

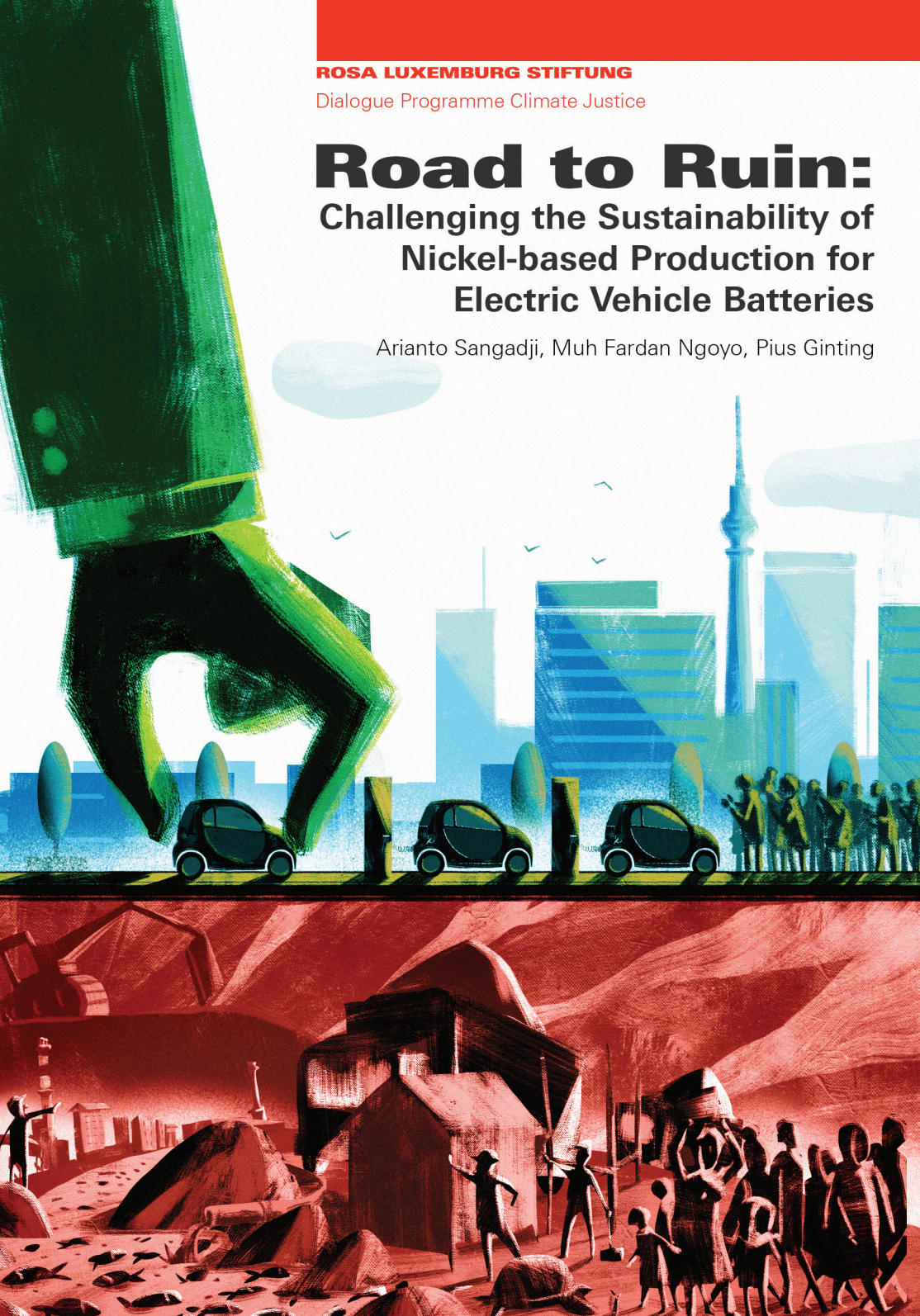
**ROSA LUXEMBURG STIFTUNG**

Dialogue Programme Climate Justice

# Road to Ruin:

## Challenging the Sustainability of Nickel-based Production for Electric Vehicle Batteries

Arianto Sangadji, Muh Fardan Ngoyo, Pius Ginting





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## Challenging the Sustainability of Nickel-based Production for Electric Vehicle Batteries

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## EXECUTIVE SUMMARY

During its annual shareholders' meeting in April 2019, Tesla's Chief Executive Officer Elon Musk called those who refuse to purchase an electric vehicle "insane." In the mind of the tech tycoon, buying self-driving electric cars is not only a sound financial investment but also a veritable way to contribute to climate action.<sup>1</sup>

His attitude reflects the growing industrial optimism about electric vehicles that many major European countries like Germany, UK, and France have even recently incentivized. The US, too, grants certain subsidies, rebates, and tax exemptions to EV users in a bid to entice consumers to shift to a greener mode of transportation than internal combustion engine vehicles, which are notorious for belching huge amounts of carbon dioxide.<sup>2</sup> Policies like this offer an appeasement to the contradicting interests of the car industry and the public's demand for climate action. The global production capacity for batteries that EVs use has consequently drawn level with this trend, amounting, in fact, to 316 gigawatt hours (GWh) in early this year—enough to generate electricity for Greenland, the world's largest island.

However, in the Global South, where most of the raw materials needed for building these new and more efficient machines and devices are sourced, the rising demand for electric vehicles is threatening to worsen existing injustices in the extractive industry. It is thus imperative to examine what value chain production emerges from this trend. Amid discussions on electric vehicles as vital to climate solutions in the transport sector, it is crucial to situate the material footprint of the car industry against the promised decrease in carbon emissions by this shift.

Particularly, Indonesia is increasing its stakes in the resource-based market as a major player in the global supply of nickel, an important component of the batteries used for electric vehicles. It has rolled out a national plan for developing its domestic processing industry, which began by enforcing an export ban on raw minerals. For too long, indeed, the country has opened its reservoirs up to foreign businesses, to the detriment of its local industries which remain dwarfed by transnational capital. The export ban intended to prompt Indonesia-based mining firms to develop their own processing plants to refine nickel ores rather than ship off stockpiles of the mineral to major metal importers like China.

While this aspiration for self-reliance should ideally benefit the local population, what has so far been the case in Indonesia does not square with any goal other than profit accumulation by a few mining companies that have long held sway over the industry. The export ban benefited only those that had huge capital to begin with, including mostly Chinese-owned firms, to build smelters and additional plants in the country. This policy drastically attracted foreign direct investments in specially designated economic sites, one of which is the Indonesia Morowali Industrial Park (IMIP) in Central Sulawesi where most of these big mining business license holders operate.

The IMIP stands as an example of the Indonesian government's disingenuous attempt at industrialization because of its reliance on foreign capital infusion. The park is a testament to the resurgence of China as an economic powerhouse with a ravenous appetite for cheap raw materials, new energy sources, reserves for foreign exchange, and ever more remunerative frontiers. Though unofficial as of yet, the IMIP would function to integrate Indonesia into China's Belt and Road Initiative, arguably the modern world's largest financial undertaking aimed at multilateral cooperation and supposedly sustainable development. This explains the inrush of investments into the region and the government's acquiescence to an industry seen as a potential catalyst for economic growth.

Examining the value chain production of nickel in the IMIP, this study aimed to shed light on the various compromises dealt when such a project of global capital as electric vehicle production is put forward as both a climate solution and a driver for development. The findings, in particular, revealed how the local environment of Morowali and the residents ultimately stand at the losing end of this industrial development amid the disastrous consequences of resource extraction. Labor tensions in the park have also been documented and paint an ironic picture of overworked, low-wage workers deterred from protesting booming businesses.

An industry that only entrenches labor exploitation, economic injustices, and environmental degradation serves to undermine the socio-ecological transformation promised by a shift towards electric vehicles.

## I. INTRODUCTION

The climate crisis has impelled many governments worldwide to veer away from carbon-intensive technologies. According to the Intergovernmental Panel on Climate Change (IPCC), the transportation sector shares 14% of global greenhouse gas (GHG) emission as of 2015.<sup>3</sup> The automotive sector in Indonesia, a traditionally fossil fuel-reliant industry, intends to shift to this trajectory with last year's issuance of the Presidential Regulation No. 55 or the Battery Electric Vehicle Program for Road Transportation. The decree endorsed the switch from internal combustion engine (ICE) to electric vehicles (EVs) in an effort to curb GHG emissions.

Yet even EVs are not as energy-efficient as initially assumed. The lithium-ion batteries (LIBs) used for EVs require as their key raw material low-grade nickel, which can be extracted from laterite ores and processed using high-pressure acid leach (HPAL). Not only does its mining require high energy input, but even more so the hydrometallurgical facilities operated to facilitate solvent extraction and other such processes required to purify and refine nickel ores.

The demand for nickel is projected to soar as the need for more advanced LIBs grows. This scenario, thus, poses greater environmental harm in the long run. Where environmental safeguards are inadequately enforced, this emerging industry comes at a disturbingly high human cost. Besides, poisoned water and soil endanger not just biodiversity, but also the food that the people eat, the air they breathe, and the environment they depend on in the nexus of their cultural and economic lifeways.

In Indonesia, the government has not only renewed interest in manufacturing storage or rechargeable batteries, but also gone so far as to ban nickel ore exports starting next year in its bid to develop its own nickel processing industry. The Indonesia Morowali Industrial Park (IMIP) in Morowali Regency, Central Sulawesi, with its highly developed nickel-based processing plants, makes for a good example of the country's prospective manufacturing center of nickel for LIBs. It has also, over the years, grown into one of the prime hubs for stainless steelmaking in Southeast Asia.

With IMIP as a case study, this research aims to ascribe a value chain production to Indonesia's nickel industry—from mining, through the production of its intermediate products, to the development and proliferation of its derivative industries. Such an analysis of the value chain production should bring to the fore the various environmental and human costs of this extractive industry.

## II. NICKEL, LIBS, AND ENVIRONMENTAL CONCERNS

Nickel (Ni) has outstanding physical and chemical properties that render it suitable for alloying steels. Before being employed so, nickel must be converted into intermediate products that subsequently undergo further processing before they become finished products, such as turbine blades, oven toasters, and boat propeller shafts. Every year, engineering and construction industries use hundreds of thousands of these nickel-containing goods, especially stainless steels.

But the increased nickel demand for LIBs is beginning to rival that of stainless steels. LIBs are no longer just used to power devices such as drones, smartphones, and laptops, but have also found applications in EVs. The two common LIBs according to cathode chemistry – lithium nickel cobalt aluminum (NCA) and lithium nickel manganese cobalt oxide (NMC) – both rely heavily on nickel.

The state-sponsored boost to the LIB industry has propelled a commodity rush for the element.<sup>4</sup> A leading manufacturer of EV batteries, Contemporary Amperex Technology Co. Ltd. (CATL), for example, has announced to begin mass production of high-nickel batteries. In the next two years, the company will introduce NMC 811 battery – which contains 80% nickel, 10% manganese, and 10% cobalt – which is marketed for its purportedly longer lifespan. It is gaining ground on other LIBs as it allows EVs to travel farther on a single charge.<sup>5</sup>

The automotive industry has favored vehicle electrification since most governments do more than enact policies geared towards a decarbonized economy. The European Union, for example, even pledges incentives for initiatives to this end.<sup>6</sup> With a view to slash carbon dioxide emissions from cars by 37.5% in 2030,<sup>7</sup> major European countries like France, Germany, UK have granted certain subsidies and tax exemptions to EV users, as well as non-monetary incentives such as government support for the installation of charging stations in establishments and businesses.<sup>8</sup> The US, too, has provided tax rebates, registration exemption, reduction of parking fees, and subsidies for building charging points.<sup>9</sup>

Naturally, as car manufacturers ramp up the production of EVs, the demand for EV batteries is expected to swell. Bloomberg New Energy Finance (NEF), a thinktank, estimates the global LIB manufacturing capacity in early 2019 to be

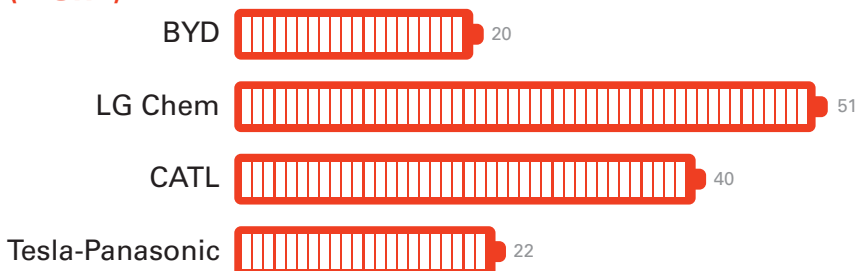


around 316 GWh, 73% of which comes from China, followed by the US, though far behind at 12%. This combined capacity is enough to generate electricity for the world's largest island, Greenland, and would grow nearly fourfold, to as much as 1,121 GWh in 2025<sup>10</sup> —equivalent to the electricity consumed by Benin, a small West African country, in 2015.

Amid this projected growth, battery companies have announced to build more manufacturing facilities in China, the US, and Europe. These comprise only several transnational companies in whose hands the LIB industry for EVs is concentrated. The biggest of the five major producers in 2018 (see CHART 1), LG Chem, a South Korea-based company, counts General Motors and Volkswagen as its LIB customers and is also set to supply batteries to Volvo, Fiat Chrysler Automobiles, Hyundai, GM and Volkswagen.<sup>11</sup>

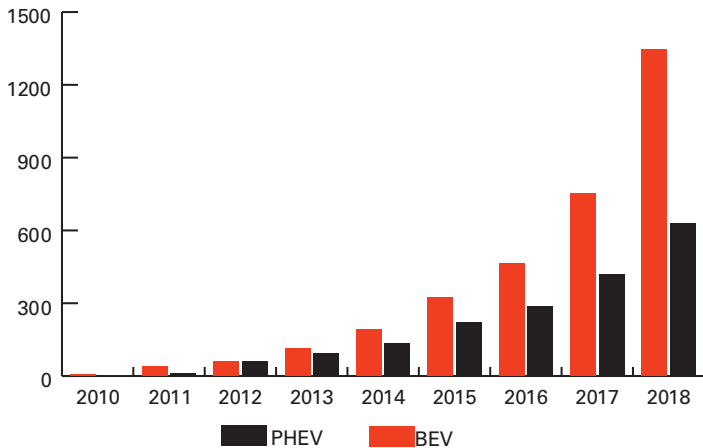
Another leading producer is CATL, the top battery manufacturer in China at present.<sup>12</sup> In its global expansion plan, CATL announced that it will establish a €1.8-billion battery-cell factory in Thuringia in eastern Germany. It is projected to produce 14 GWh of lithium-ion battery cells every year,<sup>13</sup> which would be enough to power a relatively small archipelago like the Falkland Islands in South America. CATL also recently announced that, in 2021, it would supply EV batteries to Daimler, a well-known German automaker.<sup>14</sup> The companies BMW and Brilliance have likewise signed off on a long-term procurement agreement with CATL to buy up a €110 million battery construction project.<sup>15</sup>

**CHART 1: The World's Biggest LIB Companies by Capacity 2018 (in GWh)**



Source: Matt Bohlsen<sup>16</sup> (2019) and Jack Perkowski (2017)<sup>17</sup>

**CHART 2: New BEV and PHEV Global Sales 2010-2018  
(in Thousands of Vehicles)**

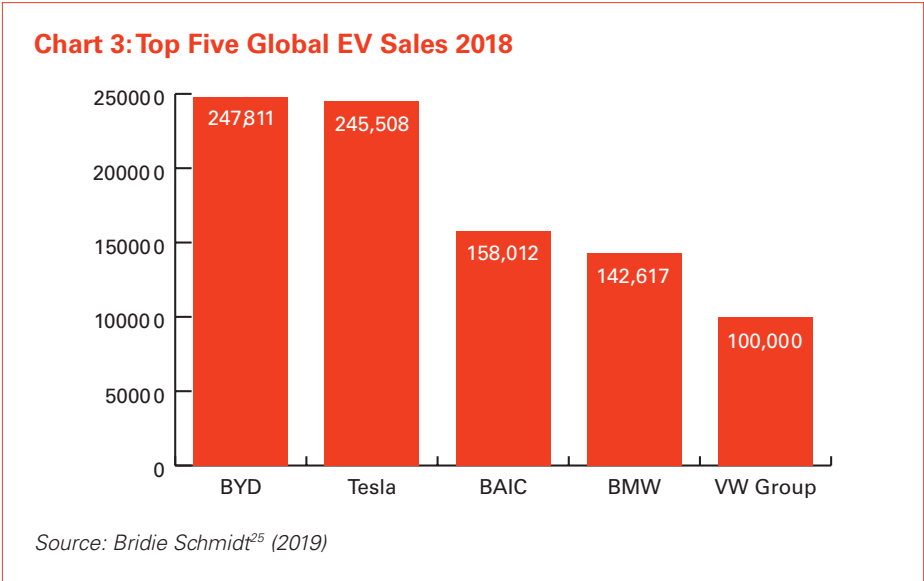


Source: International Energy Agency (2019)

Besides CATL and LG Chem, Panasonic and Tesla plan to expand their joint venture Gigafactory 1.<sup>18</sup> Panasonic also signed an agreement with Toyota last January to lend a business structure to the production of prismatic batteries for the automotive sector.<sup>19</sup> American electric car maker Tesla, on the other hand, makes for an excellent example of profit maximization from EV production via competitive leasing and energy storage services. In 2017, its automotive division made a gross profit of around €1.9 billion, which comprised 99.37% of Tesla's total profit.<sup>20</sup>

Despite the relatively high cost of production of EVs, and hence their high purchase price, McKinsey, an American leading management consulting corporation, predicts that profits from these vehicles could equal those from petrol-ICE vehicles by 2025.<sup>21</sup> Bloomberg NEF, in fact, estimates that by 2040, consumers will purchase over 56 million EVs worldwide, while EVs will consist of more than half of all new car sales.<sup>22</sup> Such projections follow the positive trend of EV sales since 2010 (see CHART 2). More than half of the total global sales of battery EVs (BEV) and plug-in hybrid EVs (PHEV) in 2018 came from China,<sup>23</sup> which has also been among the primary manufacturers of LIBs for EVs.<sup>24</sup>

As in battery manufacturing, a handful of transnational companies control the EV industry. CHART 3 shows the world's five largest companies that sell EVs with over 100,000 units per annum.



Amid these developments, Indonesia has positioned itself as an emerging investment hotspot of the battery industry for EVs.<sup>26</sup> Currently the main global supplier of nickel, the country contributed 24.34% to the world's total mining production in 2018 and controlled almost a fourth of the global nickel reserves (see TABLE 1). The nickel ore export ban has also encouraged foreign companies to own interests of up to 100% in the downstream nickel industry.

Such foreign direct investments (FDIs) have helped develop Indonesia into the second main producer of primary nickel, next to China as of 2017.<sup>27</sup> It also dominates the global nickel trade as the leading exporter of lower-purity charge nickel (class II), such as NPI, in 2016 and 2017.<sup>28</sup>

Examples of these investments include the collaboration between CATL and GEM (Jingmen) New Material Co., Ltd. to operate a €635 million nickel-based LIB project in the IMIP.<sup>29</sup> Other reports mention plans by the two other battery giants, Tesla and LG Chem, to invest in projects in the park.<sup>30</sup> Greater capital infusion is anticipated within five years in Morowali, amounting to as much as €27.2 billion for nickel processing alone.<sup>31</sup>

The influx of investments in the region reflects a general predilection to LIB manufacturing particularly among corporations in the world's top economies. Eramet, a French mining company, poured a significant stock in its 54,874-hectare nickel and cobalt mining concession in in North Maluku, Indonesia.<sup>32</sup> It is a collaboration with Tsingshan Group, China's leading metal company, Huayou Cobalt Ltd and Zhenshi Holding Group.<sup>33</sup> Eramet has also sought other sites from which to source lithium, like Argentina where it invested €542 million in another lithium mining project.<sup>34</sup>

**TABLE 1: World Mining Countries and Reserves (in metric ton)**

Country	Mining Production		Reserves
	2017	2018	
Indonesia	345,000	560,000	21,000,000
Philippines	366,000	340,000	4,800,000
New Caledonia	215,000	210,000	-
Russia	214,000	210,000	7,600,000
Canada	214,000	160,000	2,700,000
Australia	179,000	170,000	19,000,000
China	103,000	110,000	2,800,000
Other countries*	524,000	540,000	31,900,000
Total global	2,160,000	2,300,000	89,000,000

\*Production under 100,000 ton  
 Source: USGS<sup>35</sup> (2019)

More plans are in the works to forge alliances between big transnational companies involved in the battery industry and looking to expand in Indonesia. Japan's Sumitomo Metal Mining (SMM) has committed €1.5 billion for the construction of a nickel smelter<sup>36</sup> in Pomalaa, Southeast Sulawesi, from which over 40,000 tons of intermediate nickel products will be shipped to Japan annually. SMM will process the imports into a cathode material for LIBs before supplying them to Panasonic.<sup>37</sup> Vale, a Brazilian mining company, appears to have stakes in this venture as well. Based on the company's official report, it plans to use the processing plant in Pomalaa to convert nickel ores into mixed sulfide precipitates (MSP) as raw materials for LIBs.<sup>38</sup>

The drive for such investments owes, in large part, to the growing repute of EVs as a techno-fix capable of reducing GHG emissions.<sup>39</sup> They have long been marketed as substitutes to ICE vehicles, which are known to contribute significantly to anthropogenic carbon emissions. However, such a view obscures the environmental issues inherent in the production of LIBs for use in EVs. Researchers and environmental groups have already cited concerns about GHG emissions from EV battery manufacture<sup>40</sup> and the toxicity of organic compounds and heavy metals such as nickel in LIBs that could be detrimental to the health of both consumers and the environment.<sup>41</sup>

The footprint of the varied environmental issues concerning the industry can be probed by tracing the value chain of nickel as a raw material, starting from its unsustainable extraction. Open-pit mining of lateritic nickel is linked to deforestation, biodiversity loss, and water pollution. The ores then undergo leaching via HPAL and hydrometallurgical purification.<sup>42</sup> Not only do smelting and refining processes cause, if not worsen, air and water pollution, they also consume a great deal of electric power.<sup>43</sup> Overall, both upstream (i.e., exploration and mining) and downstream (i.e., refining and purifying, marketing, and distribution) operations burn enormous amounts of fossil fuels, as revealed by life cycle assessments.<sup>44</sup>

In addition, nickel plants churn out wastes that have to be neutralized, lest health and ecological concerns in the vicinity arise. Disposal methods like submarine tailing disposal, however, pose a grave threat to the rich marine life in Indonesia's seas.

### **III. MINING AND NICKEL PROCESSING INDUSTRY IN INDONESIA**

Nickel exists naturally as either sulfide or laterite deposits. While sulfide ores derive from volcanic or hydrothermal processes, laterite ores are formed near the Earth's surface, typically in tropical climates or dry regions of central Western Australia or southern Africa where extensive weathering occurs. The latter can only be extracted using open-pit mining, as they are located in large deposits at the ground's top layer.<sup>45</sup>

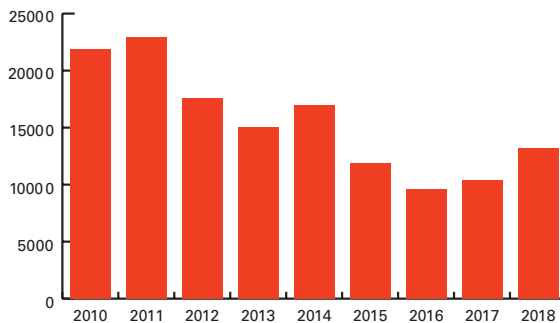
Tropical laterite abounds in Indonesia in the form of high-grade saprolite or low-grade limonite ores.<sup>46</sup> Saprolite can be processed pyro-metallurgically using electric arc or blast furnaces techniques, but limonite must undergo HPAL first

before yielding hydroxide or sulfide intermediates, which are subsequently refined to provide nickel class I needed for LIB production.<sup>47</sup> Given the difficulty of obtaining saprolite ores, the metal industry began this year to develop technologies for such hydrometallurgical techniques as HPAL to process laterite ores.<sup>48</sup>

The global demand for nickel may have surged only lately, but the market for it in Indonesia has flourished since the Dutch and Japanese colonial eras.<sup>49</sup> PT Inco Indonesia (now PT Vale Indonesia), for example, has operated nickel mine and smelting facilities since the 1960s. The government went on to issue hundreds of mining business license (MBL), following the Law on Mineral and Coal Mining in 2009. This had led to increased nickel production for export, especially to China, where in 2013, Indonesia emerged as the former's top nickel supplier. That same year, the global trade peaked at 64.8 million tons of nickel ore, amounting to €1.45 billion in export earnings.<sup>50</sup>

The government instituted an export ban on raw minerals beginning in January 2014, to accelerate the in-country processing industry and lock in stockpiles for building up domestic capacity for advancing the profitability of the mining sector. The policy forced the majority of MBL holders with no domestic smelters to stop their operations, resulting in the layoff of around 30,000 mining workers. Only in 2017 did the government permit the export of nickel, if only for ores of higher grade or those that have reached certain requisite purity levels. Despite such a concession, the ban still pushed back the nickel export growth, with last year's volume equal to just about a third of that in 2013.<sup>51</sup>

**CHART 4: Average Nickel Prices 2010-2018 (in USD/metric ton)**



Source: Statista<sup>52</sup> (2019)

A total ban specifically on exports of nickel ore is set to go into effect in 2020. The move came in light of the technological progress in low-grade nickel processing for raw materials in batteries. Major industry players supported the ban to reserve ores for Indonesia's fast-growing smelting industries. Companies like CATL, SMM, and Eramet have, in fact, started to invest in building nickel production facilities for LIB manufacturing.<sup>53</sup> Meanwhile, the ban has provoked a supply panic in the global market and, compounded by the mounting push for EV batteries, was seen to trigger an uptick in nickel prices to around €16,300 per metric ton in early September 2019.<sup>54</sup>

While the government hoped the policy would encourage firms to build smelters, bit players remain wary of integrating nickel mining and processing as both require huge investment in fixed assets. Only a few mining firms have so far expanded to smelting. These include PT Aneka Tambang (Antam), a state-owned enterprise,<sup>55</sup> and PT Vale Indonesia, a subsidiary of Vale Canada which is owned by the Brazilian transnational mining company Vale Inco.<sup>56</sup>

Apart from Vale and Antam, at least 12 smelters have been built by other companies<sup>57</sup> like PT Aquila Sponge Nickel, PT Nusajaya Persadatama Mandiri, PT Sulawesi Mining Investment (SMI), and PT PAM Metalindo, until 2017.<sup>58</sup> Many of these MBL holders did so to slough off slag from low-grade nickel ores before export, to circumvent the initial ban in 2014. This has caused an increase in the production of nickel pig iron (NPI), a cheaper alternative to pure nickel for stainless steelmaking.<sup>59</sup> The leading company on this front is PT SMI whose smelter in IMIP has supplied NPI to stainless steel factories from within the same park since 2015. Funded by FDIs, these factories have further concentrated value chain production around IMIP, reducing costs otherwise incurred by offshore processing and thus generating more profits for companies within the park.<sup>60</sup>

Though there exists no available data on combined profits of all companies in the country's nickel industry, publicly listed firms like Vale reported high average nine-year profit rates, based on pre-tax profit over market capitalization. With the London Metal Exchange (LME) official nickel price pegged at €11,850 in 2018, the company profit before income tax reached €74.6 million. In the same year, the Indonesian government received a total corporate income tax of around €20 million from Vale, not including non-tax revenues amounting to €11.9 million in royalties, water levy, and land rent from the latter.<sup>61</sup>

## **IV. INDONESIA MOROWALI INDUSTRIAL PARK AND ITS BATTERY PROJECTS**

Built in 2013, the IMIP is a joint venture between Indonesia-based mining conglomerates PT. Bintangdelapan Investama and PT Sulawesi Mining Investment (PT SMI), together with Shanghai Decent Investment Co. Ltd., a subsidiary of Tsingshan Holding Group.<sup>62</sup> In October 2013, witnessed by Chinese President Xi Jinping and then Indonesian President Susilo Bambang Yudhoyono, the heads of these companies signed a cooperation agreement to establish the industrial park.

The IMIP project is a high-water mark economic cooperation zone bankrolled by the China Development Bank, Export Import Bank, and several other financial backers. Though its conception in 2009 predates the official launch of China's Belt and Road Initiative (BRI), the IMIP stands to become a flagship BRI site in Indonesia with the recent injection of additional multibillion-dollar investments.<sup>63</sup> The BRI is touted by critics as China's ambitious effort at market expansion, to enhance industrial capacity, via multilateral funding and construction of mega-infrastructure and trade routes in over 78 countries.<sup>64</sup>

Meanwhile for Indonesia, the IMIP could be viewed from two perspectives. First, the project bears proof of the country's goal to advance its downstream mining sector. Having developed into one of the world's fastest growing centers of stainless steel production, it has indeed gone further than the government requirement to produce intermediate nickel products. Soon, the IMIP could become a leader in nickel-based processing for LIBs in Indonesia.

Second, the industrial park is also considered as a national strategic project (NSP) owing to its role in generating regional and national economic growth.<sup>65</sup> To protect the growing investment in the area, the Commander of Indonesia National Army Marshal Hady Tjahjanto plans to deploy a military base close to the park, an infantry battalion in Morowali and a navy base which includes marines.<sup>66</sup> The local police has also deployed a company of the mobile brigade, the special operations tactical unit of the Indonesian National Police, in the vicinity. Nearby, an infantry company in Malino village in North Morowali has been posted to subdue the increasing tension of religion-based violence in Poso and Morowali.<sup>67</sup>

In more alarming cases, security forces were tasked to break up labor disputes or protests. In March 2014, dozens of armed personnel claimed to be guarding the construction site of a new plant in the park, but over the next two days,



hovered around and intimidated PT SMI workers who were on strike.<sup>68</sup> Many of these structures, typically watched over by both private security and military, were yet to be built. At present, the IMIP houses processing plants, seaports, an airport with a 1,800-meter runway, and a telecom network, among others, in its 2,000-hectare compound, per IMIP's official data.<sup>69</sup> Over 38,000 workers are hired in the park, according to the Manpower and Transmigration Office of Morowali.

While hosting smelters and different plants, the IMIP is home to coal-fired power stations with a combined capacity of 1,130 MW, which consume about 6 million tons of coal annually. This capacity is bound to expand in keeping with the development of diverse factories in the park and the addition of nickel-based projects for LIB production. One of those underway aims to maximize the production of intermediate products of nickel from laterite ores. Huaqing Nickel & Cobalt (Huaqing), which has the majority of voting shares in this project, is a wholly owned subsidiary of Huayou Cobalt Co., Ltd. (Huayou).<sup>70</sup>

A similar joint venture agreement with the state-owned mining company PT Inalum<sup>71</sup> follows a controversy implicating another subsidiary of Huayou in reports of child labor and precarious working conditions in its cobalt mines in the politically restive Democratic Republic of Congo.<sup>72</sup> Relatively more expensive than nickel, cobalt has been the typical choice for cathode material in batteries.<sup>73</sup> However, while the few worker protections in artisanal or small-scale cobalt mines compelled a reckoning with the management of value chain production, it also had the inadvertent effect of shifting focus to nickel-based battery production.

The world's biggest stainless steelmaker, China's Tsingshan Holding Group Co. also has voting shares in a joint venture<sup>74</sup> – initially worth €635 million but later revised to €1.36 billion<sup>75</sup> – to build, among others, an HPAL nickel plant in the IMIP.<sup>76</sup> Since the mid-2000s, the company has been among the leading producers of NPI, which, because of its lower cost, caused one of the record drawdowns in nickel prices in recent history.<sup>77</sup> This reputation as a disruptive industry force has not prevented Tsingshan from investing in even more projects in nickel smelting for use in EV batteries. The rapid growth of this industry in Morowali, including the abundance of cheap laterite ores in the regency, makes the IMIP a prime site for Tsingshan to augment its operations.

Central to the development of the IMIP as a world-class industrial center is its integration of the upstream segment of nickel mining with the downstream facilities for diverse processing facilities. Together, they form a value chain

production for multiple commodities generated within a short spatial distance with reduced production costs, which could be offered at low prices. An array of factors contributes to the overall coordination and management of this supply chain.

For one, the industrial park sits on the mineral-rich regency of Morowali. The late 2000s witnessed several industry players beginning to mine the region for export-oriented rich lateritic nickel ore deposits. But, in 2014, when the ban on raw mineral exports took effect, only a few MBL holders committed to building in-house smelters were allowed to mine.<sup>78</sup> Most of the 37 mining companies in Morowali expressed no intention of doing so and decided to sell ores only to the domestic market. This gives MBL holders with in-house smelters greater control of the nickel ore trade in the region. PT Bintang Delapan Mineral (BDM), for example, has since emerged as a prominent supplier of nickel to the smelters in the IMIP.<sup>79</sup>

This way, the suppliers and smelters in the park are interconnected such that nickel-based processes are carried out not only with efficiency but also at lower expenditures. Rather than local metal companies, giants in the global extractive industry like Tsingshan<sup>80</sup> wield greater advantage owing to the leverage of transnational capital. The group practically controls management of the park, nickel-based processing facilities, and their derivative industries through effective dominations in voting shares of various projects.

From these corporate ventures, the regency of Morowali receives some portions of the royalties, land rents, and taxes that Vale, BDM, and other existing nickel mining companies, operating mostly in the park, pay to the central government. For 2019, the local government eyes over €3 million in earnings from mineral revenues.<sup>81</sup>

## **V. SOCIOECONOMIC AND SOCIAL ECOLOGY IMPACTS OF IMIP**

### **CONTRIBUTION TO REGIONAL ECONOMY**

The presence of the IMIP has major impacts on Central Sulawesi, especially on Morowali. The following indicators and figures have indicated the economic effects of the nickel-based industrialization in the park since the mid-2010s.

The advent of nickel processing plants in Indonesia has contributed to the growth of the gross regional domestic product (GRDP) in Morowali Regency. Based on the constant prices in 2010, the contribution of the manufacturing sector to Morowali's GRDP rose sharply from 8.13% in 2014 to 36.17% in 2018. The surge has made manufacturing the highest contributor to Morowali's GRDP since 2016. Another related sector in Morowali is mining, whose GRDP growth rate likewise increased in the last five years. By contrast, the agriculture sector dropped drastically by almost half from 2014 to 2018.<sup>82</sup>

Much of this growth could be attributed to the nickel export ban that ushered in FDIs to Morowali, making it the major host of FDI inflow in Central Sulawesi in 2017.<sup>83</sup> The construction of smelters served more than just as a workaround to bypass the export ban on raw minerals; it also led to the vigorous outflow of processed nickel and, by extension, the huge export value generated from the regency.<sup>84</sup> This would not have been possible without the tremendous contribution by workers in the park, who have, by the end of August 2019,<sup>85</sup> reached over 38,000 and are projected to double by 2023, per estimates by Dr. Dedi Mulyadi, the Development Director of the IMIP.<sup>86</sup>

The impact of this rise in domestic profits on local citizens, however, tells a different story.

For one, the majority of the working-age population in Morowali remains engrossed in traditional farming for livelihood. This compels the IMIP to employ thousands of migrant workers from overseas, usually from China,<sup>87</sup> because most of the locals who do seek jobs in the park typically have neither transferable skills nor technical knowledge for an industrial setting.<sup>88</sup> Some of them opt instead to profit from the thriving informal sector around the park. For example, the peasant and indigenous households in the Bahudopi District form part of the service and local trade sector as they supply basic foodstuffs like meat, rice, vegetables and fruits to the IMIP. Those who have arrived from other parts of Indonesia and are awaiting results of their job applications in the IMIP, in the meantime, set up shops, kiosks, food stalls, cafes, laundries, boarding houses, and beauty salons, among others. As the IMIP grew in scale and profit margin, so too did such small-scale businesses on the fringes of the park over the years.

These more lucrative options have convinced many Morowali citizens of converting their land. In the villages of Keurea and Bahumakmur, traditional paddy fields and gardens have been cleared and paved with concrete to build various non-agricultural structures like boarding houses, which they rent out

to migrants or IMIP employees.<sup>89</sup> Five or six years ago, residents just sold their lands at cheap prices, but could have later received greater profits as land prices in these villages jumped sharply to IDR30 million (€1,932), on average, per hectare.<sup>90</sup>

The case of Bahodopi illustrates the decline in traditional agriculture practices since nickel-based industrialization began in the region in the mid-2010s. The government no longer sponsors agricultural projects such as for rice field procurement. Traditional irrigation canals have since dried up or altogether stopped working. Villagers have increasingly turned to other sources of income rather than continue practicing subsistence farming of rice and vegetables, growing of cash crops like cocoa beans, or cattle grazing. Instead, villagers around IMIP now depend usually on the import of produce from nearby regions.

Hartati, a woman in Bahomakmur, said her village's supply of rice comes mainly from Bahonsuai in Bumi Raya sub-regency. "Sometimes it also comes from South [Sulawesi]. The rice enters here from nowhere," she added. The 0.75-hectare rice field her family had received under the central government's transmigration program was recently turned into an airport runway in the IMIP. They have since bought not just rice but also vegetables like cabbage, carrots, and tomatoes from the highlands of Napu in Poso regency, around 400 kilometers away from Morowali.<sup>91</sup>

The IMIP vowed to help the local communities through its corporate social responsibility (CSR) programs. The park's management has granted sewing machines to mothers, repaired elementary school buildings, offered food assistance, and provided agricultural and livestock assistance, among others.<sup>92</sup> However, the beneficiaries have been limited only to households in Bahudopi sub-regency, arguably the most affected around the park. "We admit that the Bahodopi district is the important thing," said a community leader in Geresu village in the farther East Bungku sub-regency. "But you can't just look at Bahodopi. We both feel the impact," he added, "so it should be fair with us [all.]"<sup>93</sup>

## ENVIRONMENTAL ISSUES

### 1. Open-pit mining

Open-pit nickel mining—from hauling construction and land clearing to overburden removal and digging ores—could drastically damage forest landscape. Particularly, laterite nickel mining could cause not only biodiversity loss but also erosion and sedimentation that may degrade riparian and marine ecologies downstream. Though mining companies claim to carry out land rehabilitation measures like post-mining reclamation and re-vegetation, the demand to stockpile nickel within a shorter span of time imposes environmental stresses that inevitably entail systemic destruction of nature.<sup>94</sup>

The adverse consequences extend down to the rural population in the lowlands. Villagers have lost access to abundant forest resources, such as resin and rattan whose production has fallen sharply in the last decade. Rivers used for farming, plantation, washing, bathing, and even drinking water have become polluted. Mining in the uplands have imperiled the coastal ecosystem so much so that fisherfolk find it more difficult to catch fish.

The local people also suspect open-pit mining to have taken a toll on the watershed. Since small-scale nickel mining operations began in Morowali in the late 2000s, traditional farmers in nearby villages have had to contend with floods that damage arable land, livestock, and crops like rice, coffee, and cashew. The massive extraction by IMIP is feared to have compounded the intensity and frequency of floods.

One such massive flood hit the villages of Lele, Dampala, and Siumbatu in Bahudopi sub-regency earlier last June, inundating hundreds of settlements and public facilities with muddy-brown water reaching up to two meters. The IMIP did not halt operations, but workers residing in the area were cut off from access to roads and bridges, some of which collapsed.

After a series of protests, residents from three villages conducted an independent probe on Dampala River and found out that a major source of the flood had come from BDM, which has a mining concession in the area.<sup>95</sup> The company, reneging on its legal duties, has failed to revegetate a 710.74-hectare block it cleared from 2017 to the first half of 2019. Though it has done so in another block where land clearing covered 653.10 hectares, the revegetation rate has been slow, averaging only at 51.16% in the last three years.<sup>96</sup> The local government, for its part, held a dialogue with the flood victims last September

**TABLE 2: The number of patients based on types of health issues in IMIP's clinic from January to August 2019**

Type of disease	Number of patients
Acute Rhinitis	26,133
Gastroenteritis	8,136
Myalgia	10,314
Dyspepsia	9,931
Cephalgia	5,324
Fever of unknown origin	6,413
Vulnus	5,347
Conjunctivitis	4,418
Dental caries	1,829
Low back pain	2,914

*Source: Health Department of Morowali, 2019.*

and promised to them not only compensation but an evaluation of MBL holders like BDM in Morowali.<sup>97</sup>

## 2. Fossil Fuel and Air Pollution

The production of nickel laterite consumes a large amount of energy and increases greenhouse gases.

Open-pit mining, by itself, already consumes a huge amount of fossil fuel to power heavy equipment like excavators, dozers, loaders and dump trucks. The processing required for laterite ores is also 2.5 to 5.7 times more energy-intensive than that for sulfide ores, and discharges GHGs that are 2.5 to 4.6 times the amount yielded when mining the latter.<sup>98</sup>

No data is available to estimate its use of fossil fuels like high-speed diesel for nickel mining. It is telling, however, how many millions of tons of high-grade nickel ores are supplied by companies including BDM to the IMIP every year.<sup>99</sup> In addition, the amount of coal used is projected to increase with the planned developments of smelters and plants in the park. In 2017 alone, the steam

power plants of SMI, GCNS and ITSS and their smelters used up over four million tons and 920,000 tons of coal, respectively.<sup>100</sup>

Another major issue arising from coal-fired power plants in the IMIP is air pollution. Other than sulfur dioxide and nitrogen oxides, coal ash is also spewed, though not so much released into the atmosphere as dispersed by wind into the surrounding houses. It is especially troubling as the particles are finer than beach sand and can be extremely harmful when inhaled.<sup>101</sup>

“This is a common issue for kids here. If [you] go to the Puskesmas [government’s community health center], it is the most known ISPA [acute respiratory infection, ARI],” she said. She gestured at the black smoke in the sky. “Look at that dusty road and smoke from the power plant.”<sup>102</sup> Data from the Community Health Center of Bahodopi, a district in Morowali, shows that more than half of those who availed of the local health services in 2018, or around 2500 patients, suffered from ARI. Pulmonary tuberculosis also shows a gradual increase compared to previous years, according to a health worker in the health center.<sup>103</sup> Data from IMIP’s clinic corroborates this observation, with more patients suffering from respiratory issues than from other complications (see TABLE 2).

The Environmental Management Plan of the companies in the park state that electrostatic precipitators (ESP) are installed in coal-fired power plants, kiln and dryer plants, and other supporting facilities to collect coal ash.<sup>104</sup> Dust suppression control technologies act as a supplement in special terminals.<sup>105</sup> However, these devices have been proven ineffective at controlling the spread of pollutant particles to surrounding areas. In the face of complaints from the residents, some companies decided to filter coal ash using nets, which again turned out to be ineffective because fine particles still pass through their large holes.<sup>106</sup>

## **LABOR ISSUES**

With the expansion of the IMIP over the last four years came the broadening of its pool of workers. Job seekers from Indonesia’s vast reserve army of labor,<sup>107</sup> mainly coming from South and Central Sulawesi, flock to the park’s new factories amid fierce competition.<sup>108</sup> The IMIP has also attracted workers from outside the island, including Chinese migrant workers,<sup>109</sup> most of whom the locals claim to have been employed illegally and given unjustly higher wages.<sup>110</sup>

The park, in response, instituted a policy to hire representatives of the latter in the human resources department supposedly to ensure they are granted higher priority. Still, this has done little to inspire confidence in the IMIP's management as the local working population continue to harbor a growing sense of racial discrimination.<sup>111</sup> Many lament how, in many cases, they ought to tap brokers and "insiders" in the recruitment process<sup>112</sup> or pay a placement fee equivalent to a month's salary to be hired in the first place.<sup>113</sup>

In the absence of a collective labor agreement, the workers are either permanently employed on an indefinite period or required to render labor within a certain period per contractual obligations. Non-permanent workers face uncertainty when they lose their jobs at the end of their contracts. Conversely, they could generally obtain "permanent" status after serving for over 15 months. The company can also opt to coerce them into voluntary resignation rather than let go of them through a layoff, in which case they are entitled to a severance pay.<sup>114</sup>

The nominally high basic salary in the IMIP, as opposed to wages elsewhere, fails to accurately reflect the effective purchasing power of the workers as well. They earn IDR3.3 million (€213) per month for working 40 hours per week. Factoring in non-fixed allowance and overtime pay, which varies among divisions, their monthly wages would amount to anywhere between IDR5 million (€323) and IDR7 million (€452). These figures, though relatively high, can barely keep the workers afloat in the IMIP. Much of their take-home pay goes to food, which they buy on credit at kiosks and ante up on pay day. They rent rooming houses and buy gasoline for the motorbikes they ride to travel to work.<sup>115</sup> In short, the workers in IMIP earn far less than their basic survival costs.

Even at work, they are vulnerable to safety hazards and workplace disasters. In February 2018, Shan Kha, a Chinese worker at Tsingshan, died after falling into a vat of slag, or waste products from smelting, which was heated to 1400 °C.<sup>116</sup> Such work-related fatalities in the park were more frequent and widely reported in the years before.<sup>117</sup> In May 2017, for instance, Joko Hama Ngadi, 50, a worker at SMI, was crushed to death by a bulldozer.<sup>118</sup> Data so far collected this year by the Department of Manpower and Transmigration of Central Sulawesi approximates workplace accidents in the park to have been around 154, regardless of type or degree, based on the number of pertinent insurance claims filed.<sup>119</sup>



Many workers face serious occupational health hazards that cause them fatigue, anxiety, and a poor ability to work.<sup>120</sup> For example, operators of heavy mobile equipment such as heavy haul trucks, scrapers, graders, dozers and loaders typically suffer from whole-body vibration (WBV), lower back pain, disturbances of cardiac function, respiration, metabolism, digestion and eyesight, according to data from the IMIP's clinic.<sup>121</sup>

The exploitative conditions in Morowali have stirred unrest among the park's workers, most of whom have decided to organize themselves and launch a series of massive strikes since 2012. In May that year, about 400 members of the union Serikat Pekerja Lingkar Tambang (SPLT) paralyzed mining operations to call on MBL holders to implement an employment contract for all workers in light of their paltry wages and prospects of layoff.<sup>122</sup> They asserted their right to form or join independent unions and demanded just compensation for overtime work and social insurance, among others. In response, only BDM and a few other companies granted their workers accident, life, and retirement insurances.<sup>123</sup>

But, by mid-August 2013, miners in BDM had again been on strike for a week to denounce another one of the company's plans to implement a three-month contractual work scheme until the year's end. Many of the workers had worked for years at the company and could only reject the immediate termination of their contract. They argued the companies just needed their cheap labor until the deadline of the export ban in January 2014. Only under the local government's intervention, through a so-called tripartite consultation, were the issues resolved, if only for the short term. The company was compelled to extend the contracts and implement a seven-hour working day rather than the hitherto eleven-hour working day.<sup>124</sup>

When the export ban took into effect, those who were laid off, including 272 miners, scarcely received compensation. Over 300 workers protested in March 2014, when the Governor of Central Sulawesi and the Regent of Morowali visited the smelter plant under construction by the SMI. More than half of the protesters kept on the strike for a couple more days to include in their demands the repatriation of some 400 Chinese workers who were reportedly illegally employed. Meanwhile, most women workers decried sexual harassment at the workplace and threatened lawsuits. All of them protested against low wages and, in a show of force, crippled the ongoing construction of the smelter.<sup>125</sup>

Though the majority of the IMIP employees have yet to collectivize in unions,<sup>126</sup> still many non-unionized workers have joined massive strikes, such as in

2016, which rejected the Governor of Central Sulawesi's decree on a measly minimum wage in the regency.<sup>127</sup> The latest in 2019 campaigned for a 20% pay increase, but the local government only agreed to 13%, raising the basic wages from IDR 2.9 million to IDR 3.3 million per month.<sup>128</sup>

Trade unions led the protests that clinched such concessions. Several groups like the Indonesian Workers Welfare Union (SBSI), the National Worker Union (SPN), the Energy Worker Federation (FPE), and the Labor Union of Sulawesi Mining Investment Factory (SP SMIP) have, on a number of occasions, consolidated their forces for a more united front that later resulted in the accommodation of workers' demands.<sup>129</sup> The oldest among them, Bintangdelapan Mineral Worker Union (SP BDM), is affiliated with the national trade union center National Front of Indonesia Labor Movement (FNPBI).<sup>130</sup> Yet most of them are struggling with gaining the confidence of most of the park's employees, who deplore the absence of collective bargaining agreement in the IMIP.

Even in the face of no such legitimate platform, trade unions carry on with organizing work in a collective endeavor to advance the workers' economic interests. Not only do they raise awareness about the importance of asserting workers' rights, they also continue to ease racial tensions, particularly the mounting anti-Chinese sentiment, among workers. They assert that Chinese workers also bear the brunt of workplace abuses and discrimination, which the management tries to cover up.<sup>131</sup> They encourage locals to ally with their fellow workers rather than capitalize on and further racial prejudice. After all, they face similar exploitation in the workplace regardless of ethnicity, religion, and nationality.<sup>132</sup> As a union activist said:

"They [Chinese workers] come to work, even far away from their hometown, leaving their wife and children. If we have a sentiment against Chinese workers, [that's wrong]. However, we are both working class. They are workers, so they are exploited too."<sup>133</sup>

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Authors	Arianto Sangadji, Muh Fardan Ngoyo, Pius Ginting
Overall Supervision	Laura Geiger, Director Dialogue Programme Climate Justice (RLS)
Editors	Alanah Torralba, Program Manager (RLS), Richard Cornelio
Layout	Ron Villegas
Cover Illustration	Ivan Reverente



**“An industry that only entrenches labor exploitation, economic injustices, and environmental degradation serves to undermine the socio-ecological transformation promised by a shift towards electric vehicles.”**