Building the Trade-Labour Nexus in Indonesia's Nickel Value Chain

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THINKING AHEAD ON SOCIETAL CHANGE

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Executive Summary

As the world's largest producer of nickel and second-largest producer of cobalt, Indonesia is a critical player in the global green energy transition. With 42.3% of the world's nickel reserves and 50% of its output,[1] the country has rapidly moved from exporting raw ore to building a processing hub linked to stainless steel, batteries, and electric vehicles (EVs). Thanks to its vast nickel reserves, it has achieved what many resource exporters could not: using export restrictions and incentives to attract investment in downstream processing, creating jobs and domestic value-added activity.

These measures boosted Indonesia's share of global refined nickel from about 23% in 2020 to 37% in 2023,[2] while the number of nickel smelters expanded from two in 2016 to over 50 by 2024.[3] However, most investment is concentrated in Chinese companies, which account for around 82% of Indonesia's nickel capacity used in battery manufacturing.[4] This reliance raises concerns among other markets about overdependence, even as South Korean and other foreign firms also invest. Indonesia and its partners ultimately need more diversified global markets and investments. The stakes extend beyond energy and environment. The real question is whether nickel-led growth can also deliver a just transition - one that embeds decent work, labour rights, and inclusive development. Worker realities in the sector underscore the urgency, with low union density, excessive overtime and fatigue, serious occupational health and safety (OHS) risks and migrant worker vulnerabilities. While Indonesia has ratified nine of the ten International Labour Organisation's (ILO) fundamental conventions, enforcement capacity lags the sector's rapid growth.

Foreign rules add complexity. The EU's Critical Raw Materials Act and Batteries Regulation embed social and environmental considerations, while export restrictions on critical minerals are on the rise. For Indonesia, this evolving regime is double-edged: it creates leverage to demand improved social and environmental performance from foreign companies but also frictions such as overlapping audits, tariff volatility, and Foreign Entity of Concern clauses. The challenge is to build an effective trade–labour nexus so that international frameworks drive stronger protections rather than deepen inequalities.

Just as Indonesia has used trade and investment to climb the value chain, it can use the same leverage to demand higher labour standards from foreign investors and domestic operators. Doing so is essential for sustaining competitiveness, diversifying buyers, and improving living standards. This is all the more important as Indonesia has committed to remove export restrictions on critical minerals to the US in recent trade negotiations.

At the same time, Indonesia's position is exceptional: its scale of reserves and ability to shift global nickel markets mean it is not a template for other resource-rich countries. Rather, it offers insights into how trade, investment and industrial policy interact with labour standards — but each country's path will depend on its own endowments, governance capacity, and geopolitical context.

Recommendations

- Trade, investment, and enforcement levers: Tie market access and investment benefits to measurable labour benchmarks; involve unions and civil society in trade negotiations; use critical-mineral agreements to secure assistance for labour inspection and OSH enforcement.
- Corporate accountability and park governance: Translate global standards (IRMA, ICMM, Copper Mark, ResponsibleSteel) into locally usable guidance; adopt park-wide agreements on OSH, wages, and collective bargaining; ensure transparent accident reporting.
- Domestic labour frameworks and skills: Make OSH a licence to operate; strengthen inspectorate capacity; enhance protections for migrant workers; support transitions from informality; build Green Jobs Academies and clear career progression pathways.
- Transparency and shared responsibility: Pilot battery passports and traceability tools; use offtake contracts to reward verified labour performance; establish cross-functional government coordination and regional mining dialogue platforms.

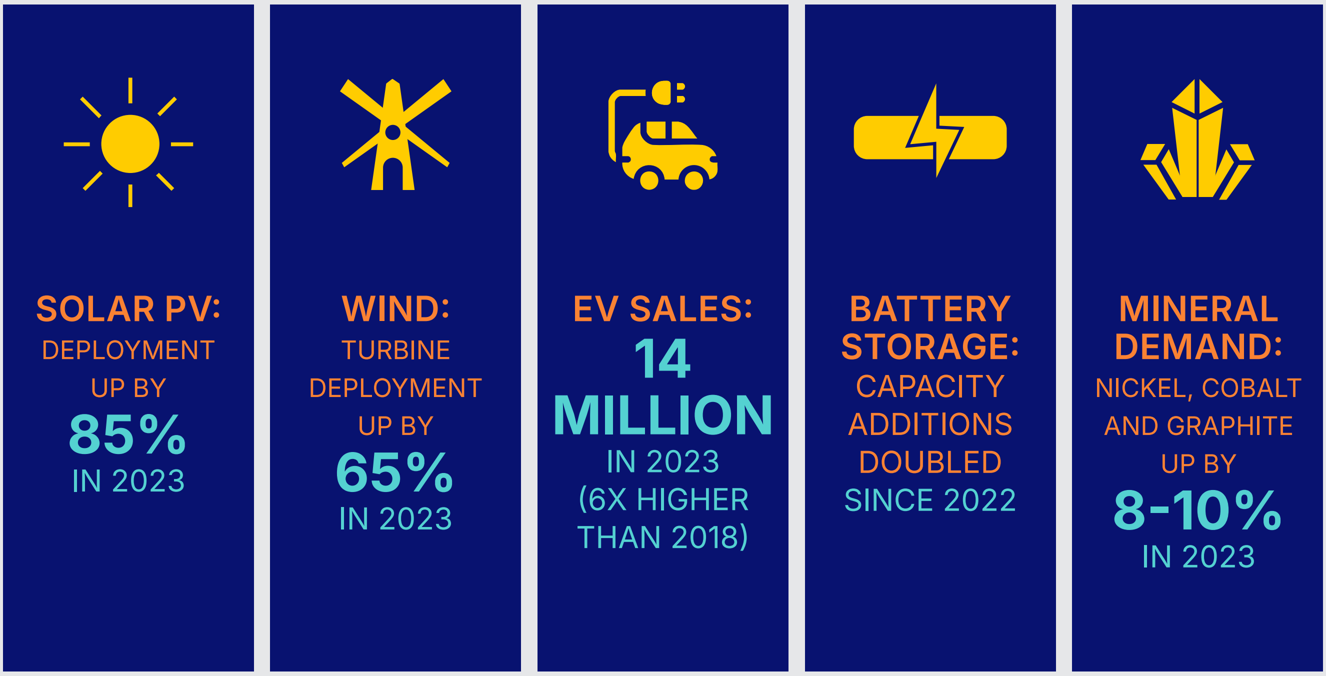
Introduction

As demand for critical minerals like nickel grows to fuel the global shift to green energy, supply chains become pivotal arenas for shaping labour outcomes. They can support a just transition - one that sustains livelihoods and expands decent work - when this growth is paired with strong labour protections.

Indonesia's nickel sector, now central to the clean energy economy, illustrates both the promise and the risks of the green transition. With 42.3% of the world's nickel reserves,[5] Indonesia is a major supplier. Globally, around 65% of nickel goes into stainless steel and about 16% into batteries, and demand for both uses is expected to grow, in part due to clean energy applications (Figure 1).[6]

To curb raw-ore exports and build domestic industries, the Indonesian government has combined trade, investment and industrial policy measures to push more value-added activity onshore, moving from extraction into refining, battery and, increasingly, electric-vehicle (EV) manufacturing (planned). The aims have been clear: capture more value, develop skills and deepen linkages with the wider economy. Investment has surged and processing capacity has expanded quickly in response. But sustained growth and broad benefits depend on strong labour and environmental safeguards, consistent policy, and mechanisms to reinvest gains in workers and communities. These shifts could generate substantial employment, including green jobs, but unresolved labour challenges risk diluting development gains. Without stronger, better-coordinated trade-labour governance, these benefits may be unevenly distributed,

Figure 1: Critical minerals and the clean energy surge



Source: International Energy Agency. (2024). *Global Critical Minerals Outlook 2024.* https://www.iea.org/reports/global-critical-minerals-outlook-2024/market-review especially for workers and communities in mining and smelting regions. While these measures have succeeded in attracting investment, there are questions about the replicability of such approaches, and whether they can be reconciled with multilateral commitments.

Both domestic and international dynamics matter. Indonesia's strategy is evolving amid technological developments, regulatory uncertainty, market volatility, shifting investment patterns and intensifying trade tensions. This environment offers uneven incentives for robust labour standards across Indonesia's nickel value chain. As geopolitics prioritises supply security, subsidy races and de-risking strategies often reward the lowest-cost producers regardless of working conditions, enabling compliance arbitrage and eroding trust in "green" supply chains. Subsidy races also often generate inefficient outcomes, with firms becoming dependent on continued support rather than investing in productivity or worker welfare.

The gap between economic ambition and labour protection underscores the need for clear, actionable trade–labour frameworks that support inclusive, sustainable development in resource-rich contexts. A stronger nexus would provide predictable rules for firms, steer finance toward responsible producers and help ensure that rapid capacity expansions translate into safer workplaces and better wages.

It is important to note that Indonesia's experience reflects a unique combination of abundant ore deposits and strategic Chinese investment. Returns on some processing plants are reportedly low, raising doubts about whether this model is replicable elsewhere. However, if Indonesia closes its trade-labour policy gap, its experience could offer lessons for other resource-rich economies navigating the green transition.

Aim and structure of the paper

This paper examines how Indonesia could leverage its position in critical minerals to improve labour standards through domestic policy and international engagement—and how trade partners can use market power and regulatory tools to reward responsible production and investment. It focuses on forging a stronger trade and labour nexus by assessing whether trade agreements, foreign regulations and corporate-accountability mechanisms provide meaningful incentives for better labour outcomes, where the "missing links" lie, and potential pathways to close them. The paper concludes with recommendations to strengthen labour protections, enhance policy coherence, deepen corporate accountability, and build capacity and partnerships for a just transition.

The analysis draws on insights from over 40 structured, qualitative interviews and a workshop in Jakarta in collaboration with INKRISPENA and the Center for International Trade and Investment, Universitas Pelita Harapan. The study forms part of the 'Trade and Labour Programme' run by the TASC Platform and the World Economic Forum with funding from Laudes Foundation and builds on research into policy tools to improve outcomes for workers in global supply chains.[7]

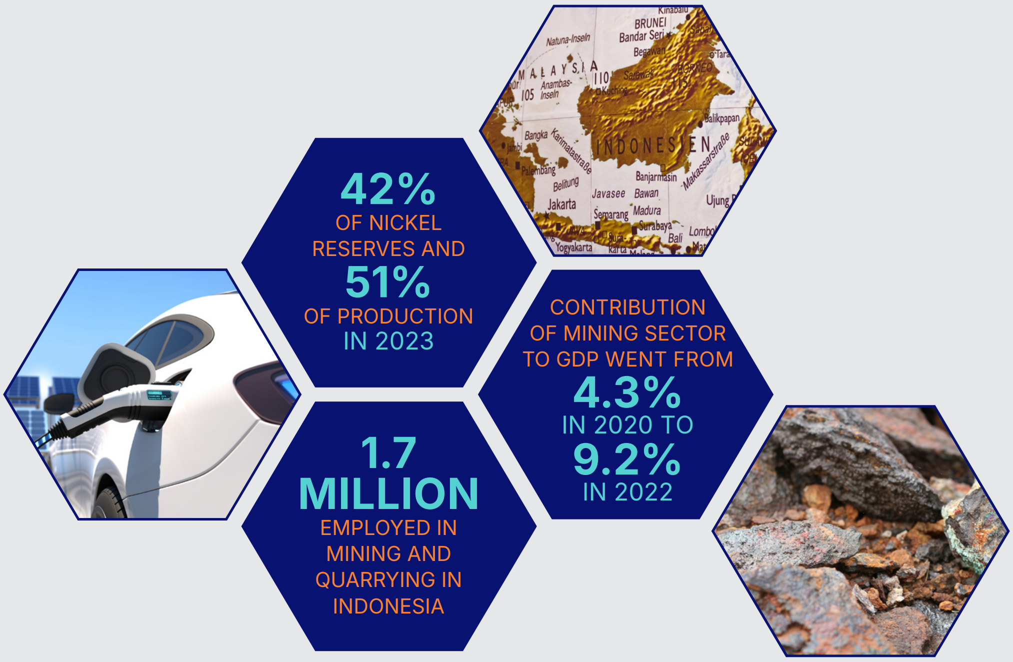
Section 1. Indonesia's Nickel Value Chain: Growth, Policy and Opportunity

Indonesia's nickel "downstreaming" policy has combined trade, investment and industrial policy measures to accelerate domestic processing and attract investment in industrial parks and EV-adjacent manufacturing and assembly.

Nickel is indispensable for stainless steel and remains important for the clean-energy transition. Many EVs and some storage systems use nickel-rich cathodes, although nickel-free chemistries such as lithium iron phosphate (LFP) already dominate grid storage and are gaining market share in vehicles.[8] Policy choices in Beijing, Brussels and Washington, together with battery innovation, recycling growth and price cycles, feed directly into investment and employment dynamics.

To shape rather than just absorb these shifts, Indonesia has sought to move up the value chain. Mining more broadly is a pillar of its economy. With sizeable endowments of nickel, copper, gold, tin, and coal, the sector accounted for about 9.2% of the country's GDP in 2022 and supports employment across multiple provinces[9] (see Figure 1). Within this portfolio, nickel has become both a major export earner and the spearhead of a strategy to move value-added activities onshore - "downstreaming" (*hilirisasi*)

Figure 2: Snapshot of mining in Indonesia



Sources: US Geological Survey, Mineral Commodity Summaries, January 2024, https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-nickel.pdf; BPS Statistics Indonesia, "Population 15 Years To Top Who Worked by Main Industry (People), 2024", https://www.bps.go.id/en/statistics-table/2/MjQ3OSMy/population-15-years-to-top-who-worked-by-main-industry--people-.html; PwC, Mining in Indonesia, 2023, https://www.pwc.com/id/en/energy-utilities-mining/assets/mining/mining-guide-2023.pdf

– using raw ore export restrictions, local content requirements, investment incentives and other policies. The approach draws legitimacy from the 1945 Constitution's mandate that natural resources serve public welfare[10] and from the 2009 Mineral and Coal Mining Law requiring domestic processing.[11]

The policy trajectory is captured in Table 1, a timeline from 2009 to 2025 that charts Indonesia's shift from raw-ore exporter to processing hub and into EV –related manufacturing, such as battery components and precursor materials.

Table 1: Timeline of policy developments in Indonesia related to nickel and downstream industries

Year	Event
2009	Mineral and Coal Mining Law (Law No. 4/2009) requires processing domestically within 5 years
2013	Construction of Indonesia Morowali Industrial Park (IMIP) in Central Sulawesi begins
1 January 2014	Nickel ore exports prohibited
2017	Government Regulation 1/2017 requires mining companies to convert to a special mining business operation production license, divest 51% of shares to Indonesian entities within 10 years and build a smelter in Indonesia by January 2022 (later extended to 2023), as a prerequisite for mineral concentrates export license
2017	Export ban relaxed till 2022 to allow exports of nickel ore with concentration < 1.7%
2018	Indonesia Weda Bay Industrial Park is established
12 August 2019	Presidential Regulation No. 55/2019 on Acceleration of Battery Electric Vehicles Program for Road Transportation[12] (amended in 2023) sets out incentives and local-content requirements of 35–40% for EVs in 2019 and 80% in 2026/2030
August 2019	Full nickel ore export ban announced for 1 January 2020
22 November 2019	EU complaint at WTO against Indonesia's export ban and domestic processing requirements
1 January 2020	Nickel ore export ban in force
14 May 2020	Nickel ore floor price set
16 March 2021	PT Indonesia Battery Corporation set up
30 November 2022	WTO Panel finds in favour of the EU - now under appeal with the final outcome stalled and the EU considering retaliating under its Enforcement Regulation[13]
5 July 2024	First EV battery plant in SE Asia in Karawang, West Java by HLI Green Power (joint venture between Indonesia Battery Corporation, Hyundai Motor and LG Energy Solution)
10 September 2024	US Department of Labor adds nickel in Indonesia to its forced labour list based on reports regarding Chinese migrant workers
June 2025	GAC Indonesia Smart Factory EV assembly plant begins operations. GAC is a Chinese state-owned automaker and the plant is owned by Indonesian PT Indomobil Group.[14]
22 July 2025	Joint Statement on Framework for US-Indonesia Agreement on Reciprocal Trade states that Indonesia will remove export restrictions on industrial goods, including critical minerals, to the US

The effects of this policy mix have been rapid and visible. Indonesia's share of global mined nickel increased from roughly 34% to 52% between 2020 and 2023, while its share of refined nickel increased from about 23% to 37%.[15] The number of nickel smelters expanded from two in 2016 to roughly 54 by 2024.[16]

Much of the new capacity reflects investment and commitments by Chinese firms, estimated at around USD 30 billion[17] with approximately 82% of Indonesia's nickel used in battery supply chains in 2024 attributed to Chinese-owned producers.[18] Trade flows have realigned accordingly: exports of nickel products to China climbed from USD 82.5 million in 2014 to USD 4.5 billion in 2022,[19] and around 71% of Indonesia's exports of nickel articles went to China that year.[20] This underscores China's deliberate strategy to secure mineral supply, and its effectiveness in embedding long-term influence in Indonesia's nickel sector.

Private sector stakeholders have also drawn our attention to fiscal impacts and risk allocation in this context. To-date, exposure to ferronickel price downturns has been absorbed by financing and guarantees of private investors, even where major park projects relied on Chinese investor support. In fiscal terms, despite tax holidays and subsidized coal, Indonesia has been net-positive on nickel processing through royalties and related revenues. The timing, technology and demand have aligned to power the success of Indonesia's nickel strategy - however applying identical instruments to other metals runs the risk of backing weak project economics with limited labour and community benefits.

As capacity has scaled, the policy focus has shifted from stainless-steel production toward battery materials and EV manufacturing. Presidential Regulation No. 55/2019 laid out fiscal and non-fiscal incentives and a rising local-content path, while the creation of Indonesia Battery Corporation in 2021 formalised the ambition to become a global EV-battery manufacturer. Yet nickel alone is not enough. Securing other critical inputs - such as lithium, which Indonesia does not produce - and investing in recycling have become priorities.

US "reciprocal" tariffs threats and the resulting negotiations with various countries, including Indonesia, have resulted in a sharp shift, however. In June 2025, Jakarta eased import licensing and restrictions on industrial raw materials from the US,[21] and by July 2025, in a joint statement with the US on a framework for negotiating an agreement, Indonesia committed to lift export restrictions on critical mineral exports to the US and to exempt US companies and goods from local content requirements.[22]

While Indonesia has transformed the geography of nickel mining and processing in a remarkably short time, the challenge now is to build a skilled workforce and attract investments that genuinely promote technology transfer and to do so with limited use of export restrictions. Whether this yields durable, broad-based development will depend on how effectively domestic institutions and international economic instruments align to reinforce labour rights, safe workplaces, and environmental responsibility.

Section 2. Trade, Geopolitics and Labour Dynamics in the Nickel Value Chain

Trade rules on critical minerals are being rewritten, and today's "security-first" framing risks sidelining labour outcomes unless they are hard-wired into trade and investment instruments.

Trade dynamics

Most major economies now treat nickel as critical for clean energy, defence, industrial resilience, and supply-chain security.[23] In the United States, nickel was added to the federal critical minerals list in 2023.[24] The European Union's Critical Raw Materials Act (CRMA) identifies nickel as a strategic raw material with 2030 benchmarks for extraction, processing, and recycling[25] and similar designations exist in other countries.[26] These designations activate subsidies, investment screening tools, and sourcing rules that redirect investment and trade flows.

Policy instruments are expanding, introducing explicit targets, eligibility tests, and, in some cases, sustainability due-diligence requirements:

- **EU CRMA (2024):** Mandates that by 2030, at least 10% of consumption be extracted, 40% processed, and 25% recycled within the EU. Reliance on a single non-EU country is capped at 65%, pushing diversification. To qualify as "Strategic Projects", and therefore benefit from financing support advice and offtake matchmaking, raw material projects in third countries must be sustainably implemented, including in terms of labour, human and Indigenous Peoples rights.
- **EU Battery Regulation (2023):** Embeds social and environmental due diligence as a condition for battery market access.
- **US Inflation Reduction Act (2022):** Grants EVs assembled in North America a consumer tax credit, if inputs are sourced from countries that the US has FTAs with and provided they do not contain battery components manufactured or critical minerals processed by a Foreign Entity of Concern – including one owned, controlled or directed by the Chinese government.[27] However, these provisions are uncertain under the Trump administration, which aims to eliminate support for EVs.

Together, these frameworks blend mineral security with values-based production and trade, however they also raise compliance complexity and could fragment markets.

Geopolitics

Geopolitics is amplifying this shift. Since 2 April 2025, the US has imposed or threatened tariffs on its trading partners, as well as on products like steel, aluminium and copper, in exchange for the removal of tariff and non-tariff barriers, the purchase of US goods and other concessions. This signals a more transactional stance, with partners racing to beat deadlines and weighing retaliation. While these moves do not target nickel directly, they heighten policy volatility and push firms to re-price geopolitical risk.

China remains pivotal in midstream processing and deeply embedded in Indonesia's nickel parks through equity, technology, and offtake agreements. Chinese firms control roughly 40% of global nickel output, while European producers hold over 20%.[28] Supply has become more concentrated; Indonesia and China accounted for about two-thirds of refined nickel in 2023, increasing both opportunity and exposure for Indonesia.[29] Beijing's recent export controls on key materials in 2025 underscore how quickly policy can constrict supply.[30]

Meanwhile, the US-led Minerals Security Partnership (MSP) — a coalition of 14 countries and the EU — coordinates efforts for diversified, "responsible" supply and has set up a network to finance projects.[31] Indonesia is not a member nor a beneficiary but joined a Principals' meeting in London in October 2023,[32] signalling demand for producer participation. For Jakarta, the MSP signals that future financing and offtakes may increasingly depend on demonstrable ESG performance.[33]

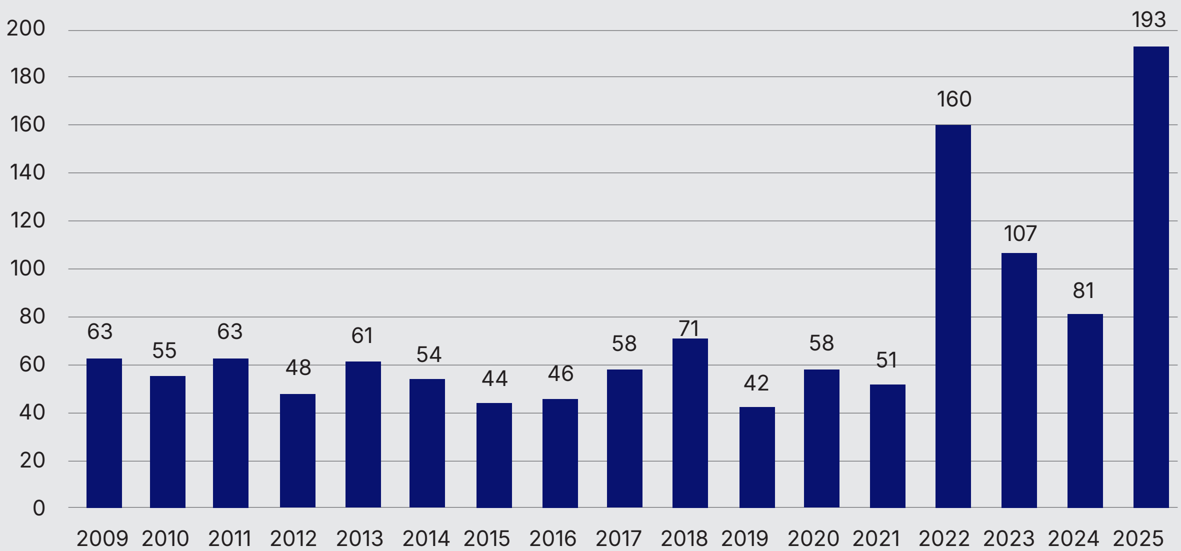
One unambiguous trend is the rise of trade barriers tied to critical materials. OECD tracking shows that between 2021 and 2023 about 14% of global trade in non-waste/scrap industrial raw materials faced at least one export restriction,[34] while the Global Trade Alert documents a steady accumulation of critical-minerals interventions since 2009 (Figure 3). Such measures, though often justified as industrial policy tools, also tighten supply, spur stockpiling, and invite retaliation.

Implications for Indonesia

For Indonesia, this evolving landscape is double-edged. On the upside, diversified demand and new partnership frameworks could strengthen its bargaining position - not only for technology transfer and long-term offtake agreements, but also for improved social and environmental performance in mining and processing hubs. If buyers must comply with EU and US criteria, Indonesian suppliers should be able to demand a premium for improved traceability and for meeting higher labour and environmental standards. That's what a few non-Indonesian producers are attempting, but with limited success, underscoring the need for Indonesia to leverage its scale and policy environment more effectively. On the downside, these rules can generate friction. Foreign Entity of Concern (FEOC) clauses may constrain demand, overlapping ESG regimes create audit fatigue, and tariff volatility deters patient, long-term investment. In many industries, traceability has not consistently translated into higher prices for suppliers. This raises doubts about whether improved standards in nickel will be matched with financial rewards unless buyers explicitly commit to responsible-premium schemes.

Overall, China's deep investment in Indonesia has underpinned capacity growth and jobs but concentrated parts of the supply chain. Western

Figure 3: Number of export and import restrictions on critical minerals (2009-25)



Source: Global Trade Alert. *Import and Export Restrictions: Critical Minerals.* Last accessed 5 September 2025, https://globaltradealert.org/threads/import-and-export-restrictions-critical-minerals schemes promise diversification and at times stronger ESG signalling but remain nascent; overlapping requirements risk fragmenting standards and raising costs.[35] For Indonesia, the question is not whether nickel is strategic — it is — but whether global regimes will also reward labour and community outcomes to make growth sustainable.

Regulatory landscape affecting labour in mineral value chains

A combination of intergovernmental agreements, domestic laws and foreign regulation, as well as private sector standards affect labour standards in Indonesia's mineral supply chains. These are outlined in Table 2, explained below and expanded upon in the Annex.

Labour provisions in Indonesia's trade agreements, where they exist (for instance, with Chile and European Free Trade Association), tend to be soft.[36] Ongoing EU-Indonesia Comprehensive Economic Partnership Agreement (CEPA) negotiations are set to conclude in 2025, with a political agreement reached on 13 July 2025.[37] The EU has proposed a Trade and Sustainable Development chapter[38] and an Energy and Raw Materials chapter which has received pushback from civil society organizations urging the EU to support domestic value addition in Indonesia, invest in environmentally and socially sustainable processing and ensure a fair price for nickel.[39]

In exchange for the US reducing its "reciprocal tariffs" announced on 2 April from 32% to 19%,

Table 2: Regulatory landscape affecting labour in critical mineral supply chains

Intergovernmental	Free trade agreements	Provisions and chapters on labour, sustainability and minerals
	International investment agreements	Provisions on natural resources, critical minerals and responsible business conduct
	Critical mineral agreements and MoUs	Vary, but facilitate dialogue and cooridination on supply and encourage ESG compliance
	Regional initiatives	Dedicated sustainable mining taskforces at APEC and ASEAN are venues for adopting sustainability principles
Foreign	Critical mineral strategies and laws	These may contain some sustainability commitments, but the focus is on securing supply and production
	Supply chain sustainability laws	Supply chain sustainability due diligence and reporting and modern slavery legislation aim to cover workers in supply chains
	Forced labour import bans	These affect critical mineral and downstream exports where forced labour is suspected in the value chain
Domestic	Labour laws	Are crucial to protect labour rights and improve working conditions in critical mineral supply chains
	Mining laws	Mining laws may require adherance to labour laws
	Investment laws	Domestic investment laws may condition approvals on meeting labour requirements
Private	Private sustainability standards	These are numerous and cover labour standards, but their use in the Indonesian mining context is limited
	Offtake agreements	Agreements between producers and purchasers of critical minerals to buy future production could include environmental and social sustainability requirements

Source: Authors.

Indonesia has committed to eliminating 99% of tariffs on US goods imports and removing export restrictions on industrial commodities including critical minerals exported to the US. It also commits to a forced labour import ban, protecting freedom of association and collective bargaining rights and strengthening labour law enforcement. The agreement is yet to be finalized.[40]

Through ASEAN, Indonesia participates in additional FTAs, but these largely expand market access without substantial labour provisions.[41] Likewise, the Regional Comprehensive Economic Partnership Agreement (RCEP), to which Indonesia is a party, lacks a labour chapter.

Indonesia participates in the US-led Indo-Pacific Economic Framework (IPEF). The Supply Chain Agreement contains labour-rights language and advisory structures,[42] and the Clean Economy Agreement commits parties to promote decent work, labour rights, and social dialogue (Arts. 6.2–6.3) and to foster sustainable supply chains via due diligence and responsible business conduct (Arts. 5.3(b), 6.3(a)). Though it does not name critical minerals, these provisions could extend to Indonesia's nickel sector as part of clean-energy value chains.[43] However the initiative's future remains uncertain under the Trump administration.

In parallel, Indonesia has been renegotiating its older international investment agreements (IIAs) to widen policy space, limit investor-state dispute settlement exposure and carve natural resources out of agreements. The latter ensures that foreign investors cannot bring cases against Indonesia through investor-state dispute settlement (ISDS) for labour or other public policies affecting their investments in the sector.[44]

For workers, most of these instruments establish expectations and cooperation mechanisms but lack enforceable rights; their value depends on domestic enforcement and sustained social dialogue.

Complementing these are critical mineral agreements, including the UK–Indonesia Strategic Partnership on Critical Minerals[45], and non-binding regional fora such as the Asia-Pacific Economic Cooperation (APEC) Mining Task Force[46] and the ASEAN Working Group on Sustainable Minerals Development (WGSMD), whose principles (adopted in 2023) on sustainable minerals are yet to be translated into implementable standards.[47] Finally, foreign regulations with binding requirements increasingly condition finance, offtake, and market access. These include EU due-diligence regimes, the CRMA and Battery Regulation, modern-slavery and forced-labour import ban measures. Taken together, this mix of incentives can steer capital toward producers with strong labour and community practices but also risks fragmentation, audit fatigue, exclusion of smaller suppliers, and rising compliance costs unless coordination improves.

Global frameworks such as the UN Guiding Principles on Business and Human Rights[48] and the OECD Due Diligence Guidance for Responsible Mineral Supply Chains[49] offer reference points, while private standards (see Table 2 in the Annex) provide roadmaps, though uptake and enforcement in Indonesia remain limited. There are emerging signs of traction: two projects are currently being assessed against the IRMA Standard (Harita[50] and Sorowako[51]), and Weda Bay Nickel - one of the largest nickel mines in the country - has made a public commitment to pursue IRMA certification.

This is why intent on paper is not enough. In practice, the credibility of any trade-labour nexus will rest on enforcement that reaches worksites, and on incentives that remain predictable across political cycles. For Indonesia, strategic autonomy will depend on balancing investor pools, documenting labour performance to meet domestic and external requirements, and leveraging its critical-minerals platform to shape the next wave of global rules.

Section 3. Labour Realities: Challenges and Opportunities

Beyond international rule-making and strategic positioning, worker experiences are defined by realities in Indonesia's nickel hubs, where protections have advanced but major gaps remain.

Indonesia's nickel boom has coincided with broader gains in living standards. Since moving into the "high human development" category in 2019,[52] the country has expanded social assistance, lifted labour-force participation and raised minimum wages. Unemployment stood at about 3.3% in 2024[53] - below the G20 average of 4.9%.[54] With a population of roughly 281 million in 2023[55] and a projected 324 million by 2045,[56] demographics offer Indonesia a significant advantage by combining a young workforce with a rising consumer base—both critical for sustaining its industrial transformation and green transition.

Mining's macro footprint has also grown: its share of GDP rose from 4.3% in 2020 to 9.2% in 2022, with exports climbing from 12% to 22% during the same period.[57] Industrial parks, most visibly PT Indonesia Morowali Industrial Park (IMIP) in Central Sulawesi, have drawn workers from across the archipelago with relatively higher pay, shifting labour out of agriculture into more formal factory jobs. The domestic nickel industry has generated significant new investment and employment. Some localities have channelled mining-derived revenues into public goods such as water systems and roads. All of this underscores the sector's potential to provide quality employment, especially for young people, if labour protections and institutions keep pace.

Indonesia's labour framework is comparatively robust. Indonesia is the first Asia–Pacific country to ratify nine of ten fundamental ILO conventions, covering freedom of association and collective bargaining (Conventions 87 and 98) and the suppression of forced labour (29 and 105), and it has ratified the Promotional Framework for Occupational Safety and Health (187).[58] Successive reforms—often with ILO support—have strengthened union law, labour standards and dispute resolution, yielding a dense regulatory framework applicable to mining and processing. Yet, gaps remain: Indonesia has not ratified the 2014 Protocol to the Forced Labour Convention (P.29), the OSH Convention (155)[59] or the Social Security Minimum Standards Convention (102).[60] Indonesia has initiated the process required to ratify Convention 155.[61] In practice, the distance between the law and lived experience is often defined by enforcement capacity and the realities of fast-growing industrial parks.

Interviews and reports point to recurring deficits:

Union density is relatively low - around 12% in 2022[62] - and workers cite constraints on freedom of association and collective bargaining. Some Chinese migrant workers in nickel parks have reportedly been unable to join unions.

Pay-setting is formalized[63] through provincial, district/city and sectoral minimums anchored in *Kebutuhan Hidup Layak* (Decent Living Needs), however worker groups argue that adjustments lag inflation and that price pass-through in remote parks (of fuel, cooking gas and food) erodes purchasing power.[64]

Long hours and excessive overtime surface repeatedly; some workers report consecutive 12-hour shifts with short breaks, describing

records 114 accidents in nickel facilities from 2015 to mid-2024, resulting in 101 fatalities and 240 injuries.[65] Coal-fired power in several parks compounds respiratory risks and sits uneasily with "green" value-chain narratives.[66]

Allegations regarding **confiscation of passports and restrictions on movement** for some Chinese migrant workers have prompted external scrutiny, including forced-labour allegations by foreign authorities.[67] Foreign workers also face hurdles in navigating Indonesia's labour-dispute mechanisms, and weak alignment between employment and migration law undermines safeguards.[68] Taken together, these factors point to the need for integrated oversight—linking OSH enforcement, migration governance and energy policy—so that protections improve at the worksite. Equally important is the consistent establishment and effective operation of Joint Health and Safety Committees (JHSCs) in workplaces, which remain insufficient across many facilities despite being critical to identifying risks and ensuring worker representation in safety decisions.

fatigue and mental-health strain. As described by one worker during interviews: "We often work 12-hour shifts consecutively for 3 or 4 days with very small half-an-hour breaks. Long hours, unsafe working conditions, and pressures from home are a common cause of depression and, in extreme cases, suicides among workers." Interviewees further reported job insecurity, including informal contracts and layoffs lacking clear rules, while also voicing concern about the longer-term risks if industrial parks eventually close—particularly the lack of clarity on worker protections, community impacts, and whether funds for clean-up and rehabilitation will be secured in advance.

Occupational safety and health (OSH) remains a central concern. Indonesia has made significant strides in OSH regulations, but challenges persist in coordination and overlapping responsibilities between ministries. High-temperature processes, molten metal, heavy lifting and dust exposure combine with language barriers (where supervisors or technicians in Chinese-operated facilities do not always speak Bahasa Indonesia), inadequate personal protective equipment, and fatigue to raise incident risks. Trend Asia, an Indonesian NGO, drawing on media reports,

Inspection and oversight capacity lag the sector's growth. The Ministry of Manpower's inspectorate operates under a robust legal mandate (including the Occupational Safety Law No. 1/1970 and Manpower Law No. 13/2003, and ILO Convention 81), yet resources are thin: with an estimated 1,455 labour inspectors consisting of 1,321 regional inspectors and 134 central inspectors (stationed at the Ministry level) in July 2024 for approximately 145.8 million workers.[69] Re-centralising inspection from districts to provinces (Law No. 23/2014) was intended to bolster independence, and ILO-supported training has modernised some methods and introduced gender-responsive approaches. Still, limited authority, staffing and equipment constrain thorough investigations, including of smelter incidents.

Interviewees highlighted the **skills supply** as another fault line. Companies and workers reported shortages of metallurgy, maintenance and process-engineering capabilities, and many local residents need extensive training before entering higher-skilled roles. Although Indonesia's eight million metric tons of nickel refining capacity in 2023 appears spread across 33 companies, ownership tracing shows heavy concentration, with Chinese firms ultimately controlling over 75% and Indonesian shareholders only 13%.[70] This has contributed to reliance on foreign expertise, especially in facilities with foreign ownership, and to internal migration from Java and Sumatra to nickel hubs in Sulawesi and Maluku. As the policy focus shifts toward battery and EV manufacturing, demand is rising for workers proficient in digital systems, automation and precision maintenance. Government programmes in technical education and vocational training aim to close these gaps, but scale and alignment with industry needs remain works in progress.

Beyond the factory gate, **environmental impacts** feed back into labour markets. Communities in parts of Sulawesi and Maluku,[71] report deforestation, siltation and hot-water discharges that degrade rivers and coastal ecosystems, harming fisheries and reducing agricultural productivity.[72] Pollution and land conversion can destabilise traditional livelihoods, pushing workers into precarious employment or migration, while coal-plant siting raises local health burdens. These dynamics highlight how environmental pressures and labour conditions are inseparable and must be addressed together. The challenge is to ensure that responses do not inadvertently exclude smaller actors, particularly SMEs and artisanal and small-scale miners, who often lack the resources to comply.

Special economic zone (SEZ) development can lift district-level GDP without commensurate gains in household consumption, with benefits decaying sharply by distance from the zone. Rapid immigration of skilled workers can amplify insider–outsider divides unless nearby households gain clear pathways into formal jobs and supplier opportunities.

Uncertainty about the long-run compounds these challenges. Long-run demand for nickel in batteries is uncertain as alternatives like lithium iron phosphate (LFP) and sodium-ion gain share and recycling expands. In addition, coal-fired, smelter-led industrial parks will need to transition toward net-zero. This shift may require workers to adapt—accepting lower wages due to skills and wage gaps, or travelling long distances to find new employment as jobs relocate away from coal-dependent areas.[73] For workers and communities, practical hedges should be put in place now: stronger rights and representation, safer workplaces, credible grievance and remedy mechanisms, and investments in transferable skills that open pathways into adjacent value chains (battery components, recycling, EV assembly, and greener industrial processes).

Section 4. Pillars for a Just and Sustainable Economy

Indonesia has shown that industrial policy can shift value addition onshore at pace. The task now is to hard-wire social outcomes into that growth, so they are enforceable at the worksite, resilient across political cycles, and credible to markets.

The trade–labour connection must move from principle to practice, aligning trade instruments, due-diligence rules, and corporate accountability with domestic enforcement so nickel-driven growth delivers measurable, rights-respecting outcomes. While Indonesia's trajectory offers insights, its unique endowment and political choices mean the model is not directly replicable in most other contexts.

The recommendations below distil insights from stakeholder interviews into four action pillars to support a just transition. A concise summary appears in Table 5 in the Annex. The following recommendations are directed at different actors — including national policymakers, development partners, companies and park operators, international offtakers, and civil society — each with a distinct role in shaping a just transition.

Pillar 1: Trade, investment, and enforcement levers

At the level of trade and investment agreements, Indonesia's leverage is significant but uneven. Most sustainability chapters are non-binding, offering cooperation without enforcement. Ongoing EU–Indonesia CEPA talks and frameworks such as IPEF and MSP dialogues provide opportunities to embed clearer expectations on labour inspections, OSH, grievance access, and supply-chain transparency. The missing piece is robust enforcement: new clauses should come with measurable benchmarks, time-bound implementation plans and targeted technical assistance. While foreign regulations and market standards already shape incentives, convergence and clarity are essential amongst national policymakers and trading partners.

- **Leverage critical-mineral agreements for development cooperation and downstream investment.** Indonesia can trade predictable access for targeted assistance to strengthen labour-law enforcement, inspection capacity and worker programmes on reskilling, health and safety. While development assistance is shrinking, linking it to strategic sectors of interest to donor countries may prove effective and beneficial to both sides.
- **Institutionalize consultation with labour unions and civil society.** Formal engagement of unions and civil society organisations (CSOs) in Indonesia would help balance trade provisions and reduce perceptions of protectionism.
- **Condition investment benefits on labour compliance.** Tie fiscal incentives, licences, and park permits to verified adherence to Indonesian labour law (incident reporting, OSH committees, hours and wages) and encourage renewable energy-powered smelters to reduce health and environmental risks.
- **Develop ASEAN-level guidance on sustainable mining.** ASEAN could focus on developing practical regional guidance on sustainable mining on the basis of the WGSMD Principles of Sustainable Mineral Development[74] with a view towards convergence with global standards and continue to use the ASEAN Mineral Awards[75] to showcase high performers. Enable cost-effective compliance with external rules. Due-diligence laws, forced-

labour import bans, the EU's CRMA and Battery Regulation, responsible-sourcing requirements (including those of the London Metal Exchange), and original equipment manufacturer (OEM) purchasing policies can create demand for verifiable labour performance, provided compliance can be demonstrated at reasonable cost.

- **Reduce "audit fatigue", especially for small and medium-sized enterprises (SMEs).** Standardise templates, pool audits, use shared verification tools, and provide technical assistance so smaller suppliers are not excluded despite good-faith efforts.
- **Ensure rapid, facility-level enforcement with clear "off-ramps".** The US-Mexico-Canada Agreement (USMCA) Rapid Response Mechanism (RRM),[76] with its shift from state-to-state accountability to firm-level accountability (applying trade-related penalties to individual companies rather than entire countries), offers useful lessons: facility-level procedures with fast timelines and targeted market-access remedies can improve compliance on core rights. Indonesia's institutional setting differs and the RRM has been expensive to implement in Mexico, but two design features travel well: evidence-led inquiries focused on specific worksites, and commercial consequences for non-compliance. The initial focus could be on OSH and freedom of association in high-risk industrial parks. It will be important to provide technical assistance and clear off-ramps to lift penalties once remediation is verified.

Pillar 2: Corporate accountability and park-level governance

Corporate accountability must work on the ground, through companies, park operators and industry associations. Voluntary standards offer roadmaps, but uptake in Indonesia remains limited despite progress achieved in recent years.

- **Translate global standards into locally usable guidance.** Develop practical toolkits (based on IRMA, ICMM, Copper Mark joint due diligence for nickel, ResponsibleSteel, etc.) aligned with Indonesian law and supported by whistle-blower protection and accessible remedy. A bottom-up process can address legitimacy concerns about "foreign" standards while remaining interoperable with buyer requirements.
- **Use park-wide agreements to lift the floor.** Tenants in industrial parks should commit to baseline guarantees covering OSH, hours, wages, freedom of association and collective bargaining, backed by shared training, multilingual standard operating procedures (SOPs), and transparent incident reporting.
- **Publish baselines and set near-term targets.** Publish park-level indicators on accidents, hours, wages, unionisation, and grievance resolution and create two- to three-year targets tied to incentives.

Pillar 3: Domestic labour framework, skills and inclusion

Translating these levers into practice calls for a coherent domestic policy and labour framework implemented by policymakers, development partners and training institutions. Indonesia's second National OSH Programme (2024–2029)[77] provides a timely anchor, while building a skilled workforce is central.

- **Make OSH a licence-to-operate.** Use the Second National OSH Programme (2024–2029) as the anchor: ensure functioning OSH Committees (P2K3)[78] in all nickel facilities; multilingual safety procedures and training; real-time hazard monitoring; accessible reporting channels; public disclosure of serious incidents and corrective actions; and joint OSH–environment audits.
- **Scale inspections strategically.** Expand inspector numbers in nickel regions; deploy risk-based targeting and digital case management; align practice with

ILO Convention No. 81 and the Ministry of Manpower's 2018 inspection strategy[79]; clarify sector-specific rules (as done in textiles through ILO's Better Work)[80] to aid compliance and enforcement.

- **Strengthen protections for migrant workers.** Prohibit passport retention; require contracts to be in or translated into workers' native languages; ensure access to grievance channels and legal aid; and better align migration and employment law to close protection gaps. Coordinate oversight with local communities, source-country authorities, and international organisations to ensure rights are upheld.
- **Tackle informality without exclusion.** Establish clear, accessible licensing pathways; limit incentives to compliant operators; provide targeted training and finance; and create structured community-union-company collaboration, consistent with ILO Recommendation No. 204 (concerning the transition from the informal to the formal economy),[81] so transitions to formality raise incomes and safety. Expand training for informal miners on labour rights, environmental management, and OSH to meet regulatory requirements and adopt sustainable practices.
- **Build a strong local skills pipeline.** Co-design curricula with unions, employers, and technical institutes (metallurgy, maintenance, digital systems, OSH); establish 'Local Green Jobs Academies' in mining regions for roles in renewables, battery production, recycling, and greener industrial processes; and leverage the national Decent Work Country Programme[82] and Green Jobs assessments[83] to scale and track progress. Prioritise artisanal and small-scale miners (ASM) and surrounding communities with targeted, accessible training. Skills initiatives should also extend to local vendors through quality-upgrading and supply-chain integration programs, partly compensating for the reduced role of local governments in financing such efforts. In parallel, policies should challenge the assumption that Indonesia lacks high-skill technical labour. Significant pools exist, particularly in Java, but relocation barriers limit their participation. Practical steps—such as requiring bilingual technical manuals, enabling telecommuting (for remote technical support roles etc.) or rotational deployments, and offering flexible work schedules—can help channel these skills into remote industrial parks while strengthening local capacity over time.
- **Expand flexible pathways into skilled work.** Develop apprenticeships, sector-specific certifications, and regional training hubs in partnership with universities, unions, and employer organisations so workers can upskill while employed and transition into higher-value roles.
- **Open supervisory and management pathways for local talent.** Move beyond entry-level hiring by creating clear, transparent progression routes into supervisory and managerial positions, ensuring producing regions capture more of the value added.

Pillar 4: Transparency, shared responsibility and results

Greater transparency and shared responsibility along the chain will reinforce these efforts. Policy coherence and multi-stakeholder partnership will determine staying power, while delivery hinges on measurement and incentives.

- **Make performance visible to markets.** Deploy battery passports and interoperable traceability systems[84] in major parks to make social and safety outcomes visible to buyers and integrate responsibly sourced recycled material.
- **Use buyer leverage constructively**. EV and steel OEMs should embed progressive labour requirements in offtake contracts and support suppliers to meet them; explore a "responsible nickel" premium[85] linked to independently verified environmental, OSH and labour metrics.

- **Pair ethical-sourcing demands with support.** Consumer countries should match social sustainability requirements with funding and technical assistance for compliance upgrades and remedy (e.g., financing windows for SMEs, capacity-building, and access to grievance/redress).
- **Create a 'Cross-Functional Working Group on Responsible Mining and the Green Transition'.** Link labour, trade/industry, energy, environment, and planning ministries to streamline policy, clarify roles, and embed responsible sourcing, green mining practices, and worker protections across government strategies. Set targets, share data, and publish an annual labour and safety in nickel scorecard. This could be part of Indonesia's Energy Transition and Green Economy Task Force.
- **Establish local 'Mining Dialogue Platforms'.** Bring local governments, employers, unions, communities, Indigenous Peoples, environmental organisations, and inspectors together to tackle park-level issues (OSH, housing, transport, cost of living). Use these forums for structured, ongoing discussions on labour rights, environmental safeguards, and social impacts, improving policy alignment at the regional level.
- **Launch an 'Open Responsible Mining Data Platform'.** Aggregate near-real-time information on labour, safety, and environmental performance, accessible to the public, with inputs from independent monitors, civil-society groups, labour unions, and industry, and safeguards for worker data privacy. This transparency strengthens supply-chain responsibility, accountability and innovation.
- **Embed inclusion.** Ensure Indigenous Peoples, women, migrants, and informal workers help design the transition via a standing Green Transition Forum.
- **Strengthen social dialogue and collective bargaining.**
  — Adapt proven models, such as Indonesia's Tripartite Cooperation Programme in the fishing sector, to foster inclusive cooperation and co-create solutions in nickel.
  — Build on ILO Better Work Indonesia (BWI) approaches: stronger bipartite committees, improved collective bargaining, and effective enterprise-level cooperation.
  — Enforce freedom of association and collective-bargaining rights; invest in capacity-building for unions and worker representatives so they can negotiate on safety standards, fair contracts, and enhanced social protection.
- **Improve data integrity and worker voice.** Third-party audits; digital reporting and analytics to identify and address violations in real time; provide safe channels for workers to report concerns.

While difficult to replicate in most other contexts, Indonesia has successfully used trade and investment measures to move up the nickel value chain and develop downstream industries. The next step is to ensure that gains extend to workers and communities by using its leverage with foreign investors and mining and processing companies, as well as consuming countries to spur a race to the top—anchored in labour rights, cleaner production, and shared prosperity. That is the essence of a just transition.

Annex

Table 1: Trade agreements with labour provisions that Indonesia is party to

Agreement	Parties	Labour provisions
EU - Indonesia FTA86 (under negotiation)	EU, Indonesia	Trade and Sustainable Development (TSD) Chapter proposed.[87]
EFTA - Indonesia Comprehensive Economic Partnership Agreement (CEPA)[88] (signed 2018, in force 2021)	EFTA (Iceland, Liechtenstein, Norway and Switzerland), Indonesia	TSD Chapter commits to human rights, protecting vulnerable groups, and promoting sustainability via education and training. Reinforces adherence to ILO core conventions on freedom of association, elimination of forced and child labour, and non-discrimination. Calls for implementation of ratified ILO conventions, progress on others, and rejects using weak labour standards as a trade advantage.
Indonesia-Switzerland Labour and Employment Memorandum of Understanding*	Indonesia, Switzerland	Non-binding MoU establishes cooperation on labour market policies, international labour standards, and social dialogue. Promotes decent work, productivity, and sustainable development through exchanges, workshops, and capacity building.
Chile – Indonesia Comprehensive Economic Partnership Agreement[89] (signed 2017, in force 2019)	Chile, Indonesia	Article 9.6 commits to job creation, decent work, and adherence to ILO principles. Parties agree not to weaken labour standards and to cooperate on labour rights, social security, safety, human capital, and trade–labour linkages. *(No labour dispute mechanism under general dispute settlement).*
Indo-Pacific Economic Framework for Prosperity Agreement Relating to Supply Chain Resilience[90] (in force 24 February 2024)	Australia, Brunei Darussalam, Fiji, India, Indonesia, Japan, the Republic of Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand, United States and Vietnam	Highlights labour rights and workforce development as key to supply-chain resilience. Supports upskilling, inclusivity, and access to skilled jobs, and creates an IPEF Labour Rights Advisory Board to promote sustainable trade and worker protections.
Indonesia–United States Framework for Negotiating an Agreement on Reciprocal Trade (announced 22 July 2025, not yet finalized)	Indonesia, United States	Indonesia reportedly commits to removing export restrictions on industrial goods, including critical minerals, to the US, implementing a forced-labour import ban, protecting freedom of association and collective bargaining, and strengthening labour law enforcement. In exchange, the US reduces "reciprocal" tariffs on Indonesian goods from 32% to 19% and Indonesia eliminates 99% of tariffs on US imports.

* While not a trade agreement, this MoU was undertaken alongside EFTA-Indonesia FTA negotiations.

Table 2: Industry standards

Instrument	Year of adoption (Indonesia)	Description (relevance to labour issues)
IRMA Standard for Responsible Mining[91]	2018	Requires fair labour policies, collective bargaining, non-discrimination, grievance mechanisms, and living wages. Prohibits child and forced labour. Mandates strong OSH systems, risk assessments, inspections, and continuous safety improvements with worker participation. Site level performance is verified by independent third-party auditors, accredited and trained by IRMA, who are required to interview workers and union representatives. Public disclosure of final audit report (not a summary), including time-bound corrective action plan. Labour is one of six "sectors" that govern the IRMA system and have equal decision-making power.
International Council on Mining and Metals (ICMM) Mining Principles[92]	2003 (first iteration)	Sets ESG standards with 39 performance expectations. Labour focus: respect workers' rights, fair wages and hours, zero tolerance for child or forced labour, grievance channels, and DEI measures including gender equity and psychological safety.
Environmental, Social, and Governance Standards for Mineral Supply Chains (Responsible Minerals Initiative)	2021	Requires processors to ensure safe, fair, and non-discriminatory workplaces, fair pay, grievance mechanisms, and human rights protections. Also mandates community engagement and responsible land and environmental management.
The Joint Due Diligence Standard for Copper, Lead, Molybdenum, Nickel, and Zinc (The Copper Mark, the International Lead Association (ILA), the International Molybdenum Association (IMOA), the Nickel Institute (NI), the International Zinc Association (IZA) and the Responsible Minerals Initiative (RMI))[93]	2022	Voluntary framework for due diligence in copper, nickel, and other metals. Five steps: robust management systems, risk identification (including labour risks), risk mitigation, independent audits, and transparent reporting.
Copper Mark[94]	2022	Assurance framework for responsible copper, nickel, and related metals. Certification requires compliance with the Joint Due Diligence Standard and Copper Mark production criteria. Covers sites involved in extraction, processing, recycling, or handling of metals.
Responsible Steel International Production Standard[95]	2019 (most recent update in 2022)	Requires responsible sourcing, safe working conditions, fair wages, and compliance with health, safety, and anti-forced labour standards. Applicable to operational steelmaking and input-processing sites.
London Metal Exchange Policy on Responsible Sourcing[96]	2019 (updated 2023)	Mandates implementation of OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas. Requires ISO environmental and OSH management system certification, independent audits, and public reporting. Applies to all LME-registered brands.

Table 3. Thematic recommendations at a glance

Theme	Key finding	Core action	Policy hook	Worksite indicators
Trade and investment agreements	Labour provisions feel "soft"; need bite and inclusion	Tie market access/benefits to measurable labour benchmarks; include unions and CSOs in consultations	CEPA; IPEF; MSP dialogues	% facilities meeting FOA/CB standards; timely incident reporting
Critical-mineral agreements	Use Indonesia's leverage for capacity-building, not just access	Exchange predictable access for development cooperation on inspections/OSH	Bilateral CM MoUs/ Partnerships	# inspectors trained; OSH lab capacity; inspection coverage
ASEAN standard	Global private standards are hard to implement	Build an achievable ASEAN mining standard; use ASEAN Mineral Awards to showcase leaders	WGSMD Principles → implementable standards	% sites meeting ASEAN baseline; corrective actions taken
Foreign due diligence and bans	Compliance costs, audit fatigue (SMEs hit hardest)	Provide pooled audits, shared tools, TA for SMEs to meet foreign regulatory and private requirements	National SME support window; pooled verification scheme	Audit cycle time; SME pass rate; duplicate audits reduced
Corporate accountability	Need for localised guidance and remedy	Translate IRMA/ ICMM/Copper Mark/ ResponsibleSteel into Indonesian toolkits; protect whistle-blowers	National guidance; model park agreements	# grievances resolved; whistle-blower cases protected
Park-level governance	Cluster fixes beat site-by-site	Park-wide compacts on OSH, hours, wages, FOA with multilingual SOPs and joint audits	Industrial-park MOUs; regulator templates	OSH committee (P2K3) functionality; near-miss reporting
Enforcement model	Need for fast, targeted remedies (with exits)	Pilot rapid, facility-level procedures with clear off-ramps once remediation verified	CEPA side-deal; sectoral MoUs (RRM-style)	Time to remedy; monitoring lifted on schedule
OSH and inspections	Accidents and fatigue; need for capacity and transparency	Make OSH a licence-to-operate; scale risk-based inspections; publish serious incidents	National OSH Programme 2024–2029; ILO C.81	LTIFR/TRIR; share of high-risk sites inspected
Migrant workers	Passport retention, language barriers, access to remedy	Ban retention; contracts in native languages; legal aid and grievance channels	Migration–employment law alignment; regs/ministerial decrees	% workers with own documents; grievances resolved
Informality	Avoid exclusion of small actors	Clear licensing; incentives only for compliant operators; training/finance for upgrades	ILO R.204-aligned formalisation programme	# formalised units; compliance upgrade completion
Skills and local jobs	Upgrade pipelines; move local talent up the ladder	Local Green Jobs Academies; curricula co-designed with unions and employers	DWCP; Green Jobs tools; MoUs with Technical and Vocational Education and Training institutions.	# certified workers; share in supervisory roles

Transparency and purchasing power	Buyers can drive performance	Battery passports/ traceability; offtake clauses; explore a responsible-nickel premium	OEM procurement policies; battery passport pilots	% lots with traceable social data; premium contracts
Coordination and dialogue	Need for one place to align targets and data	Cross-Functional Working Group; Regional Mining Dialogue Platforms; open data	Inter-ministerial decree; Open Responsible Mining Data Platform	Annual scorecard published; issues closed via platforms
Measurement and incentives	Need for predictability	Publish baselines; set 2–3-yr targets; condition incentives on verified progress	Incentive regulations; park concession terms	Progress vs targets; incentives granted/withheld

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