. Nickel mining in the area has led to deforestation, water contamination, and rising health issues, including respiratory infections. Local leaders and activists caution that ongoing industrialisation could erase indigenous cultures and languages as communities are displaced and Bahasa Indonesia becomes the dominant language. Additionally, mining-driven migration is altering the strong social fabric of the communal way of life, replacing it with a more individualistic society.[212]

Furthermore, PTVI's mining operations in Sorowako have disrupted the cultural fabric of the Indigenous Karonsi'e Dongi people. Before the company's arrival in 1968, the Karonsi'e Dongi lived in harmony with their ancestral land, practising cultivation, gathering forest resources, and maintaining sacred sites. However, a 1957 contract between the Indonesian government and the mining company led to their forced eviction, severing their ties to their land and traditional way of

life. The destruction of customary forests, rice fields, and sacred spaces has eroded the cultural identity of the Karonsi'e Dongi. Their land has turned into industrial sites, a golf course, and company housing.[213]

Inco demonstration, photo by Yayasan Tanah Merdeka (source: EJ Atlas)

Despite their displacement, the Karonsi'e Dongi continue to resist, striving to preserve their traditions, language, and community bonds. Women have played a central role in this struggle, cultivating small plots of land to sustain their families and leading protests to reclaim their rights. Today, the Karonsi'e Dongi are still struggling for recognition, access to resources, and the right to practice their customs. Despite the intimidation, they are commited to preserving their cultural heritage.[214]

3.6 Land disputes and forced evictions

Nickel production activities in Indonesia have threatened the land rights of local communities in different ways. Evidence from Halmahera, Moluccan, shows that land acquisition has been fraught with land grabbing, inadequate or no compensation, unfair sales, and a lack of free, prior, and informed consent from affected communities. Some people have faced intimidation or retaliation for resisting land sales or opposing the nickel industry.[215]

Testimonies of community members adjacent to Weda Bay Industrial Park (IWIP) evidence the company's land-grabbing practices. IWIP took and cleared the land without consent and without or inadequate compensation, from individuals and Indigenous Peoples holding both legal and customary ownership. One interviewee stated:

"I owned 38 hectares of land, but they only paid me for 8 hectares. They said that the rest of the money was paid to someone else who claimed they owned the land… The company excavated my land without my consent while I owned it."[216]

Exacerbating the issue of taking customary lands from Indigenous Peoples, the Indonesian government has failed to recognise most of the country's Indigenous territories as of 2024, though it is expanding slowly.[217] For example, mining companies took customary land inside forest areas from Indigenous communities in Minamin and Saolat villages, Hamahera, to build a mining road:

"They came without consulting us, no dialogues whatsoever, and they came here stealing from us. It's our customary land, but the government doesn't recognize it. Our ancestors lived here long before independence"[218]

"Mentally, we're tortured, because we're scared and restless because we keep wondering about the future of our village…Without dialogues, we don't know what kind of benefits that we'll receive. We've been here for generations. We have protected nature because our lives depend on nature. If this is all gone, how are we supposed to live?"[219]

Many people who sold their land to nickel mining companies felt they had little choice, often forced by losing access to their farms due to surrounding acquisitions. Most were dissatisfied with the low compensation and saw one-time payments as inadequate to replace their lost income and food security. Many had not wanted to sell at all.[220] Others refusing to sell their lands or trying to negotiate received threats and had to face retaliation by the police, military and the companies. Activists who have protested against mining expansion in East Halmahera, also face intimidation, including heavy police and military presence at demonstrations. Authorities have threatened arrests for disrupting national projects, and there are concerns about the criminalisation of activists opposing mining operations.[221]

In August 2024, media reported that residents of IHIP in Morowali were being sued by BTIIG, a tenant in the industrial park, for blocking the company's production road. The road was unilaterally claimed by the company, while it served as the community's access to Topogaro Cave (a cultural site) and their plantations and rice fields. What is more, this followed after the forced eviction from farmland belonging to 12 families in a nearby village in 2022.[222]

PTVI (formerly PT Inco) also has a history of allegedly committing human rights violations, starting in 1968 with the company's exploration of Sorowako's nickel. The signing of a contract between the Indonesian government and the mining company in 1957 caused the Karonsi'e Dongi Indigenous Peoples to be evicted from their ancestral lands and consequently lose their traditional livelihoods.[223] After multiple evictions and many protests, representatives of PTVI agreed to provide an area ("the Old Camp") as compensation to earlier land grabs at Songko from affected residents in 2020. Based on the agreement, a team of representatives of PTVI, the chairman of a local CSO (Kerukunan Wawainia Asli Sorowako, KWAS), and residents' legal representatives started preparations for assigning plots to recipients and installing stakes. However, in March 2023, PTVI put up a sign at the Old Camp area prohibiting residents from accessing, mobilising police, military and other security forces around the area, and reporting 39 residents to the East Luwu police for illegal land use.[224] EJ Atlas reports that, as of 2016, approximately 170 Karonsi'e Dongi people live in 57 huts in Kurate Lawa and Bumper on 3.5 hectares of abandoned mining land along the Inco/PTVI golf course, with no secure water supply, under the watchful eye of armed security.[225]

On the right: Acquired and reclaimed farmland by ATI (developer of PTVI's smelter). On the left: Sambaragi village surrounded by construction work. Bung Peshir District – October 2024).

Source: Fair Finance Guide Japan (2025, February), *Compensation Negotiations that Foster Dissatisfaction and Distrust - Indonesia: The reality of the Baho Dopi mine and smelter project*, p.17.

In addition to the expansion in Sorowako, PTVI started preparing for a new mine in the Bahodopi District, Morowali. For this, the company received an environmental permit in February 2024 and was given a Special Mining Business Permit by the Government in May 2024. However, this project is associated with untransparent practices and unfair and insufficient compensation for the acquisition of farmland from residents.[226]

3.7 Severity assessment

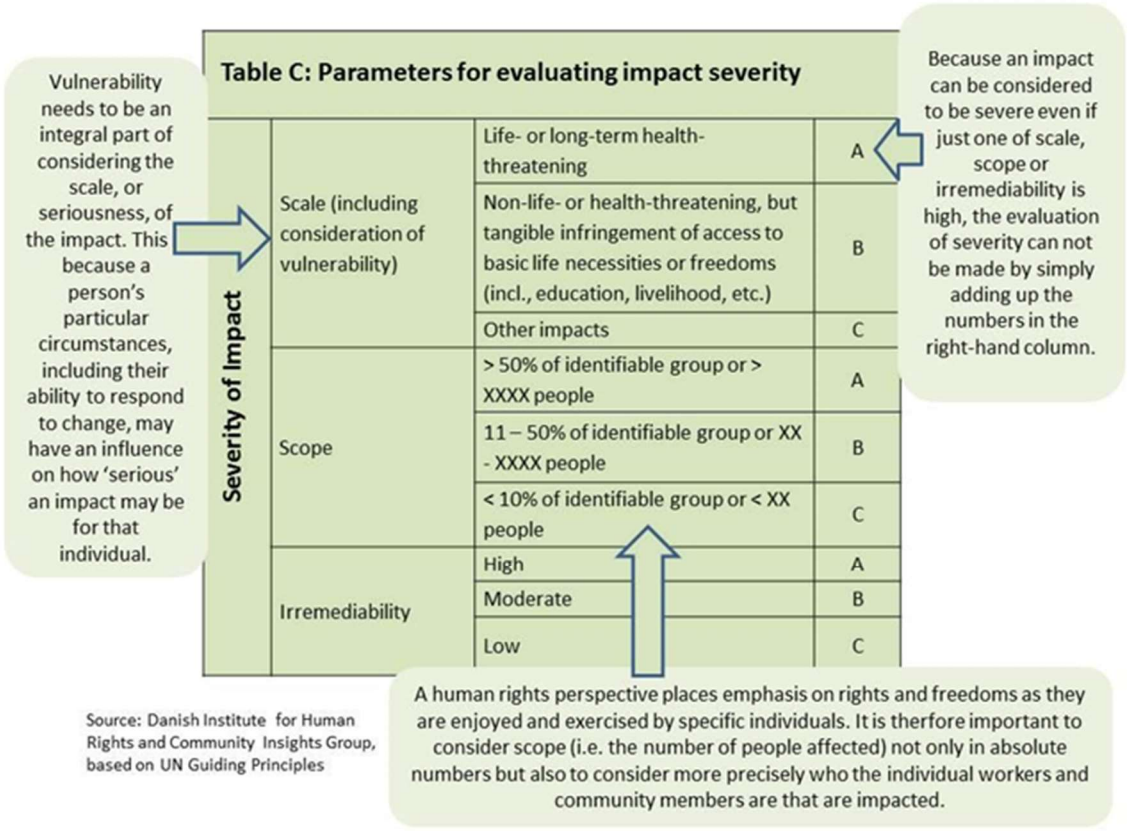
According to international standards on human rights, including the OECD Guidelines for Multinational Enterprises and the Danish Institute for Human Rights, among others, enterprises should conduct human rights risk assessments as part of due diligence processes for responsible business conduct.[227] If it is not feasible for a company to address all impacts at the same time, a severity assessment can assist in setting priorities. Therefore, such assessments do not aim to determine which impacts need to be addressed but rather to identify the order of priority in which they should be addressed.[228]

The severity of the adverse social impacts identified in sections 3.3 and 3.4 can be assessed based on scale, scope and irremediability. An overview is provided in Figure 14. Although we can draw overall conclusions from a severity assessment, it is important to note that:[229]

- Determining the severity of an impact requires direct engagement with individual rights-holders, such as workers and community members, as well as their representatives or organisations.
- Vulnerability plays a crucial role in assessing severity. For example, if a company's activities relocate a water source from 200 meters to 2 kilometres away, the impact will be far greater for those who must walk than for those who have vehicles. Similarly, the loss of a single farm animal is more severe for a family relying on it as their sole income source than for a large-scale farmer with 100 animals.
- When evaluating scope (i.e., the number of people affected), it is important to look beyond absolute figures and consider who is impacted. If the same vulnerable groups—such as Indigenous people, women, or persons with disabilities—are disproportionately affected, this could indicate systemic discrimination that should be observed in the assessment.

- Human rights expertise is essential to ensure a well-informed assessment process.
- Severity is not an absolute concept and cannot be universally defined. Assessing impact severity involves professional judgment, stakeholder dialogue, and analysis of interconnected impacts and long-term consequences. Severity also depends on the local context. For example, the likelihood and consequences of conflict may be highly relevant in some areas but less so in others.

Figure 14 Framework for evaluating impact severity



Source: The Danish Institute for Human Rights (2020), *Analysing Impacts Practitioner Supplement - Human Rights Impact Assessment Guidance and Toolbox*, p.9.

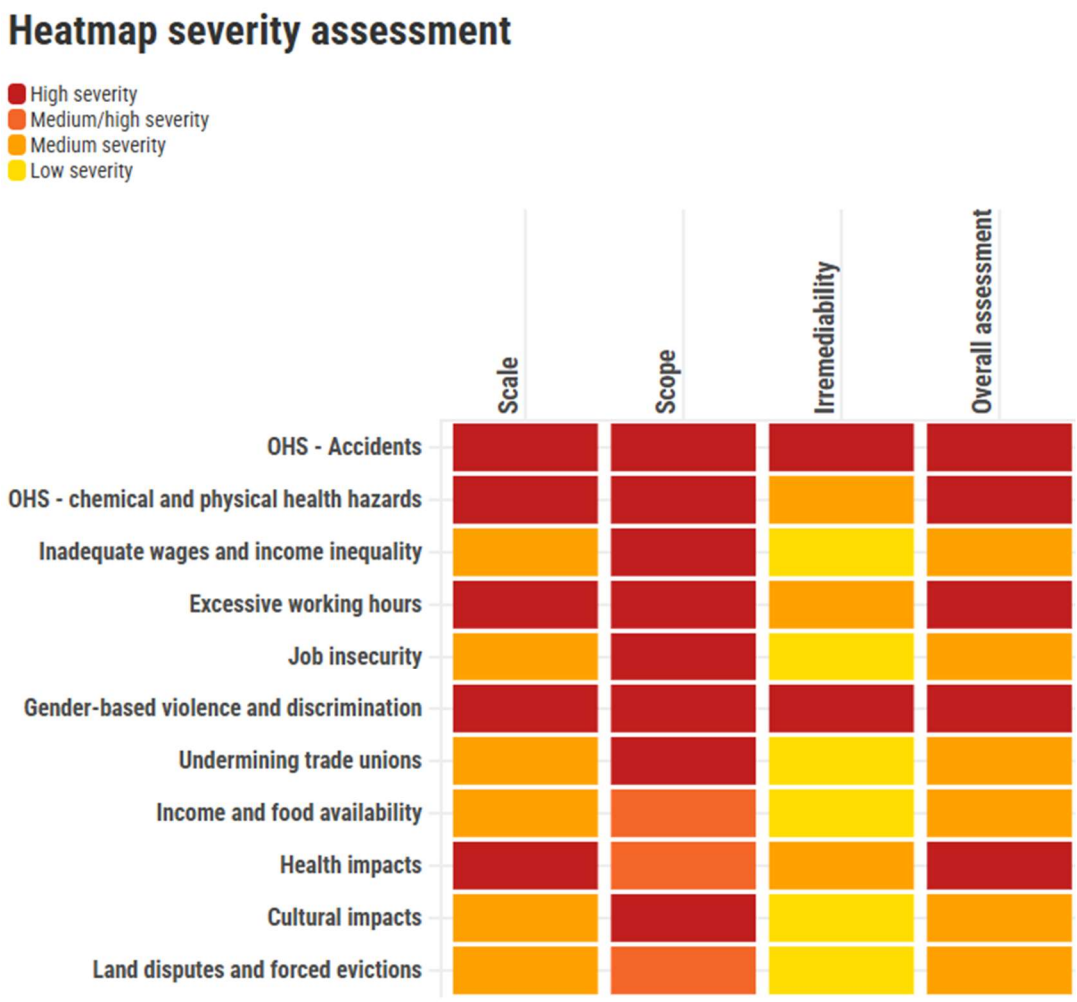
It is important to note that for this severity assessment, no direct engagement with individual rights-holders, such as workers and community members, as well as their representatives or organisations, was conducted. Therefore, since the evaluation is based on research reports, documentation and other secondary sources, the results should be considered as a preliminary evaluation. Although the results can be arguably different for each negative social impact identified in this research after engagement with local rights-holders and organisations, this evaluation does provide a picture of the gravity of the human and labour rights violations in the Indonesian nickel supply chain.

Based on the framework published by the Danish Institute for Human Rights, as shown in Figure 14, a preliminary severity assessment was conducted. A heatmap illustrating the results of the severity assessment is shown in Figure 15. The underlying results are presented in 0.

Although the severity assessment is based on information available online, and this is likely not the full story, the documented issues provide a proper picture of the severity of the situation for workers at nickel processing facilities in Indonesia and the surrounding communities. The heatmap shows that in relation to workers at the nickel processing facilities, Occupational Health and Safety impacts are of high severity, as are excessive working hours and gender-based violence

and discrimination. Health impacts to the surrounding communities are also of high severity. These impacts should get high priority in addressing them by companies and the government, before more irremediable harm is done to the workers and local population.

Figure 15 Heatmap of the severity assessment



Source: Profundo.

Table 4 Severity assessment

Topic	Adverse impact	Scale	Scope	Irremediability	Overall assessment
Labour impacts	OHS - Accidents	A: Life- or long-term health threatening. Accidents cause deaths, permanent and temporarily damage to workers.	A: Whilst the absolute number of people affected is small, the people impacted are workers who can be identified as a vulnerable group*	A: The impacts of deaths and permanent harm are impossible to remediate.	This might be considered an impact of high severity.
	OHS - chemical and physical health hazards	A: Life- or long-term health threatening. These hazards cause permanent and temporarily damage to workers, and if untreated, even to deaths in the longer term.	A: Whilst it remains unclear how many workers are affected precisely, the majority of workers at the nickel processing facilities appear to be exposed to chemical and physical health hazards, in varying degrees. Furthermore, the people impacted are workers who can be identified as a vulnerable group*	B: The impacts of deaths and permanent harm are impossible to remediate, while other health impacts can be remediated by treatment.	This might be considered an impact of high severity.
	Inadequate wages and income inequality	B: Non-life or health-treathing, but a serious infringment of access to basic needs and freedom of workers.	A: most workers appear to be affected to differing degrees depending on their position, which can amount to >50% of the group.	C: The impacts of inadequate and unequal pay are remediable.	This might be considered an impact of medium severity.
	Excessive working hours	A: Life- or long-term health threatening. Excessive working hours can cause permanent and temporarily damage to workers.	A: most workers appear to be affected to differing degrees depending on their position, which can amount to >50% of the group.	B: The health impacts may be remediable, depending on the severity.	This might be considered an impact of high severity.
	Job insecurity	B: Non-life or health-treathing, but a serious infringment of access to basic needs and freedom of workers. There is much competition so they do not have (many) other options.	A: most workers appear to be affected to differing degrees depending on their position, which can amount to >50% of the group.	C: The impacts of job insecurity are remediable.	This might be considered an impact of medium severity.
	Gender-based violence and discrimination	A: A serious interference with the women's human rights. Moreover, they are identified as a particularly vulnerable group.	A: At IMIP, 7% of the workers are female. Although this share is low, they are identified as a particularly vulnerable group.	A: The impacts of sexual harassment and assault would be difficult or impossible to remediate.	This might be considered an impact of high severity.
	Undermining trade unions	B: Non-life or health-treathing, but a serious interference with the workers' right to bargaining and freedom of association. Moreover, they can be identified as a vulnerable group*	A: most workers appear to be affected to differing degrees depending on their position, which can amount to >50% of the group.	C: The impacts the undermining of trade unions are remediable.	This might be considered an impact of medium severity.

Topic	Adverse impact	Scale	Scope	Irremediability	Overall assessment
Community impacts	Income and food availability	B: Non-life or health-treathing, but a serious infringment of access to basic needs for local communities, who depend on their land, forests and sea for their income and food.	A/B: Large parts of local communities are affected.	C: The impacts are remediable.	This might be considered an impact of medium severity.
	Health impacts	A: Life- or long-term health threatening. The pollution can cause permanent and temporarily damage to local community members and if untreated, even to deaths in the longer term.	A/B: Large parts of local communities are affected.	B: The impacts of deaths and permanent harm are impossible to remediate, while other health impacts can be remediated by treatment.	This might be considered an impact of high severity.
	Cultural impacts	B: Non-life or health-treathing, but an infringement on the right to participate in cultural life.	A: Whilst the absolute number of people affected may be small, the people impacted are indigenous and have been identified as a vulnerable group.	C: The impacts are mostly remediable.	This might be considered an impact of medium severity.
	Land disputes and forced evictions	B: Non-life or health-treathing, but a serious infringment of access to basic needs for local communities, who depend on their land, forests and sea for their income and food.	A/B: Large parts of local communities are affected.	C: The impacts are remediable.	This might be considered an impact of medium severity.

Note: See Figure 14 for an explanation of the categories A-C. * because they are poor, often immigrants, and some have been identified as arguably meeting the definition of modern slavery. Number of people affected are estimates based on information available. Since the evaluation is based on research reports, documentation and other secondary sources, the results should be considered as a preliminary evaluation.

Source: Profundo.

4

Strategic recommendations

Drawing on the findings from the supply chain research and social risk assessment, strategic recommendations can be drafted for companies in the renewable energy and EV sectors as key stakeholders to limit social and environmental risk and improve ethical sourcing. These companies are recommended to comply with relevant EU regulations, improve supply chain traceability, address human rights and environmental risks in their supply chains, and as part of this, leverage supplier relationships to drive improvements. Finally, recommendations for future research are discussed.

4.1 Recommendations for companies

4.1.1 Compliance with EU regulations

Many recommendations – both mandatory and voluntary – remain valid for companies involved in the nickel supply chains from Indonesia to the EU. At the same time, some uncertainty persists regarding specific legal obligations, as these will depend on when and in how far the proposed changes under the Omnibus Package are implemented.

- **Companies directly buying nickel from Indonesian mining companies will still need to comply with the relevant due diligence obligations**, including the environmental and human rights aspects, regarding their suppliers. As many mining companies in Indonesia are vertically integrated, and include mining operations, concentrate production, and smelting, monitoring the social and environmental impacts of mines will still be relevant.
- **Companies further downstream (for example, buying alloys or metal parts from companies in the EU, which in turn buy nickel from Indonesia) should closely monitor any civil society publications and reports.** Even under the (rather diluted) CSDDD scope, obligations remain to go beyond Tier 1 (direct) suppliers when there is a complaint, credible NGO**,** or media report about harmful activities at the level of an indirect supplier.
- **For many companies, including EV producers, ensuring sustainable supply chains is both a moral imperative and a selling point for their clients,** many of whom may be choosing an electric or hybrid vehicle because of their values, social practises, and lifestyles. Voluntarily retaining robust due diligence systems for all sourced materials along the entire value chains and ensuring timely, regular, and independently verified reporting is strongly recommended.
- As the EU Batteries Regulation is not directly within the scope of the Omnibus package, currently, all requirements, including on the value chain due diligence in terms of occupational health and safety, child labour, forced labour, discrimination, trade union freedoms, and community life (including that of Indigenous Peoples) remain applicable. Though the development of detailed guidelines for the Batteries Regulation's due diligence requirements has been paused,[230] awaiting the outcomes of the Omnibus Proposal, as of March 2025, **the EU companies still need to comply with the EU Batteries Regulation for their value chains.**

4.1.2 Improving traceability and transparency

Given the supply chain links identified and obstacles encountered when trying to do so, it is important that companies in the renewable energy and EV sectors improve supply chain

traceability and transparency to limit social and environmental risk and improve ethical sourcing. In this context, it is recommended that these companies:

- **Implement human rights due diligence processes throughout the organisation**, including human rights risk assessments and the implementation of zero-tolerance policies against the abuse of communities, workers, and human rights defenders.[231] Furthermore, it is crucial to engage workers and communities in these processes, while ensuring protection and guarantee of non-retaliation for all participants. For the implementation of human rights due diligence, international standards provide detailed guidance, for example:[232]
    - OECD Guidelines for Multinational Enterprises; OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct*.
    - The Danish Institute for Human Rights - *Human rights impact assessment guidance and toolbox*[233]
    - IEA and OECD (2025), *The Role of Traceability in Critical Mineral Supply Chains*.
    - Sector-specific responsible sourcing guidelines published by, among others, the Nickel Institute and the Responsible Minerals Initiative may provide additional guidance.[234]
- **Conduct regular, independent audits of mining, smelting and refining operations** to ensure compliance with human rights, labour standards, Indigenous rights, and environmental standards.
- **Report Scope 3 emissions** of critical minerals used in end-products in annual disclosures.
- **Enhance transparency** in mineral supply chain by **publicly disclosing the companies involved in mineral mining, refining, smelting, and battery/parts production**, including nickel.
- Even though the amount of nickel used in end-products may be small for one company, **the impact of the nickel industry as a whole has significant adverse effects** on workers, local residents, and their environment at nickel processing facilities in Indonesia, which should, therefore, be traced and addressed by companies.
- **Assign clear Board responsibility for and oversight of respect for social and environmental rights**. The Board should approve policies and their implementation, and regularly review human and environmental rights violation allegations, due diligence processes and remedy outcomes.[235]

4.1.3 Addressing social and environmental risks

To address the social and environmental risks found through due diligence processes, it is recommended that companies in the renewable energy and EV sectors cease, prevent and mitigate adverse impacts and communicate about this.[236] Specifically, measures that can be taken to prevent and mitigate adverse impacts related to a supplier relationship include:[237]

- **Adjusting business operations or activities to prevent and reduce negative impacts** associated with the company's supplier relationships, e.g.: integrating expectations for responsible business conduct into supplier relationships and contracts, and/or modification of the company's operations, products or services.
- **Addressing systemic issues**, that is, challenges that are widespread in a given context, stemming from underlying factors beyond the company's direct control, yet still heightening the risk of negative impacts within its operations or supply chain. For example, they may arise from governments failing to enforce human rights laws and protect vulnerable groups. Companies can address such systemic issues by, e.g.:[238]
    - **engaging in pre-competitive collaboration across sectors** to benefit from synergies, scale up efforts and not just shift issues to other sectors,
    - **engaging with governments** through public statements, multi-stakeholder initiatives and policy dialogue, and

    - **leveraging** existing initiatives by utilising established prevention and mitigation strategies from governments, industry groups, or peers to address sector-wide risks, such as using community grievance mechanisms.

      For example, encouraging the Government of Indonesia to become a member of the Intergovernmental Forum on Mining, Mineral, Metals and Sustainable Development (IGF) which supports members to advance responsible practices in the mining and mineral industry.[239]

- **Exercising leverage to influence the practices of the suppliers responsible** for the adverse impact(s) to the extent possible (see 4.1.4).
- **Assisting business partners in preventing or mitigating adverse impact(s)** (see 4.1.4).
- **Terminating the supplier relationship** as a last resort (see 4.1.4).
- **Monitor the implementation and the results** of all due diligence activities and prevention and mitigation measures taken **and communicate** this externally.[240]
- **Provide for or cooperate in remediation** when the company has identified it has caused or contributed to actual negative impacts.[241] Legitimate remediation mechanisms include legal state-based processes, non-judicial state-based mechanisms such as the National Contact Points to the OECD Guidelines for MNEs, and non-state-based processes such as operational-level grievance mechanisms, community grievance mechanisms, and collective bargain agreements.[242]

4.1.4 Leveraging supplier relationships to drive improvements

An important way to prevent or mitigate future adverse impacts along companies' supply chains is by leveraging their business relationships. Companies may:

- **Collaborate with suppliers** and business partners to create and execute corrective action plans with clear timelines and measurable outcomes.
- **Offer technical support** to suppliers and business partners, such as training, upgrading management systems, and other capacity-building measures.
- Encourage supplier and business partner **participation in broader sector-wide or regional initiatives** aimed at impact prevention.
- **Connect suppliers** and business partners with local service providers to enhance their capabilities in preventing and mitigating adverse impacts or risks.
- **Support suppliers and business partners in accessing financing** for corrective action plan implementation through direct funding, low-interest loans, sourcing guarantees, or assistance in securing financial resources.
- **Use their purchasing power to pressure mines and suppliers to adopt responsible practices** that prevent environmental and human rights harm. If necessary, cease sourcing nickel from producers engaged in human rights violations.
- Demand nickel suppliers **to halt the construction of new coal plants** and develop a time-bound plan to transition to renewable energy.
- If a supplier fails to meet environmental or human rights standards, **support remediation efforts to address the violations**. If violations persist without resolution, withdraw or terminate the business relationship. If a company decides to disengage, it should do so responsibly by:[243]
    - Adhering to national laws, international labour standards, and collective bargaining agreements.
    - Defining and communicating escalation measures for disengagement in advance to the business partner/supplier.
    - Communicating the reasons for disengagement to management and relevant trade unions.
    - Providing adequate notice to the business partner whenever feasible.
- If a lack of leverage is identified, the **OECD guidelines** provide recommendations for **using the leverage companies do have**. For example, they may collaborate with other companies

sourcing from the same supplier, they may join sector-wide, geographic and issue-specific initiatives to engage suppliers.[244]

4.2 Recommendations for future research

Owing to Indonesia's significant role in nickel mining and processing and substantial foreign - especially Chinese - investments in local refining and battery manufacturing facilities in recent years, Indonesian nickel is likely to enter the supply chains of industries that rely on nickel-containing products, including the EV and renewable energy sectors.

While the supply chain analysis revealed a number of potential current and future links with EV and battery manufacturers, this research confirms the level of opaqueness and complexity inherent to mineral supply chains, including for nickel. It shows that companies and their suppliers still have a long way to go in providing supply chain transparency and taking responsibility for ensuring ethical sourcing.

The member companies of the Dutch Renewable Energy Agreement (REA) were contacted for this research, of which one disclosed concrete supply relationships. This limits, for a large part, the level of detail of the supply chain mapping from upstream companies and raises questions as to their commitment towards the Agreement. Even if a company is a small player and/or nickel amounts to a small share of the company's total procurement, it is important to consider the larger picture of the nickel supply chain and its destructive social and environmental impacts upstream in Indonesia. In other words, all small users together make up a considerable part of the nickel supply chain and may still be indirectly involved in adverse human rights abuses.

Future research could focus on Chinese export links and relationships with the EU market to establish certainty in the supply chain links identified. Access to Chinese company-level export data would support this. Besides the EV and renewable energy sectors, further research could focus on other major industries that use nickel, such as consumer goods.[245] Stainless steel is found in end-consumer goods like dishwashers, washing machines, and outdoor grills. Moreover, it is especially prominent in kitchen sinks, cookware (pots and pans), cutlery and interior design elements. Nickel alloys are integral to various electronic devices and appliances, including heating elements and thermostats. Nickel is also used in the construction of mobile phones and computers, particularly in internal electronics and external cases. Nickel is crucial for lithium-ion, NiMH, and NiCd batteries used in electronics and household tools.

References

1 Mordor Intelligence (2025), “Europe Large Wind Turbine Company List”, online: https://www.mordorintelligence.com/industry-reports/europe-large-wind-turbine-market/companies, viewed in February 2025.

2 BMW Group email from 21 March 2025.

3 Sumitomo Metal Mining (2024, February 27), *Sumitomo Metal Mining Announces PTVI Divestment Agreement with MIND ID*, Press release.

4 Eurostat (2024, October), “EU imports in green energy products higher than exports”, online: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20241014-1, viewed in February 2025;

Eurostat (2024, October), “Growing EU trade of electric & hybrid cars”, online: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20241030-2, viewed in February 2025.

5 Pistilli, M. (2024, January 23), “What is nickel used for?”, *Investing News Network*, online: https://investingnews.com/daily/resource-investing/base-metals-investing/nickel-investing/nickel-applications/, viewed in March 2025.

6 Nickel Institute (n.d.), “Stainless steel: The role of nickel”, online: https://nickelinstitute.org/en/nickel-applications/stainless-steel, viewed in March 2025.

7 Pistilli, M. (2024, January 23), “What is nickel used for?”, *Investing News Network*, online: https://investingnews.com/daily/resource-investing/base-metals-investing/nickel-investing/nickel-applications/, viewed in March 2025.

8 International Nickel Study Group (2024), *The World Nickel Factbook 2024*, p. 41.

9 Shanghai Metal Market (2025, February 18), “Behind Green Energy: The Supporting Role of Copper, Aluminum, and Nickel in Solar Technology Innovation”, online: https://www.metal.com/en/newscontent/103183354?utm_source=chatgpt.com, viewed in March 2025.

10 Lithium Harvest (2025, January), “Lithium-Ion (Li-Ion) Batteries”, online: https://lithiumharvest.com/knowledge/green-energy-transition/how-lithium-is-powering-the-renewable-energy-revolution/, viewed in April 2025.

11 International Energy Agency (IEA) (2024), *Global EV Outlook 2024*, p.85-87.

12 International Energy Agency (IEA) (2024), *Global EV Outlook 2024*, p.85-87.

13 International Energy Agency (IEA) (2022), “Mineral requirements for clean energy transitions”, online: https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/mineral-requirements-for-clean-energy-transitions, viewed in April 2025.

14 Medium (2024, February), “Tesla Goes All-In With LFP Battery Technology to Replace Unsustainable Nickel Batteries”, online: https://medium.com/@DiggerInsights/tesla-goes-all-in-with-lfp-battery-technology-to-replace-unsustainable-nickel-batteries-5a7f3a382e18, viewed in April 2025.

15 Tesla (2023, April), Master Plan Part 3, p.22.

16 Foote, B. (2025, April), “Ford EV Battery Partner CATL Posts Record Profit In Q1 2025”, *Ford Authority*, online: https://fordauthority.com/2025/04/ford-ev-battery-partner-catl-posts-record-profit-in-q1-2025/, viewed in April 2025.

17 Flor, J. (2024), “BMW Going With New Batteries For Its Ambitious EV Plans”, *Clean Technica*, online: https://cleantechnica.com/2023/11/01/bmw-going-with-new-batteries-for-its-ambitious-ev-plans/, viewed in April 2025.

18 International Energy Agency (IEA) (2022), *The Role of Critical Minerals in Clean Energy Transitions*, p.103-105.

19 International Energy Agency (IEA) (2022), *The Role of Critical Minerals in Clean Energy Transitions*, p.103-105.

20 Coates, G. (2021), “Wind and water – Nickel in clean energy”, *Nickel*, Vol. 36(2): 6-9.

21 Vedanta (2024, July 29), “The power behind solar panels: Unveiling nickel’s critical role in renewable energy systems”, online: https://www.linkedin.com/pulse/power-behind-solar-panels-unveiling-fxcrc/, viewed in March 2025.

22 US Geological Survey (USGS) (2024), *Mineral Commodity Summaries: Nickel*, p. 125.

23 International Nickel Study Group (2024), *The World Nickel Factbook 2024*, p. 14.

24 Subarna, R.A. (2024, September), "Smelters squeeze Indonesia's nickel ore supply", *Easte Asia Forum*, online: https://eastasiaforum.org/2024/09/14/smelters-squeeze-indonesias-nickel-ore-supply/, viewed in April 2025.

25 International Energy Agency (IAE) (2024, March 19), "Prohibition of the export of nickel ore", online: https://www.iea.org/policies/16084-prohibition-of-the-export-of-nickel-ore, viewed in March 2025.

26 UN Comtrade (n.d.), "Trade data", online: https://comtradeplus.un.org/, viewed in March 2025.

27 IMIP (n.d.), "Home page", online: https://imip.co.id/, viewed in February 2025.

28 Nickel Industries (n.d.), "Indonesia Morowali Industrial Park (IMIP)", online: https://nickelindustries.com/section/indonesia-morowali-industrial-park-imip/, viewed in April 2025.

29 IMIP (n.d.), "About us", online: https://imip.co.id/tentang-kami/, viewed in February 2025.

30 IMIP (n.d.), "About us", online: https://imip.co.id/tentang-kami/, viewed in February 2025.

31 IMIP (n.d.), "About us – Industrial cluster – Stainless steel", online: https://imip.co.id/tentang-kami/, viewed in February 2025.

32 IMIP (n.d.), "About us – Industrial cluster – EV battery", online: https://imip.co.id/klaster-industri-ev-battery/, viewed in February 2025.

33 Bintang Delapan (n.d.), "PT. BINTANG DELAPAN MINERAL", online: https://bintangdelapan.com/?portfolio=pt-bintang-delapan-mineral, viewed in April 2025;

Nickel Industries (n.d.), "Hengjaya Mine", online: https://nickelindustries.com/section/hengjaya-mine/, viewed in April 2025.

34 Ginting, P. and E. Moore, (2021, November), "Indonesia Morowali Industrial Park (IMIP)", online: https://thepeoplesmap.net/project/indonesia-morowali-industrial-park-imip/, viewed in February 2025;

Business & Human Rights Resource Centre (2022, April), "Indonesia Morowali Industrial Park (IMIP) - Project Profile", online: https://www.business-humanrights.org/en/latest-news/indonesia-morowali-industrial-park-imip-project-profile/, viewed in February 2025;

AidData (n.d.), "Project ID: 66200", online: https://china.aiddata.org/projects/66200/, viewed in February 2025;

Bintang Delapan (n.d.), "Home", online: https://bintangdelapan.com/, viewed in February 2025.

35 IMIP (n.d.), "Tenants", online: https://imip.co.id/tenant/, viewed in April 2025.

36 Tesla (n.d.), *Impact Report 2023*, p. 122.

37 IMIP (n.d.), "Tenants - PT CNGR Ding Xing New Energy", online: https://imip.co.id/pt-ding-xing-new-energy/, viewed in February 2025.

38 Shipment records available to Profundo.

39 Shipment records available to Profundo.

40 GEM (2024), *Annual Report 2023*, p.21.

41 Shipment records available to Profundo.

42 Shipment records available to Profundo.

43 Shipment records available to Profundo.

44 Axens (2023, October), "Axens and Hunan Changyuan Lico strengthen their strategic partnership to produce battery materials in France by 2027", online: https://www.axens.net/resources-events/news/pr-axens-and-hunan-changyuan-lico-strengthen-their-strategic-partnership, viewed in February 2025.

45 Ningbo Shanshan (n.d.), "Lithium ion battery material", online: https://www.ssgf.net/index/en/business2.html#business=2, viewed in February 2025.

46 Joon-hyun, M. (2024, November), "Samsung SDI builds EV momentum with Audi, Hyundai deals", *The Korea Herald*, online: https://www.koreaherald.com/article/10011584#:~:text=Samsung%20SDI%20recently%20began%20supplying,batteries%20from%20LG%20Energy%20Solution, viewed in February 2025.

47 Stellantis (2023, July), "Stellantis, Samsung SDI Announce Plans to Build Second StarPlus Energy Gigafactory in the United States", online: https://www.stellantis.com/en/news/press-releases/2023/july/stellantis-samsung-sdi-

announce-plans-to-build-second-starplus-energy-gigafactory-in-the-united-states, viewed in February 2025.

48 Ford (2021, May), "Ford Commits to Manufacturing Batteries, to Form New Joint Venture with SK Innovation to Scale NA Battery Deliveries", online: https://media.ford.com/content/fordmedia/fna/us/en/news/2021/05/20/ford-commits-to-manufacturing-batteries.html, viewed in February 2025.

49 Umicore (n.d.), "Markets & products – Energy & batteries", online: https://www.umicore.com/en/markets-products/energy-and-batteries/, viewed in February 2025.

50 Stellantis (2022, September), *List Of Refiners In Our Direct Material Supply Chain For High-Voltage Batteries*, p.2.

51 Volkswagen Group (2023, June), "PowerCo and Umicore set up pre-eminent new European battery materials player", online: https://www.volkswagen-group.com/en/press-releases/powerco-and-umicore-set-up-pre-eminent-new-european-battery-materials-player-17732, viewed in February 2025.

52 Shipment data available to Profundo.

53 Mining Technology (2024, October), "JSW Group partners with South Korea's POSCO to set up steel plant in India", online: https://www.mining-technology.com/news/jsw-posco-steel-india/?cf-view, viewed in April 2025.

54 Shipment data available to Profundo.

55 POSCO International (2020, February 2), "POSCO INTERNATIONAL now directly supplies automobile components to Volkswagen in Cooperation with S&S", online: https://poscointl.com/eng/newsroom_view.html?idx=5856&key=&page=25, viewed in April 2025.

56 POSCO India (n.d.), "POSCO-ICPC was named "Supplier of the Year" at the Supplier Day 2024 event held by Schaeffler India in Maharashtra, India, on April 18, 2024", onlinehttps://www.poscoipc.com/awards-certifications/#:~:text=POSCO%2DICPC%20was%20named%20%E2%80%9CSupplier,%2C%20on%20April%2018%2C%202024., viewed in April 2025.

57 *China Daily* (2019, December 2), "Baogang steel now used in luxury German cars", online: https://regional.chinadaily.com.cn/innermongolia/baotou/2019-12/02/c_427777.htm., viewed in April 2025.

58 Shipment data available to Profundo.

59 Rept Battero (n.d.), "Solution – EV", online: https://www.reptbattero.com/en/ev/, viewed in February 2025.

60 Rept Battero (n.d.), "Solution – Energy Storage System Solutions", online: https://www.reptbattero.com/en/ess1/?_gl=1*148ir7x*_up*MQ..*_ga*MTQ2MTI3MzQ4Ni4xNzM4ODU2NzA4*_ga_7CRMMJ4XFL*MTczODg1NjcwNy4xLjAuMTczODg1NjcwNy4wLjAuMTQ4MTY2ODc1MQ., viewed in February 2025.

61 Nickel Industries (n.d.), A*nnual Report 2023*, p.90.

62 Nickel Industries (2024), *Annual Report 2023*, p.30.

63 Eternal Tsingshan Group (n.d.), "Research Institute", online: https://www.etsingshan.com/Art/Art_75/Art_75_204.aspx, viewed in March 2025.

64 Reuters (2021, March 3), "CORRECTED-China's Tsingshan signs pacts for 100,000 T nickel matte in EV push", online: https://www.reuters.com/article/business/corrected-chinas-tsingshan-signs-pacts-for-100000-t-nickel-matte-in-ev-push-idUSL3N2L10VC/, viewed in February 2025.

65 Volkswagen Group China (2022, march 21), "Volkswagen Group China intends strategic partnerships for battery raw material supply chain", online: https://volkswagengroupchina.com.cn/en/news/Detail?ArticleID=705E75C6C4484A959C116B0A95196585, viewed in February 2025.

66 Volkswagen (n.d.), *Responsible Raw Materials Report 2023*, p. 33.

67 S&P Global Ratings (2024, February 20), *Volkswagen AG*, p. 18.

68 MFY Steel (2025, February), "Who Are the Top Stainless Steel Coil Manufacturers in China?", online: https://mfysteel.com/top-stainless-steel-coil-manufacturers-china/#:~:text=Market%20Share%20Analysis&text=Recent%20industry%20data%20shows%3A,Baosteel%3A%2015%25%20market%20share, viewed in February 2025.

69 Eurostat (2024, October), "EU imports in green energy products higher than exports", online: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20241014-1, viewed in February 2025.

70 Huayou Indonesia (n.d.), “Our business”, online: https://huayouindonesia.com/en/our-business/, viewed in February 2025.

71 Shipment records available to Profundo.

72 Huayou Cobalt (2024), 2023 Annual Report of Zhejiang Huayou Cobalt Co., Ltd., p.12

73 Shepherd, J. (2018, April), “Huayou partners with LG Chem as China-South Korea ‘battery wars’ thaw continues”, *Best*, online: https://www.bestmag.co.uk/huayou-partners-lg-chem-china-south-korea-battery-wars-thaw-continues/, viewed in February 2025

74 Stellantis (2022, September), *List Of Refiners In Our Direct Material Supply Chain For High-Voltage Batteries*, p.2.

75 Tesla (n.d.), *Impact Report 2023*, p. 122.

76 IMIP (n.d.), “Tenants - PT Huayue Nickel Cobalt”, online: https://imip.co.id/pt-huayue-nickel-cobalt/, viewed in February 2025.

77 BHRRC (2022, August 10), “Indonesia: Tesla's nickel transactions with Chinese companies leave trails of pollution and environmental suffering”, online: https://www.business-humanrights.org/en/latest-news/indonesia-teslas-nickel-transactions-with-chinese-companies-leave-trails-of-pollution-and-environmental-suffering/, viewed in February 2025.

78 Bloomberg (2022), “Tesla inks battery materials deals with two China suppliers’, online: https://www.bloomberg.com/news/articles/2022-08-01/tesla-inks-battery-materials-deals-with-two-chinese-suppliers?leadSource=uverify%20wall, viewed in February 2025

79 Huayou Cobalt (2024), *Annual Report 2023*, p.12.

80 *Indonesia Business Post* (2024, August), ”Residents sued for blocking production road in PT IHIP industrial zone", online: https://indonesiabusinesspost.com/2529/Politics/residents-sued-for-blocking-production-road-in-pt-ihip-industrial-zone, viewed in March 2025.

81 Zhenshi Holding Group (n.d.), “Diversified development – International – Indonesia”, online: https://en.zhenshigroup.com/news/292.html, viewed in February 2025.

82 Topkota (2023, December), “March 2024, PT BTIIG-IHIP Group's PLTU-Smelter in Topogaro Morowali Inaugurated”, online: https://topkota.co/maret-2024-pltu-smelter-pt-btiig-ihip-group-di-topogaro-morowali-diresmikan/, viewed in March 2025.

83 Itsnaini, F.M. and H.B. Alexander (2024, June), "PT IHIP Agrarian Conflict in Morowali Leads to Criminalization of Residents", *Kompas,* online: https://lestari.kompas.com/read/2024/06/28/200000586/konflik-agraria-pt-ihip-di-morowali-berujung-kriminalisasi-warga?page=all#, viewed in March 2025.

84 Lahay, S. (2024, July), “Affected Communities Protest IHIP Nickel Industrial Area Project in Morowali”, *Mongabay*, online: https://www.mongabay.co.id/2024/07/05/masyarakat-terdampak-protes-proyek-kawasan-industri-ihip-di-morowali/, viewed in March 2025.

85 Zhenshi Holding Group (n.d.), “Diversified development – International – Indonesia”, online: https://en.zhenshigroup.com/news/292.html, viewed in February 2025.

86 Shipment records available to Profundo.

87 Negri, M., A. Bui, Y. Ordonez, G. Bieker and A. Isenstadt (2024, September), *Which Automakers are Shifting to Green Steel?* Washington, DC, USA: ICCT, p.ii.

88 Vale (n.d.), “Indonesia – About PT Vale”, online: https://vale.com/indonesia/about-pt-vale, viewed in February 2025;

PT Vale Indonesia (n.d.), *Annual Report 2023*, p.14

89 Vale (n.d.), “About PT Vale Indonesia”, online: https://vale.com/indonesia/about-pt-vale-indonesia, viewed in February 2025.

90 PT Vale Indonesia (n.d.), *Annual Report 2023*, p. 42.

91 PT Vale Indonesia (n.d.), *Annual Report 2023*, p. 44.

92 PT Vale Indonesia (n.d.), *Annual Report 2023*, pp. 18, 46.

93 Sumitomo Metal Mining (n.d.), *Integrated Report 2024*, p.64.

94 PT Vale Indonesia (n.d.), *Annual Report 2023*, p.83.

95 Vale (n.d.), “Indonesia – About PT Vale”, online: https://vale.com/indonesia/about-pt-vale, viewed in February 2025.

96 PT Vale Indonesia (n.d.), *Annual Report 2023*, p. 46.

97 PT Vale Indonesia (n.d.), *Annual Report 2023*, p. 21.

98 Indonesian Mining Association (IMA) (2024, November), “Doubted by BPK, Vale Opens Up Development of RKEF Smelter in Morowali”, online: https://ima-api.org/detail/news/mining/diragukan-bpk-vale-buka-perkembangan-smelter-rkef-di-morowali, viewed in April 2025.

99 Wahyuddin, R. (2025, January), “Vale Boss Reveals Progress on Three Integrated HPAL-RKEF Smelter Projects”, *Indonesian Mining Association (IMA)*, viewed in April 2025.

100 Vale (n.d.), “Canada”, online: https://www.vale.com/nl/canada, viewed in February 2025.

101 PT Vale Indonesia (n.d.), *Annual Report 2023*, p. 46.

102 Shipment records available to Profundo.

103 Sumitomo Metal Mining (n.d.), *Integrated Report 2023*, p. 1.

104 PT Vale Indonesia (n.d.), *Annual Report 2023*, p. 46.

105 Sumitomo Metal Mining (n.d.), *Integrated Report 2023*, pp. 64, 139.

106 Sumitomo Metal Mining (n.d.), “Isoura plant”, online: https://www.smm.co.jp/en/corp_info/location/domestic/isoura/, viewed in February 2025;

Sumitomo Metal Mining (n.d.), *Integrated Report 2023*, p. 64.

107 Shipment records available to Profundo.

108 Sumitomo Metal Mining (SMM) (2024), *Integrated Report 2024*, p.55.

109 Mining.com (2021, July 6), “Sumitomo Metal to invest $424m to boost battery materials output”, online: https://www.mining.com/web/sumitomo-metal-to-invest-424m-to-boost-battery-materials-output/, viewed in February 2025;

Mining.com (2023, November 16), “Sumitomo Metal looks to boost battery materials output, possibly in US”, online: https://www.mining.com/web/sumitomo-metal-mining-looks-to-boost-battery-materials-output-possibly-in-us/, viewed in February 2025.

110 Fleet Europe (2024, January 23), “Mass(ive) production and price cuts: How did the Tesla - Panasonic alliance thrive over the years?”, online: https://www.globalfleet.com/en/manufacturers/global/analysis/massive-production-and-price-cuts-how-did-tesla-panasonic-alliance-thrive-over-years?t%5B0%5D=Tesla&t%5B1%5D=Electrification&curl=1, viewed in February 2025.

111 Battery Industry (2024, September 28), “Panasonic’s Next-Gen EV battery set for mass production”, online: https://batteryindustry.net/economy-tech-panasonics-next-gen-ev-battery-set-for-mass-production/, viewed in November 2024.

112 Reuters (2018, September 13), “Japan’s Sumitomo to focus on battery material supply to Panasonic, Toyota”, online: https://www.reuters.com/article/business/japans-sumitomo-to-focus-on-battery-material-supply-to-panasonic-toyota-idUSKCN1LT2QA/, viewed in February 2025.

113 Panasonic (2013, October 30), “Panasonic and Tesla reach agreement to expand supply of automotive-grade battery cells”, online: https://news.panasonic.com/global/topics/4727, viewed in February 2025.

114 Shipment records available to Profundo.

115 Medium (2024, February), “Tesla Goes All-In With LFP Battery Technology to Replace Unsustainable Nickel Batteries”, online: https://medium.com/@DiggerInsights/tesla-goes-all-in-with-lfp-battery-technology-to-replace-unsustainable-nickel-batteries-5a7f3a382e18, viewed in February 2025.

116 Tesla (2023, April), *Master Plan Part 3*, p.22.

117 Battery Industry (2024, September 28), “Panasonic’s Next-Gen EV battery set for mass production”, online: https://batteryindustry.net/economy-tech-panasonics-next-gen-ev-battery-set-for-mass-production/, viewed in February 2025.

118 Toyota (2024, March), “TMC Strengthens Battery Production Capabilities”, online: https://global.toyota/en/newsroom/corporate/40515408.html, viewed in February 2025.

119 Sumitomo Metal Mining (2020, March 10), “SMM’s battery cathode material NMC selected for lithium ion battery

for Toyota Motor Corporation's new Yaris", Press release, viewed in February 2025.

120 Sumitomo Metal Mining (2024, March 28), "Sumitomo Metal Mining to build recycling plants for lithium ion batteries", Press release, viewed in February 2025.

121 Mining Technology (2024, July 16), "Sumitomo Metal mining gets grant for cathode mactive material for lithium ion secondary battery", online: https://www.mining-technology.com/data-insights/sumitomo-metal-mining-gets-grant-for-cathode-active-material-for-lithium-ion-secondary-battery/?cf-view, viewed in February 2025.

122 Indonesia Miner (2023, November), "PT Gunbuster Nickel Industry Collaborates for Labor Market Expansion", online: https://indonesiaminer.com/news/detail/2023-11-01100656-pt-gunbuster-nickel-industry-collaborates-for-labor-market-expansion, viewed in February 2025.

123 Rakhmat, M.Z., B.Y. Adhinegara and Y. Purnama (2025), *The Fallout of PT Gunbuster Nickel Industry Closure*, Jakarta, Indonesia: CELIOS, p.1.

124 USGS (n.d.), *2020–2021 Minerals Yearbook – Indonesia*, pp.12.4,12.10.

125 *Bloomberg News* (2025, February 25), "China-backed $3 billion Indonesian nickel smelter risks shutdown", online: https://www.mining.com/web/china-backed-3-billion-indonesia-nickel-smelter-risks-shutdown/, viewed in March 2025.

126 PT Gunbuster Nickel Industry (2025, February), "Press Release PT Gunbuster Nickel Industry", online: https://gunbusternickelindustry.com/en_us/2025/02/25/press-release-pt-gunbuster-nickel-industry/, viewed in April 2025.

127 Su, R. (2025, February), "Indonesia's Gunbuster Nickel Industri faces near-total shutdown amid financial struggles", YIEH, online: https://www.yieh.com/en/indonesias-gunbuster-nickel-industri-faces-near-total-shutdown-amid-financial-struggles/153102, viewed in April 2025.

128 Rakhmat, M.Z., B.Y. Adhinegara and Y. Purnama (2025), *The Fallout of PT Gunbuster Nickel Industry Closure*, Jakarta, Indonesia: CELIOS, p.5.

129 *IndoPremier* (2025, March 4), "Indonesia's Nickel Boom Forces Smelters to Curb Their Own Success", online: https://www.indopremier.com/ipotnews/newsDetail.php?jdl=Booming_Nikel_Indonesia_Paksa_Smelter_Mengekang_Keberhasilannya_Sendiri&news_id=195236&group_news=IPOTNEWS&taging_subtype=LOGAMDANMINERAL&name=&search=y_general&q=smelter%20nikel,nikel&halaman=1, viewed in March 2025.

130 *Kompas.com* (2025, March 17), "China's Nickel Smelter Threatened with Closure, Can Danantara Be the Savior?" [Bahasa], online: https://lestari.kompas.com/read/2025/03/17/140000786/smelter-nikel-asal-china-terancam-tutup-bisakah-danantara-jadi-penyelamat, viewed in March 2025.

131 Gunbuster Nickel Industry (2021, December), "Inaugurated by President Jokowi, PT GNI Smelter Factory in Morut Absorbs 60,000 Local Workers", online: https://gunbusternickelindustry.com/2021/12/27/iure-dolor-ut-consectetur-et-sed-odit/, viewed in February 2025.

132 MIND ID (2021, May), "ANTAM Increases Production Capacity This Year", online: https://mind.id/news/antam-tingkatkan-kapasitas-produksi-tahun-ini, viewed in February 2025.

133 PT ANTAM (2024, June), *Interim Consolidated Financial Statements 30 June 2023 and 31 December 2022 and for the Six-Month Periods Ended 30 June 2023 and 2022*, p.63.

134 Spence, E. (2024, September), "Nickel flowing to Europe shows Indonesia's grip on global supply", online: https://www.mining.com/web/nickel-flowing-to-europe-shows-indonesias-grip-on-global-supply/, viewed in February 2025.

135 Shipment data available to Profundo.

136 Mining Technology (2024, October), "JSW Group partners with South Korea's POSCO to set up steel plant in India", online: https://www.mining-technology.com/news/jsw-posco-steel-india/?cf-view, viewed in April 2025.

137 Shipment data available to Profundo.

138 POSCO International (2020, February 2), "POSCO INTERNATIONAL now directly supplies automobile components to Volkswagen in Cooperation with S&S", online: https://poscointl.com/eng/newsroom_view.html?idx=5856&key=&page=25, viewed in April 2025.

139 POSCO India (n.d.), "POSCO-ICPC was named "Supplier of the Year" at the Supplier Day 2024 event held by Schaeffler India in Maharashtra, India, on April 18, 2024", onlinehttps://www.poscoipc.com/awards-certifications/#:~:text=POSCO%2DICPC%20was%20named%20%E2%80%9CSupplier,%2C%20on%20April%2018%2

C%202024., viewed in April 2025.

140 *China Daily* (2019, December 2), "Baogang steel now used in luxury German cars", online: https://regional.chinadaily.com.cn/innermongolia/baotou/2019-12/02/c_427777.htm., viewed in April 2025.

141 Shipment data available to Profundo.

142 Segun, W. (2023, October), "ESG Social Risks Overview", online: https://www.auditboard.com/blog/social-risks-esg/, viewed in March 2025.

143 EU Commission (n.d.), Corporate sustainability due diligence, online: https://commission.europa.eu/business-economy-euro/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en, viewed in October, 2024.

144 EU Commission (n.d.), Corporate sustainability due diligence, online: https://commission.europa.eu/business-economy-euro/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en, viewed in October, 2024.

145 EU Commission (n.d.), Corporate sustainability due diligence, online: https://commission.europa.eu/business-economy-euro/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en, viewed in October, 2024.

146 EU Commission (2024, August), CSRD FAQ, online : https://finance.ec.europa.eu/document/download/c4e40e92-8633-4bda-97cf-0af13e70bc3f_en?filename=240807-faqs-corporate-sustainability-reporting_en.pdf, viewed in October 2024.

147 PwC (2023), European Union's Corporate Sustainability Reporting Directive (CSRD), online: https://viewpoint.pwc.com/dt/us/en/pwc/news-and-alerts/landing-page/csrdplacematesglp.pdf, viewed in October 2024.

148 European Commission (2023, August 17), "New law on more sustainable, circular and safe batteries enters into force", online: https://environment.ec.europa.eu/news/new-law-more-sustainable-circular-and-safe-batteries-enters-force-2023-08-17_en, viewed in February 2025.

149 European Parliament and Council (2023, July), Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC

150 European Union (2023, June), *Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries*, p. 83

151 European Union (2023, June), *Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries,* p. 86

152 European Union (2023, June), *Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries*, p. 90

153 European Union (2023, June), *Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries*, p. 123-126

154 European Commission (2025), "Commission proposes to cut red tape and simplify business environment", online: https://commission.europa.eu/news/commission-proposes-cut-red-tape-and-simplify-business-environment-2025-02-26_en, viewed in March 2025.

155 Ashurst (2025), "EU Parliament adopts Stop-the-clock Omnibus Proposal and process to simplify ESRS starts", online: https://www.ashurst.com/en/insights/eu-parliament-adopts-stop-the-clock-omnibus-proposal-and-process-to-simplify-esrs-starts/, viewed in April 2025.

156 European Parliament (2025), "Sustainability and due diligence: MEPs agree to delay application of new rules", online: https://www.europarl.europa.eu/news/en/press-room/20250331IPR27557/sustainability-and-due-diligence-meps-agree-to-delay-application-of-new-rules, viewed in April 2025.

157 ESG Dive (2025), "EU sustainability, supply chain simplification efforts face 'split' parliament, experts say", online: https://www.esgdive.com/news/eu-csrd-csddd-omnibus-simplification-efforts-face-split-parliament/742708/, viewed in March 2025.

158 TuK Indonesia (2025, February), ""Just Work On It!": Risks of Workplace Accidents Looms Over Morowali Workers", online: https://www.tuk.or.id/en/2025/02/just-work-on-it-risks-of-workplace-accidents-looms-over-morowali-workers/, viewed in March 2025.

159 China Labour Watch (2024, November), "Work Injuries, Deaths, and Labor Protests in Select Chinese Companies in

Indonesia – 11/4 update", online: https://chinalaborwatch.org/work-injuries-deaths-and-labor-protests-in-select-chinese-companies-in-indonesia-11-4-update/, viewed in March 2025.

160 China Labour Watch (2024, November), "Work Injuries, Deaths, and Labor Protests in Select Chinese Companies in Indonesia – 11/4 update", online: https://chinalaborwatch.org/work-injuries-deaths-and-labor-protests-in-select-chinese-companies-in-indonesia-11-4-update/, viewed in March 2025.

161 Business & Human Rights Resource Centre (2025, February), "Indonesia: One worker killed in fatal accident at PT Ocean Sky Metal Industry nickel smelter", online: https://www.business-humanrights.org/en/latest-news/indonesia-3/, viewed in March 2025.

162 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.42.

163 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.65.

164 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.65.

165 Rachman, J. (2025, January), "Indonesia's Nickel Business Is Boosting Development and Ruining Lives", *Foreign Policy*, online: https://foreignpolicy.com/2025/01/06/indonesia-nickel-industry-china-deaths-worker-safety-imip/, viewed in March 2025.

166 Guest, P., A. Renaldi, and T.W. Liu (2024, December), "Dust Money", *The Gecko Project*, online: https://thegeckoproject.org/articles/dust-money/, viewed in February 2025.

167 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.43-44.

168 Guest, P., A. Renaldi, and T.W. Liu (2024, December), "Dust Money", *The Gecko Project*, online: https://thegeckoproject.org/articles/dust-money/, viewed in February 2025.

169 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.45.

170 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.38-50.

171 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.50-58.

172 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.59-65.

173 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.31-33.

174 Rachman, J. (2025, January), "Indonesia's Nickel Business Is Boosting Development and Ruining Lives", *Foreign Policy*, online: https://foreignpolicy.com/2025/01/06/indonesia-nickel-industry-china-deaths-worker-safety-imip/, viewed in March 2025.

175 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.31-33.

176 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.48-49.

177 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.32.

178 Rachman, J. (2025, January), "Indonesia's Nickel Business Is Boosting Development and Ruining Lives", *Foreign Policy*, online: https://foreignpolicy.com/2025/01/06/indonesia-nickel-industry-china-deaths-worker-safety-imip/, viewed in March 2025.

179 Guest, P., A. Renaldi, and T.W. Liu (2024, December), "Dust Money", *The Gecko Project*, online: https://thegeckoproject.org/articles/dust-money/, viewed in February 2025.

180 Guest, P., A. Renaldi, and T.W. Liu (2024, December), "Dust Money", *The Gecko Project*, online: https://thegeckoproject.org/articles/dust-money/, viewed in February 2025.

181 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.34.

182 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.37.

183 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.35.

184 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.36.

185 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.55.

186 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.24-27.

187 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.41.

188 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.40.

189 Trend Asia (2024, September), "The Indonesia Nickel Pickle: The Labor and Employment Disarray at Indonesia Morowali Industrial Park (IMIP)", online: https://trendasia.org/en/the-indonesia-nickel-pickle-the-labor-and-employment-disarray-at-indonesia-morowali-industrial-park-imip/, viewed in February 2025.

190 Trend Asia (2024, September), "The Indonesia Nickel Pickle: The Labor and Employment Disarray at Indonesia Morowali Industrial Park (IMIP)", online: https://trendasia.org/en/the-indonesia-nickel-pickle-the-labor-and-employment-disarray-at-indonesia-morowali-industrial-park-imip/, viewed in February 2025.

191 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.59.

192 Trend Asia (2024, September), "The Indonesia Nickel Pickle: The Labor and Employment Disarray at Indonesia Morowali Industrial Park (IMIP)", online: https://trendasia.org/en/the-indonesia-nickel-pickle-the-labor-and-employment-disarray-at-indonesia-morowali-industrial-park-imip/, viewed in February 2025.

193 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.59.

194 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.58.

195 TuK Indonesia (2025, February), ""Just work on it!": Risks of Workplace Accidents Looms Over Morowali Workers", online: https://www.tuk.or.id/en/2025/02/just-work-on-it-risks-of-workplace-accidents-looms-over-morowali-workers/, viewed in March 2025.

196 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.56.

197 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.56-57.

198 Wasi Gedepuraka, Y. (2024, May), *Social Dialogue and Stakeholder Mapping of the Nickel sector in Central Sulawesi*, Jakarta, Indonesia: INKRISPENA and CNV Internationaal, p.58.

199 Rushdi, M., A. Sutomo, P. Ginting, Risdianto and M. Anwar (n.d.), *Fast and Furious for Future*, Rosa Luxemburg Foundation, p.85-88.

200 Rushdi, M., A. Sutomo, P. Ginting, Risdianto and M. Anwar (n.d.), *Fast and Furious for Future*, Rosa Luxemburg Foundation, p.79.

201 Milko, V. (2025, January), "Experts and advocates warn of nickel mining's risk to precious marine region of Indonesia", *AP News*, online: https://apnews.com/article/nickel-mining-coral-reefs-indonesia-evs-raja-ampat-c4dfe12a5bd97eac2f9e3a19f17b5b3c, viewed in March 2025.

202 Wahil, Y. and V. Milko (2024, December), "Global demand spurring Indonesia's mining boom comes at a cost for many communities", *AP News*, online: https://apnews.com/article/indonesia-nickel-stainless-steel-energy-transition-evs-c7f9e28b3a59f0113e1f96cd9b154067, viewed in March 2025.

203 CRI Climate Rights International (2024), *Nickel Unearthed – The Human and Climate Costs of Indonesia's Nickel Industry*, p.41.

204 CRI Climate Rights International (2024), *Nickel Unearthed – The Human and Climate Costs of Indonesia's Nickel Industry*, p.44.

205 Rushdi, M., A. Sutomo, P. Ginting, Risdianto and M. Anwar (n.d.), *Fast and Furious for Future*, Rosa Luxemburg Foundation, p.77-79.

206 Bne intellinews (2025, March), "Severe floods in Morowali, Indonesia tied to nickel mining expansion", online: https://www.intellinews.com/severe-floods-in-morowali-indonesia-tied-to-nickel-mining-expansion-372560/?source=indonesia, viewed in March 2025.

207 Wahil, Y. and V. Milko (2024, December), "Global demand spurring Indonesia's mining boom comes at a cost for many communities", *AP News*, online: https://apnews.com/article/indonesia-nickel-stainless-steel-energy-

transition-evs-c7f9e28b3a59f0113e1f96cd9b154067, viewed in March 2025.

208 Al-Ayubby, A. (2025, January), *Workers Waiting to Die in Morowali*, Indonesia: Sembada Bersama Indonesia, p.44.

209 Rushdi, M., A. Sutomo, P. Ginting, Risdianto and M. Anwar (n.d.), *Fast and Furious for Future*, Rosa Luxemburg Foundation, p.77.

210 Glynn, T. (2006), "Community-based research on the environmental and human health impacts of a laterite nickel mine and smelter in Sorowako, Indonesia", Master's thesis, *Memorial University of Newfoundland*, p.168.

211 Rushdi, M., A. Sutomo, P. Ginting, Risdianto and M. Anwar (n.d.), *Fast and Furious for Future*, Rosa Luxemburg Foundation, p.46-49.

212 Rushdi, M., A. Sutomo, P. Ginting, Risdianto and M. Anwar (n.d.), *Fast and Furious for Future*, Rosa Luxemburg Foundation, p.46-49.

213 Environmental Justice Atlas (2023), "Karonsi'e Dongi people and Vale mine in Sorowako, Sulawesi, Indonesia", online: https://ejatlas.org/conflict/karonsie-dongi-people-and-vale-mine-in-sorowako-sulawesi-indonesia, viewed in March 2025.

214 Environmental Justice Atlas (2023), "Karonsi'e Dongi people and Vale mine in Sorowako, Sulawesi, Indonesia", online: https://ejatlas.org/conflict/karonsie-dongi-people-and-vale-mine-in-sorowako-sulawesi-indonesia, viewed in March 2025.

215 CRI Climate Rights International (2024), *Nickel Unearthed – The Human and Climate Costs of Indonesia's Nickel Industry*, p.26.

216 CRI Climate Rights International (2024), *Nickel Unearthed – The Human and Climate Costs of Indonesia's Nickel Industry*, p.30.

217 Jong, H.N. (2024, August), "Indonesia expands IPLC land recognition — but the pace is too slow, critics say", *Mongabay*, online: https://news.mongabay.com/2024/08/indonesia-expands-iplc-land-recognition-but-the-pace-is-too-slow-critics-say/, viewed in March 2025.

218 CRI Climate Rights International (2024), *Nickel Unearthed – The Human and Climate Costs of Indonesia's Nickel Industry*, p.31.

219 CRI Climate Rights International (2024), *Nickel Unearthed – The Human and Climate Costs of Indonesia's Nickel Industry*, p.35.

220 CRI Climate Rights International (2024), *Nickel Unearthed – The Human and Climate Costs of Indonesia's Nickel Industry*, p.35.

221 Rushdi, M., A. Sutomo, P. Ginting, Risdianto and M. Anwar (n.d.), *Fast and Furious for Future*, Rosa Luxemburg Foundation, p.81-82.

222 Indonesia Business Post (2024, August), "Residents sued for blocking production road in PT IHIP industrial zone", online: https://indonesiabusinesspost.com/2529/Politics/residents-sued-for-blocking-production-road-in-pt-ihip-industrial-zone, viewed in March 2025.

223 Business and Human Rights Resource Centre (2019), "Indonesia: Indigenous groups allege abuses of rights by Vale's nickel mining activity", online: https://www.business-humanrights.org/en/latest-news/indonesia-indigenous-groups-allege-abuses-of-rights-by-vales-nickel-mining-activity/, viewed in March 2025.

224 Trend Asia (2023, May), "Sorowako Residents Reported PT Vale Indonesia to The Human Rights Commission for Alleged Human Rights Violation", online: https://trendasia.org/en/sorowako-residents-reported-pt-vale-indonesia-to-the-human-rights-commission-for-alleged-human-rights-violation/, viewed in March 2025.

225 Environmental Justice Atlas (2023), "Karonsi'e Dongi people and Vale mine in Sorowako, Sulawesi, Indonesia", online: https://ejatlas.org/conflict/karonsie-dongi-people-and-vale-mine-in-sorowako-sulawesi-indonesia, viewed in March 2025.

226 Fair Finance Guide Japan (2025, February), *Compensation negotiations that foster dissatisfaction and distrust - Indonesia: The reality of the Baho Dopi mine and smelter project*, p.2-3.

227 The Danish Institute for Human Rights (2020), *Phase 3: Analysing Impacts - Human Rights Impact Assessment Guidance and Toolbox*;

OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct.*

228 The Danish Institute for Human Rights (2020), *Phase 3: Analysing Impacts - Human Rights Impact Assessment*

Guidance and Toolbox, p.10.

229 The Danish Institute for Human Rights (2020), *Phase 3: Analysing Impacts - Human Rights Impact Assessment Guidance and Toolbox*, p.13.

230 Şen, D. (2025, March), "EU Battery Regulation Due Diligence Requirements Guidelines Publication Delayed", *Compliance & Risk*, online: https://www.complianceandrisks.com/blog/eu-batteries-regulation-due-diligence-requirements-guidelines-publication-delayed/, viewed in April 2025.

231 Business and Human Rights Resource Centre (2023), *Powering Electric Vehicles*, p. 19.

232 The Danish Institute for Human Rights (2020), *Phase 3: Analysing Impacts - Human Rights Impact Assessment Guidance and Toolbox*;

OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct.*

233 The Danish Institute for Human Rights (n.d.), "Human rights impact assessment guidance and toolbox", online: https://www.humanrights.dk/tools/human-rights-impact-assessment-guidance-toolbox, viewed in March 2025.

234 Nickel Institute (n.d.), "Responsible Sourcing and ESG Due Diligence", online: https://nickelinstitute.org/en/sustainability/esg/responsible-sourcing-and-esg-due-diligence, viewed in March 2025;

Intergovernmental Forum on Mining, Mineral, Metals and Sustainable Development (IGF) (n.d.), "About us", online: https://www.igfmining.org/about-us/, viewed in March 2025.

235 Business and Human Rights Resource Centre (2023), *Powering Electric Vehicles*, p. 19.

236 OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct,* p.74.

237 OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct,* p.74-81.

238 OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct,* p.76.

239 Intergovernmental Forum on Mining, Mineral, Metals and Sustainable Development (IGF) (n.d.), "About us", online: https://www.igfmining.org/about-us/, viewed in March 2025.

240 OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct,* p.82-87.

241 OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct,* p.88.

242 OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct,* p.89.

243 OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct,* p.80.

244 OECD (2018*), OECD Due Diligence Guidance for Responsible Business Conduct,* p.79.

245 Nickel Institute (n.d.), "Consumer products: the role of nickel", online: https://nickelinstitute.org/en/nickel-applications/consumer-products/, viewed in April 2025.

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