

PEMETAAN REGULASI, AKTOR, DAN PENDANAAN DALAM RANTAI PASOK MINERAL UNTUK BATERAI KENDARAAN LISTRIK INDONESIA: KOBALT, NIKEL, DAN LITHIUM



November 2023

Ringkasan Laporan



PENGANTAR

1. Pemanasan suhu dunia yang terus meningkat selalu menjadi agenda penting dalam Pertemuan Para Pihak Konvensi Perubahan Iklim (COP UNFCCC). Kondisi ini juga memaksa negara-negara di dunia untuk mencari sumber energi yang ramah lingkungan dan berkelanjutan. Transisi penggunaan energi ini menempatkan kendaraan elektrik sebagai (calon) primadona di masa mendatang, yang banyak didorong oleh pasar, dan didukung oleh pemerintah Indonesia, sebagai jalan menuju pembangunan rendah karbon. Pemerintah Indonesia sudah menempatkan insentif terhadap *end-user* produk berupa pengurangan pajak dan subsidi kendaraan listrik.
2. Padahal dalam konteks potensi energi baru dan terbarukan yang dimiliki Indonesia terdiri dari banyak sumber energi. Seperti tercantum di dalam RUEN 2017 memuat Panas Bumi, Tenaga Air, Minihidro dan Mikrohidro, Bioenergi, Tenaga Surya, Bayu, dan Arus Gelombang Laut, yang menurut ESDM memiliki potensi sebesar 3.686 GW (Giga Watt). Ini menunjukkan proses transisi energi Indonesia memiliki banyak pilihan sumber energi dan tidak harus berfokus kepada industri baterai dan kendaraan listrik.
3. Sebagai negara yang diberkati dengan kekayaan alam dan energi fosil, Indonesia memang memainkan peran penting dalam mengurangi gas rumah kaca dunia, melalui implementasi pembangunan berbasis 'Ekonomi Hijau' (*green economy*). Ini disebabkan karena posisi Indonesia sebagai eksportir terbesar batubara thermal dunia sebanyak 480 juta ton (2021). Demikian juga dengan konsumsi batubara dalam pembangkitan listrik nasional yang sangat besar, mencapai nyaris 60%. Pada titik inilah transisi energi diperlukan, pemanfaatan energi fosil sebisa mungkin dikurangi persentasenya, dengan mendorong ketersediaan energi baru (EBT) dan mendorong aktivitas ekonomi berbasis energi hijau seperti transportasi berbasis listrik.
4. Berdasarkan kondisi di atas, maka riset kali ini akan fokus melakukan pemetaan regulasi, aktor dan skema pendanaan untuk mineral yang mendukung kendaraan listrik, seperti Nikel, Bauksit, Tembaga, Mangan, Lithium, dan Cobalt. Namun untuk pemetaan kali ini akan dipilih Nikel sebagai komponen mineral terbesar untuk Kendaraan Listrik Berbasis Baterai (80%), Lithium, serta Cobalt, mengingat kedua jenis mineral terakhir ini termasuk dalam kategori "*critical minerals*" dalam arti permintaan pasar akan meningkat ke depannya (*emerging demands*) dan belum ada alternatif pengganti. Untuk kemudahan pemetaan kali ini, rangkaian rantai pasok akan dibagi tiga, yaitu Rantai Pasok Hulu dengan fokus pertambangan, Rantai Pasok Antara dengan fokus smelter, dan Rantai Pasok Hilir dengan fokus produk baterai bagi kendaraan listrik.

Kendaraan Listrik di Indonesia dan Strategi Mitigasi Iklim

5. Emisi gas-gas rumah kaca Indonesia mencapai 600 MtCO₂-eq di tahun 2021. Sumber emisi terbesar berasal dari sisi pasokan, yaitu energi untuk industri sekitar 50% dari total emisi. Dari sisi permintaan, emisi terbesar diduduki oleh sektor transportasi yang mencapai 23% dari total emisi. Transportasi darat adalah kontributor terbesar di sektor transportasi yang mencapai 90 persen.³

³ IESR. (2023). Indonesia Electric Vehicle Outlook 2023. Electrifying Transport Sector: Tracking Indonesia EV Industries and Ecosystem Readiness. Institute for Essential Services Reform (IESR). Jakarta. <https://iesr.or.id/wp-content/uploads/2023/02/Indonesia-Electric-Vehicle-Outlook-2023.pdf>

6. Di tahun 2018, sektor transportasi berkontribusi 28% dari emisi Indonesia di bidang energi. Emisi dari transportasi diperkirakan akan terus meningkat, dari 53% di tahun 2015 meningkat dua kali lipat antara tahun 2030 dan 2060. Mencapai nir-emisi hampir tidak mungkin tanpa Achieving net-zero emissions will not be possible without addressing fossil fuel combustion in the transport sector.⁴ Electric vehicles have been included in the mitigation action of Indonesia. To meet the emission reduction target under Indonesia's Nationally Determined Contribution (NDC), 2-electric wheelers (2Ws) must reach 1.8 million by 2025 and 13 million by 2030, while 4-electric wheelers (4Ws) must reach 0.4 million by 2025 and 2 million by 2030. However, this target is still far from meeting the Paris Agreement's 1.5°C warming target. According to the IESR study, to do so, EVs must reach 110 million E2Ws and E4Ws by 2030, followed by 3 million Low Duty Vehicles (LDV) and 2.4 million buses.⁵

KEBIJAKAN DAN REGULASI

7. Selama periode 2009 hingga 2023, pemerintah Indonesia telah aktif mengeluarkan sejumlah undang-undang, peraturan pemerintah, dan peraturan menteri yang secara khusus dirancang untuk mengatur industri pertambangan nikel. Tujuan utama dari rangkaian perubahan peraturan ini adalah untuk mencapai dua sasaran utama. Pertama, meningkatkan nilai tambah dalam proses pengolahan dan pemurnian mineral nikel, yang bertujuan menghasilkan lebih banyak nilai ekonomi dari sumber daya alam yang dimiliki oleh Indonesia. Kedua, mengendalikan ekspor nikel agar tetap sesuai dengan kebijakan pemerintah dan dapat memberikan kontribusi yang lebih besar terhadap penerimaan negara.
8. Undang-Undang (UU) No. 4 Tahun 2009 tentang Pertambangan Mineral dan Batubara (UU Minerba) melarang perusahaan pertambangan di Indonesia melakukan ekspor bahan mentah. Undang-undang ini mengharuskan perusahaan di Indonesia memiliki smelter untuk memproses bahan minerba menjadi bahan olahan. Berdasarkan Peraturan Pemerintah (PP) No. 23 Tahun 2010 tentang Pelaksanaan Kegiatan Usaha Pertambangan Mineral dan Batubara, menjadi keharusan bagi perusahaan pertambangan untuk memproses dan memurnikan mineral sebagai nilai tambah dari produknya. Namun, kemudian lahir PP No. 1 Tahun 2014 yang melonggarkan pembatasan ekspor dalam PP No. 23 Tahun 2010, dalam peraturan ini disebutkan perusahaan pertambangan dengan izin dan fasilitas proses pemurnian dapat mengeksport bahan mentah dalam jumlah terbatas.
9. UU Minerba mengatur tentang izin pertambangan, yaitu Izin Usaha Pertambangan (IUP) dan Izin Usaha Pertambangan Khusus (IUPK). The main difference between IUP and IUPK permits is the mining area, where IUPK holder is given permission to mine in the Special Mining Business Licence Area (*Wilayah Izin Usaha Pertambangan Khusus*, WIUPK) inside of Special Mining Business Area (*Wilayah Usaha Pertambangan Khusus*, WUPK) which is part of State Reserve Area (*Wilayah Pencadangan Negara*, WPN) that is allowed to be commercialized. The details of total area and count of permits related to nickel mining activities are shown in Table 2.2. and Table 2.3. below.

⁴ Varone, A., & Ferrari, M. (2015). Power to liquid and power to gas: An option for the German Energiewende. <https://doi.org/10.1016/j.rser.2015.01.049>

⁵ IESR. (2023). Indonesia Electric Vehicle Outlook 2023. Electrifying Transport Sector: Tracking Indonesia EV Industries and Ecosystem Readiness. Institute for Essential Services Reform (IESR). Jakarta. <https://iesr.or.id/wp-content/uploads/2023/02/Indonesia-Electric-Vehicle-Outlook-2023.pdf>

Table 2.2. Count of permit and its total area based on the mining activity

Permit Type	IUP	IUPK	KK	Grand Total
Mining activity	Total Area (ha)			
Exploration		1,681.00	16,470.00	18,151.00
Operation - Production	714,469.16		176,218.00	890,687.16
Grand Total	714,469.16	1,681.00	192,688.00	908,838.16

Permit Type	IUP	IUPK	KK	Grand Total
Mining activity	Count of Permit (#)			
Exploration		1	1	2
Operation - Production	342		6	348
Grand Total	342	1	7	350

Source: MODI, 2023⁶

Table 2.3. Count of permit and its total area based on the administrative location

Permit type	IUP	IUPK	KK	Grand Total
City/regency	Total area (ha)			
Banggai Regency	61,735.00			61,735.00
Bombana Regency	26,922.92			26,922.92
Bone Regency	2,100.00			2,100.00
Buton Regency	675.00			675.00
Central Buton Regency	3,860.96			3,860.96
South Halmahera Regency	32,177.58			32,177.58
Central Halmahera Regency	20,029.96		45,065.00	65,094.96
East Halmahera Regency	101,380.21			101,380.21
Kolaka Regency	21,389.80		20,286.00	41,675.80
North Kolaka Regency	18,642.90		4,466.00	23,108.90
Konawe Regency	42,496.00			42,496.00
Konawe Islands Regency	850.90			850.90
South Konawe Regency	19,367.37			19,367.37
North Konawe Regency	92,039.26	1,681.00		93,720.26
East Luwu Regency	23,199.00			23,199.00
Morowali Regency	156,472.82		93,265.00	249,737.82
North Morowali Regency	52,808.48			52,808.48
Raja Ampat Regency	7,095.00		13,136.00	20,231.00
Sarmi Regency			16,470.00	16,470.00
West Seram Regency	4,389.00			4,389.00
Tojo Una-una Regency	10,800.00			10,800.00
N/A	16,037.00			16,037.00
Grand Total	714,469.16	1,681.00	192,688.00	908,838.16

Permit type	IUP	IUPK	KK	Grand Total
City/regency	Count of permit (#)			
Banggai Regency	21			21
Bombana Regency	11			11
Bone Regency	1			1
Buton Regency	1			1
Central Buton Regency	2			2
South Halmahera Regency	15			15
Central Halmahera Regency	15		1	16
East Halmahera Regency	20			20
Kolaka Regency	15		1	16
North Kolaka Regency	17		1	18
Konawe Regency	15			15
Konawe Islands Regency	1			1
South Konawe Regency	17			17
North Konawe Regency	78	1		79
East Luwu Regency	7			7
Morowali Regency	73		2	75
North Morowali Regency	27			27
Raja Ampat Regency	2		1	3
Sarmi Regency			1	1
West Seram Regency	1			1
Tojo Una-una Regency	1			1
N/A	2			2
Grand Total	342	1	7	350

Source: MODI, 2023⁷

Relevant Policies: Minimum Processing Export Requirement

10. The Indonesian government has been planning to increase the economic values of several mineral commodities by prohibiting exports of mineral raw material. This target is also accompanied by strategies and investment into the upstream and middle stream industries. The Ministry of Energy and Mineral Resources Regulation No. 25/2018 sets out minimum export requirements for these mineral commodities.⁸ The type of minerals with minimum export requirements are displayed in Table 2.12.

⁶ Kementerian Energi dan Sumber Daya Mineral. "Mineral One Data Indonesia", 2023. <https://modi.esdm.go.id/>. accessed 5 August 2023 21:00:00 GMT+7

⁷ Kementerian Energi dan Sumber Daya Mineral. "Mineral One Data Indonesia", 2023. <https://modi.esdm.go.id/>. accessed 5 August 2023 21:00:00 GMT+7

⁸ The Ministry of Energy and Mineral Resources No. 25/2018 on Mineral and Coal Mining Industries has been amended three times with No. 50/2018, 11/2019, and 17/2020

Table 2.12. Mineral commodities with minimum processing requirements for export

<i>Minerals of metal</i>	<i>Minerals of non-metal</i>	<i>Mineral stones</i>	<i>By-products</i>
Copper	Zircon	Marble	Anode sludge
Nickel and cobalt	Kaolin	Granite	Tin slag
Bauxite	Clay	Onic	
Iron	Zeolit	Opal	
Tin	Bentonite	Jade	
Manganese	Silica	Amethyst	
Lead and zinc	Calcite	Topaz	
Gold	Felspar	Perlite	
Silver	Diamond	Obsidian	
Chromium		Toseki	
Zirconium		Slate	
Antimony		Granodiorite	
		Gabro	
		Peridotite	
		Basalt	
		Chalcedony	
		Chert	
		Jasper	
		Chrysoprase	
		Garnet	

Source: Ministry of Energy and Mineral Resources Regulation No. 25/2018 (jo. 50/2018, 11/2019, 17/2020)

11. As part of the export minimum processing requirement strategy, the Ministry of Energy and Mineral Resources pushed the investment to establish new smelting facilities within the country along with the development of other sectors, including labor, digital infrastructure, and renewable energy.⁹

⁹ Kementerian Investasi. "Indonesia Investment Opportunities and Investment Updates in Automotive Supply Chain Industry". 2022. [presentation] https://www.asean.or.jp/ja/wp-content/uploads/sites/2/20220825-Webinar-AJC-FTA-and-Supply-Chain_v01.pdf accessed 21 August 2023 at 22:45:32 GMT+7

Table 2.13. Current status of smelter facility construction, per 2020

Commodity	Number of Smelting Facility (#)			Total Investment (mil. USD)	Actual Investment until Q2 2020 (mil. USD)
	Existing	Planned	Total		
Nickel	13	17	30	8006.5	6261.2
Bauxite	2	9	11	8647.2	4293.7
Iron	1	3	4	193.9	140.5
Copper	2	2	4	4693.2	1332.8
Manganese	1	1	2	23.9	13.3
Lead and zinc	0	2	2	28.8	19.7
Total	19	34	53	21593.6	12064.5

Source: Kementerian Energi dan Sumber Daya Mineral, 2020¹⁰

12. The export prohibition of mineral raw materials policy is currently being disputed under the World Trade Organization. The dispute was complained by the European Union towards Indonesia as respondent for establishing policies against the 1994 General Agreement on Tariffs and Trade (GATT). The European Union claimed that Indonesia put a barrier to trade violating the 1944 GATT and failed to publish such policies accordingly.¹¹ The decision on the dispute settlement was mainly over nickel ore export prohibition and domestic processing requirements. The WTO dispute settlement panel agrees that Indonesia failed to demonstrate that export prohibitions are due to critical shortage of low-grade nickel ore and, in the future, high-grade nickel ore. The export restriction was also perceived as not temporarily applied, because the policy has been enacted for 7 years for nickel ore and 9 years for domestic processing requirements. Thus, the export restriction and domestic processing requirement (DPR) policy was agreed to not conform to 1994 GATT Article XI:1 and XI:2(A) about quantitative restrictions. This decision was settled by the panel on 30 November 2022.¹²
13. After the loss at the WTO panel, Indonesia submitted an appeal on December 8. Further, the European Union also submitted their intent for an oral statement disagreeing Indonesia's appeal to the dispute settlement body.¹³ As a result, Indonesia should re-modify the policy of interest as accordingly. Currently the nickel ore export restriction and domestic processing requirement policy are still in place, because the dispute process is still ongoing through the

¹⁰ Kementerian ESDM, "Pemutakhiran Peta Smelter pada ESDM One Map", 2020. https://onemap.esdm.go.id/news/updating_spatial_smelter_on_esdm_one_map

¹¹ World Trade Organization Dispute Settlement No. 592: Indonesia - Measures Relating to Raw Materials. Currently, the dispute has yet to be resolved. Official progress information under the WTO can be followed on WTO webpage:

https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds592_e.htm

¹² World Trade Organization Dispute Settlement No. 592: Indonesia - Measures Relating to Raw Materials. Currently, the dispute has yet to be resolved. Official progress information under the WTO can be followed on WTO webpage:

https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds592_e.htm

¹³ World Trade Organization Dispute Settlement No. 592: Indonesia - Measures Relating to Raw Materials. Currently, the dispute has yet to be resolved. Official progress information under the WTO can be followed on WTO webpage:

https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds592_e.htm

appeal and not yet in force.^{14,15} The European Union stakeholders conducted several consultations to propose countermeasures for Indonesia's appeal for the nickel ore export dispute.¹⁶ In December 2022, President Joko Widodo issued a date, which is in June 2023, prohibiting policy enactment on bauxite ore export along with the domestic processing requirement.¹⁷ Further in February 2023, the Indonesian government pushed the date on copper concentrate export prohibition from June 2023 to June 2024.^{18,19}

Tumpang tindih lahan

14. Berdasarkan hasil analisis, terungkap bahwa total luasan izin pertambangan nikel yang berada dalam kawasan hutan mencapai 633.324,191 hektar. Tumpang tindih ini menimbulkan pertanyaan serius tentang dampak lingkungan yang mungkin terjadi akibat praktik pertambangan dalam lingkungan hutan yang rentan. Analisis ini dilakukan melalui integrasi dua set data yang berbeda, yaitu deliniasi kawasan hutan Indonesia yang diperbaharui pada tahun 2021 dan data Izin Usaha Pertambangan (IUP) Nikel MOMI versi Juli 2023 yang dikeluarkan oleh Kementerian Energi dan Sumber Daya Mineral (ESDM). Pendekatan ini memungkinkan identifikasi lokasi-lokasi yang mengalami tumpang tindih antara izin pertambangan nikel dan kawasan hutan.

Izin Pertambangan Nikel x Kawasan Hutan

Provinsi / Fungsi Kawasan	Jumlah Luasan
MALUKU	3249.448
HPK	674.142
HPT	2265.517
SA	309.789
MALUKU UTARA	183731.454
HL	58694.176
HP	34243.459
HPK	19285.564

¹⁴ CNN Indonesia, "RI Masih Bebas Larang Ekspor Nikel Meski Kalah Gugatan di WTO".

<https://www.cnnindonesia.com/ekonomi/20230223151009-92-916982/ri-masih-bebas-larang-ekspor-nikel-meski-kalah-gugatan-di-wto>

¹⁵ Kementerian Keuangan. "Gugatan Uni Eropa di World Trade Organization (WTO) Mengancam Hilirisasi Industri Pertambangan di Indonesia". 2022. <https://www.djkn.kemenkeu.go.id/kanwil-kalbar/baca-artikel/15503/Gugatan-Uni-Eropa-di-World-Trade-Organization-WTO-Mengancam-Hilirisasi-Industri-Pertambangan-di-Indonesia.html> accessed 21 August 2023 at 17:20:44 GMT +7

¹⁶ European Commission. "EU launches consultation on use of enforcement regulation on Indonesian nickel export restrictions". 2023. https://policy.trade.ec.europa.eu/news/eu-launches-consultation-use-enforcement-regulation-indonesian-nickel-export-restrictions-2023-07-07_en accessed 21 August 2023 at 19:22:10 GMT +7

¹⁷ Kementerian Kominfo RI, "Pemerintah akan Berlakukan Larangan Ekspor Biji Bauksit Mulai Juni 2023". <https://www.kominfo.go.id/content/detail/46457/pemerintah-akan-berlakukan-larangan-ekspor-bijih-bauksit-mulai-juni-2023/0/berita>

¹⁸ Katadata, "Jokowi Batalkan Larangan Ekspor Tembaga, Apakah Langgar UU Minerba?". <https://katadata.co.id/yulawati/berita/644b65279cc98/jokowi-batalkan-larangan-ekspor-tembaga-apaakah-langgar-uu-minerba>

¹⁹ Sekretariat Kabinet RI, "Presiden Segera Umumkan Penghentian Ekspor Tembaga Mentah". <https://setkab.go.id/presiden-segera-umumkan-penghentian-ekspor-tembaga-mentah/>

HPT	71508.255
PAPUA	16265.076
HL	4996.021
HP	10948.899
HPT	320.156
PAPUA BARAT	5187.921
HL	5187.921
SULAWESI SELATAN	73045.465
HL	48371.368
HP	112.609
HPK	79.533
HPT	24029.261
TWA	452.694
SULAWESI TENGAH	203711.332
HL	29183.134
HP	36009.608
HPK	28947.048
HPT	109570.243
KSA/KPA	1.299
SULAWESI TENGGARA	148133.495
HL	24823.964
HP	58936.573
HPK	9404.47
HPT	54690.268
HSA	3.329
TWAL	274.891
Grand Total Luasan (Hektar)	633324.191

Tabel 2.4. IUP dalam kawasan hutan menurut provinsi dan fungsi kawasan (Sumber : MOMI Minerba, KESDM 2023, Peta Kawasan Hutan Indonesia, KLHK 2021)

15. Analisis ini telah mengidentifikasi sejumlah provinsi di Indonesia yang terdampak oleh tumpang tindih antara izin pertambangan nikel MOMI dan kawasan hutan. Dalam konteks ini, Sulawesi Tengah muncul sebagai provinsi dengan luas kawasan hutan terbesar yang terpengaruh, mencapai 148.183,496 hektar. Maluku Utara menduduki peringkat kedua dengan luas kawasan hutan terdampak sebesar 183.731,454 hektar, sementara Sulawesi Tenggara menempati urutan ketiga dengan luas 148.183,496 hektar. Dalam konteks perlindungan lingkungan, adanya tumpang tindih antara izin pertambangan nikel dan kawasan hutan membawa potensi risiko serius terhadap kerusakan ekosistem hutan.

I. MAPPING OF NICKEL, COBALT, AND LITHIUM'S UPSTREAM SECTOR AND THE ACTORS

2.1. Mapping of Nickel Supply Chain and The Actors

16. The global mineral reserve is not distributed equally across the globe. Nickel, for instance, is estimated to be more abundant in Australia and Indonesia, among other countries (see Figure 2.3). Nickel is mostly observed in the laterite and sulfide deposits. The Agency of Geology

Indonesia mapped nickel deposits up to 49 million tons²⁰, more than twice compared to the USGS estimate. Commercial nickel-bearing minerals include pentlandite²¹ and garnierite, which are sulfide and laterite, respectively.²² Depending on the iron and magnesium content, laterite ores can be classified as limonites or saprolites.²³ Saprolite ores rich in nickel have been processed by capital-intensive and environmentally challenging pyrometallurgy.²⁴ The hydrometallurgical process favors limonites and other low-grade ores due to low capital costs for an equivalent metal production rate and avoids production of gaseous or dust emissions. With this wet process, recovery of multiple metals from a single feed source is made possible.²⁵

²⁰ Ministry of Energy and Mineral Resources (2021) Grand Strategy Mineral dan Batubara. esdm.go.id/assets/media/content/content-buku-grand-strategy-komoditas-minerba.pdf

²¹ Haldar, S. K. (2017). Chapter 1 - Introduction. In: Platinum-Nickel-Chromium Deposits, edited by S. K. Haldar. Elsevier. DOI <https://doi.org/10.1016/B978-0-12-802041-8.00001-8>

²² C. K. Thubakgale, R. K. K. Mbaya and K. Kabongo. (2013). A study of atmospheric acid leaching of a South African nickel laterite. *Minerals Engineering* 2013 Vol. 54 Pages 79-81. DOI: <https://doi.org/10.1016/j.mineng.2013.04.006>

²³ S. Zauyah, C. E. G. R. Schaefer and F. N. B. Simas. (2018). Chapter 3 - Saprolites. In: *Interpretation of Micromorphological Features of Soils and Regoliths (Second Edition)*, edited by G. Stoops, V. Marcelino and F. Mees. Elsevier. DOI <https://doi.org/10.1016/B978-0-444-63522-8.00003-6>

²⁴ D. Dreisinger. (2009). Keynote address: Hydrometallurgical process development for complex ores and concentrates. The Journal of The Southern African Institute of Mining and Metallurgy Muldersdrift, Johannesburg, 24–26 February 2009. SAIMM Conference, Hydrometallurgy.p 253-271. <https://www.scielo.org.za/pdf/jsaimm/v109n5/01.pdf>

²⁵ D. Dreisinger. (2009). Keynote address: Hydrometallurgical process development for complex ores and concentrates. The Journal of The Southern African Institute of Mining and Metallurgy Muldersdrift, Johannesburg, 24–26 February 2009. SAIMM Conference, Hydrometallurgy.p 253-271. <https://www.scielo.org.za/pdf/jsaimm/v109n5/01.pdf>

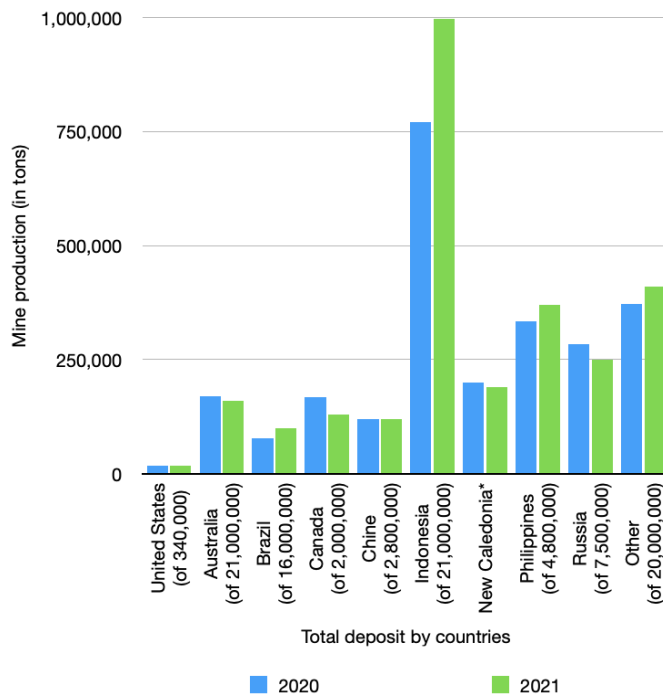


Figure 2.3. Distribution of global nickel deposit
 Source: United States Geological Survey, 2022²⁶

2.1.1. Upstream Supply Chain of Nickel in Indonesia

17. Nickel is one of the chemicals required for electric vehicle battery production. Related to the supply chain, Indonesia has a nickel industry supply chain from upstream to downstream. The Government of Indonesia is targeting to cover as many nickel supply chains as possible within the country. Currently, Indonesia has most of the supply chain available within the country.



²⁶ United States Geological Survey. "Mineral Commodity Summaries 2022 - Nickel". 2022. <https://pubs.usgs.gov/periodicals/mcs2022/mcs2022-nickel.pdf>

Figure 2.6. Upstream-Downstream of Nickel-Cobalt in Indonesia.
Source: Kementerian ESDM Grand Strategy Mineral dan Batubara, 2021.

18. Nickel reserves in Indonesia are coming primarily from lateritic ore. The nickel mining, operation, and production activities are centered in the Sulawesi region (118,017 ha), then followed by the Moluccas Islands (45,065 ha) and Papua (29,606 ha). Under the Ministry of Energy and Mineral Resources, the most nickel mining activities are holding Mining Business Licence or *Izin Usaha Pertambangan/IUP* (342 permits), followed by Contract of Work or *Kontrak Karya/KK* (1 permit), and Special Mining Business Licence or *Izin Usaha Pertambangan Khusus/IUPK* (7 permits).²⁷

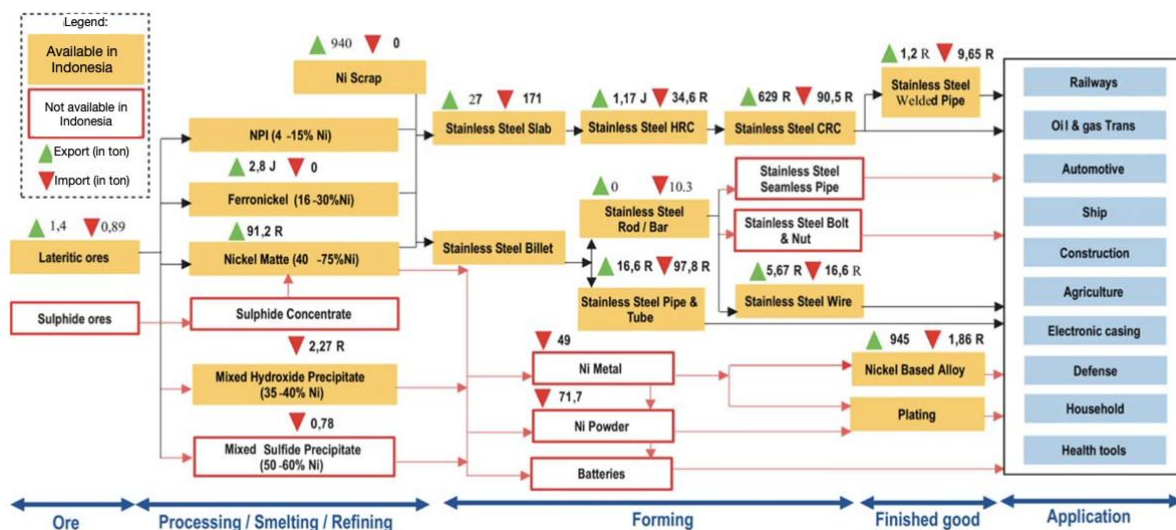


Figure 2.7. Supply chain of nickel products with export-import balance in 2020 (unit in tons, R = Ribu or thousands; J = Juta or million). Source: ESDM, 2021.

19. Considering the ore export prohibition, there have been instances of illegal nickel ore export. Since the policy was initially enacted in 2020, the Directorate General of Customs and Excise (under the Ministry of Finance) has compiled bills of lading of illegal nickel ore exports to China during 2021-2022. There were in total 5 million tons of nickel ores illegally exported from Sulawesi and North Moluccas Provinces.²⁸

2.1.2 Middle Stream Supply Chain of Nickel in Indonesia

20.

Box 2.2. Indonesia's Role in The Middle Stream Global Supply Chain for Nickel, Cobalt, and Lithium Production

²⁷ Kementerian Energi dan Sumber Daya Mineral. "Mineral One Data Indonesia", 2023. <https://modi.esdm.go.id/> accessed 5 August 2023 21:00:00 GMT+7

²⁸ CNBC Indonesia, "5 Juta Ton Nikel Ilegal Masuk China, Pemerintah Pegang Bukti". 2023. <https://www.cnbcindonesia.com/news/20230702063210-4-450446/5-juta-ton-nikel-ilegal-masuk-china-pemerintah-pegang-bukti>

Generally, there are two classifications of nickel midstream products, which are Class I and Class II. Class I includes products with higher nickel concentration such as electronic nickel, carboxyl nickel, as well as briquettes and powders. Class II has the lower concentration of nickel such as ferronickel and nickel pig iron. (IEA in Enterprise 2023, The Nickel Institute 2017). Mixed precipitates, such as Mixed Hydroxide Precipitates (MHP) and Mixed Sulfate Precipitates (MSP) are instead considered as intermediate products (Goldman Sachs 2022, Vaughan et al 2011). Thus, nickel products from Indonesia are mostly considered Class II nickel, considering 93% of nickel products from Indonesia are nickel pig iron. At the global level, critical minerals middle stream processing are dominated by players from China. Indonesia only plays a role in the global nickel and copper production (see Figure 2.11) (IEA in Enterprise 2023).

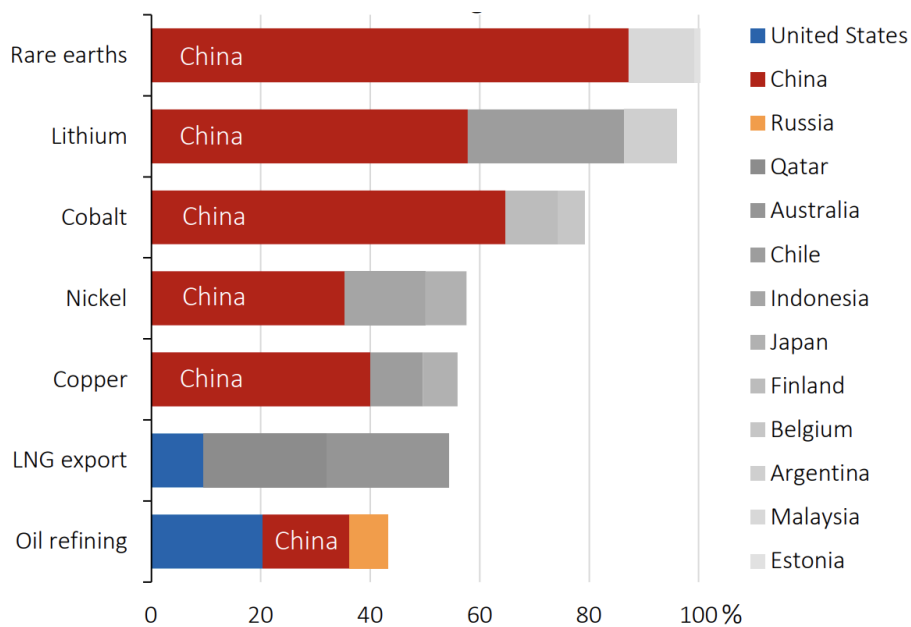


Figure 2.11. Global processing countries of selected minerals and fossil fuels
Source: [IEA in Enterprise 2023](#)

The main Class I nickel production companies are Anglo American, BHP Billiton, Glencore, JFE Mineral, Lundin Mining Corporation, Norilsk Nickel, Pacific Metals, Sherritt International Corporation, Eramet, Sumitomo Metals Mining, Vale, and Western Areas ([Fitch Solutions 2021](#)). These are the types of nickel that are demanded by electric vehicle production companies. Class II nickel products, which is the most dominant product from Indonesia, are mainly used for stainless steel production. Although depending on technology availability and economic capacity, production of Class I nickel generally requires more capital, releases more emission, and is more environmentally damaging, even with Indonesia's plan to fulfill a long-term decarbonized high-pressure acid leaching (HPAL) technology in Indonesian smelters. ([Brookings 2022](#), [Fitch Solutions 2021](#), [FastMarkets 2023](#)).

21. The downstream supply chain consists of assembly and production of battery EV, in the context of this report. Based on the Ministry of Energy and Mineral Resources²⁹, Indonesian nickel production pipeline is mostly complete for stainless steel production, but not for batteries. This also holds true for the global supply chain, in which 65% of nickel is used for

²⁹ Kementerian ESDM, "Grand Strategy Mineral dan Batubara", 2021.

<https://www.esdm.go.id/assets/media/content/content-buku-grand-strategy-komoditas-minerba.pdf>

stainless steel production. The production of nickel pig irons from Indonesia contributed to the surge increase of global supply of low-grade nickel production.³⁰

22.

Box 2.3. Nickel for Stainless Steel Products

As previously mentioned, current global nickel demand is predominantly used for stainless steel production, in addition to alloy steel, plates and battery production. Global industrial nickel demand is estimated by Wood Mackenzie to increase by 7.1% at the end of 2023 and further estimated 10.1% increase by the end of 2023 fiscal year. (see Figure 2.12). Considering China also has a major role in global stainless steel production, they also estimated slight fluctuation in the production of stainless steel due to another wave of Covid-19 in the region. Global stainless steel production was slightly dropped in 2022, following China's production ability, which later expected to recover in the following years (see Figure 2.13).

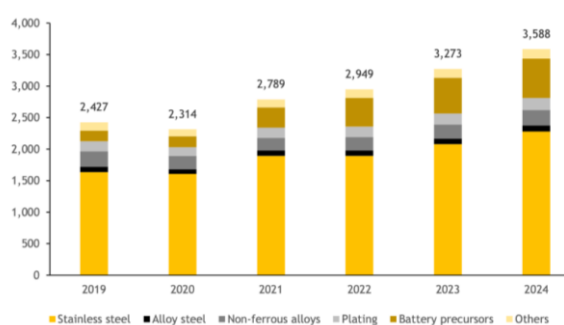


Figure 2.12. Global nickel demand by industry type. Source: Wood Mackenzie & Maybank IBG Research, 2023³¹

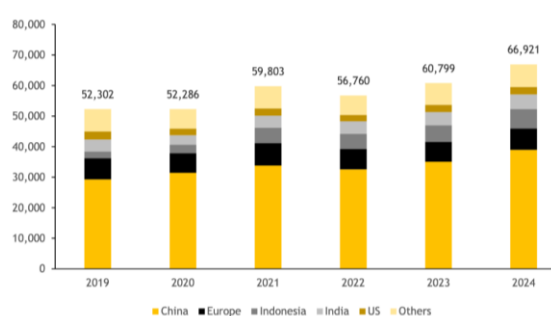


Figure 2.13. Stainless steel production by country. Source: Wood Mackenzie & Maybank IBG Research, 2023

In Indonesia, there are several stainless steel productions uptaking the available nickel intermediate products. The domestic production of stainless steel has been surging since 2018 due to the production activities in Morowali. In 2021, the domestic production of stainless steel reached 6,910,000 tons (see Table 2.8).³²

Table 2.8. Smelting and refining of integrated stainless steel companies, in 2021

³⁰ NorNickel. "2022 Financial Results - Investor Presentation". 2023.

https://nornickel.com/upload/iblock/1e1/ljgmqsxb96544svkb07g7m7ykhxo54o4/Norilsk_Nickel_FY_2022_ENG.pdf accessed 13 August 2023 at 17:43:53 GMT +7

³¹ Maybank Sekuritas Indonesia. "Indonesia Metal - Paving way to becoming a global EV hub". <https://mkefactsettd.maybank-ke.com/PDFS/296041.pdf> accessed 8 Aug 2023 18:35:48 GMT+7

³² Kementerian Perindustrian. "Rencana Kinerja Direktorat Industri Logam Tahun 2020". 2019. <https://ilmate.kemenperin.go.id/document/1589331933-3.1%20RENKIN%20LOGAM%202020.pdf> accessed 14 Aug 2023 at 14:10:26 GMT+7

No.	Name of company	Activity	Products	Production capacity (t/yr)	Location
1	PT Guang Ching Nickel and Stainless Steel	Smelter	Stainless Steel Slab/HRC	1,000,000	Morowali
2	PT Indonesia Tsingshan Stainless Steel	Smelter	Stainless Steel Slab/HRC	1,000,000	Morowali
3	PT Sulawesi Mining Investment	Smelter	Stainless Steel Slab	1,000,000	Morowali
4	PT Obsidian Stainless Stell	Smelter	Stainless Steel	3,000,000	Konawe
5	PT Indonesia Ruipu Nickel and Chrome Alloy	Casting/rolling	Stainless Steel CRC	700,000	Morowali
6	PT Jindal Stainless Indonesia	Casting/rolling	Stainless Steel CRC	150,000	Gresik
7	PT IMR ARC Steel	Casting/rolling	Stainless Steel CRC	30,000	Mojokerto
			Total	6,880,000	

Source: Kementerian Energi dan Sumber Daya Mineral, 2022

In one of the industrial complexes, Morowali, integrated supply chain of stainless steel involves activities from earlier upstream to middle stream supply chain activities. There are still partial imports to source the raw materials for stainless steel production, and almost all of the production is exported to other countries.

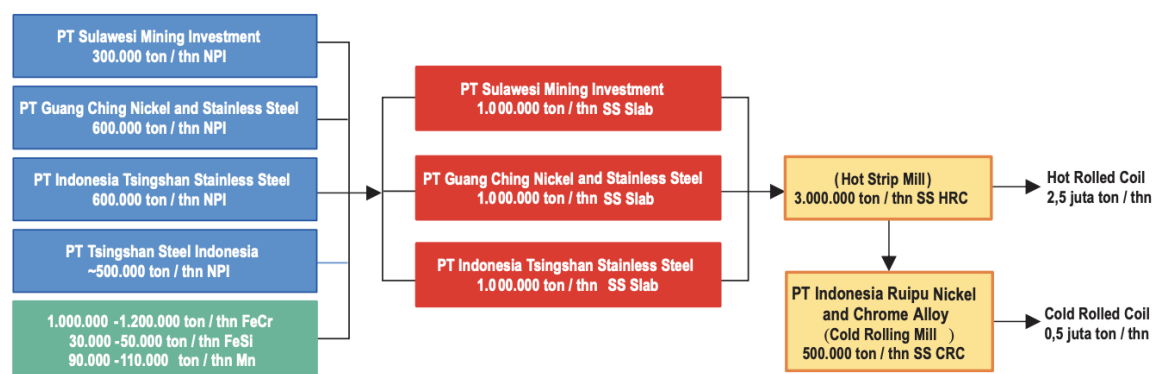


Figure 2.14. Stainless steel production capacity from companies within Indonesia Morowali Industrial Park. Source: Kementerian Energi dan Sumber Daya Mineral, 2022

2.2. Mapping of Cobalt Supply Chain and The Actors

23. Indonesia has the second largest cobalt production globally. Despite only being the third largest cobalt reserve, Indonesia produced 10,000 tons of cobalt in 2022, after Congo (130,000 tons).³³ Global cobalt demand is also expected to increase from the electronic vehicle and air transport industry.³⁴ Cobalt extracting-refining-production processes are often conducted alongside nickel production activities. In Indonesia, this is due to the naturally occurring cobalt being concentrated at the same laterite ore where nickel is extracted from.^{35,36} Figure 2.16 describes Cobalt production including export and import in 2020.

³³ USGS, "Cobalt Commodities Summary, 2023".

<https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-cobalt.pdf>

³⁴ Anbinyak, N.; Cahyaningrum, T. "Identifikasi zona kaya kobalt pada cebakan nikel laterit di Indonesia". 2021. DOI: 10.36986/impj.v2i2.38

³⁵ Kementerian ESDM, "Grand Strategy Mineral dan Batubara", 2021.

<https://www.esdm.go.id/assets/media/content/content-buku-grand-strategy-komoditas-minerba.pdf>

³⁶ Anbinyak, N.; Cahyaningrum, T. "Identifikasi zona kaya kobalt pada cebakan nikel laterit di Indonesia". 2021. DOI: 10.36986/impj.v2i2.38

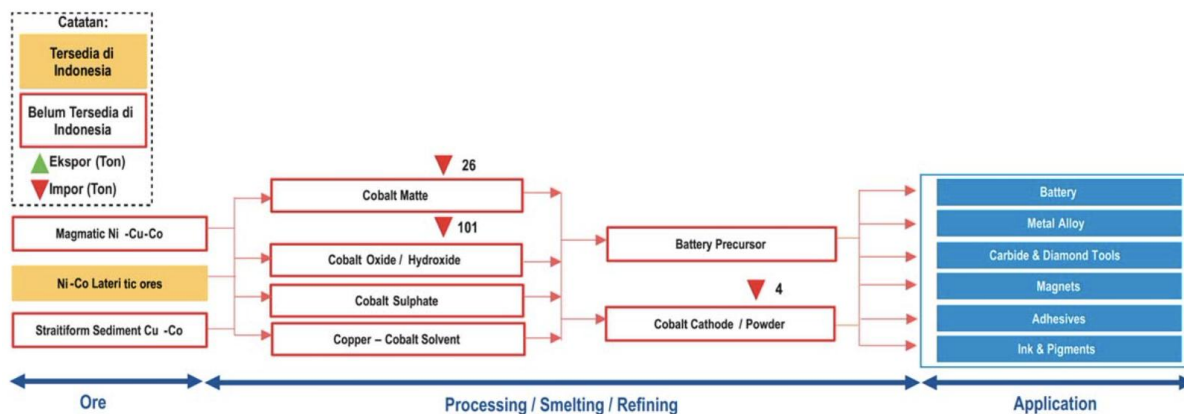


Figure 2.16. Cobalt production flow chart, including export and import, in 2020 (in tons). Source: Kementerian Energi dan Sumber Daya Mineral, 2022

24. Currently, there is no cobalt processing in Indonesia. However, HPAL technology is currently being developed for nickel-cobalt extraction domestically. HPAL is projected to enable the production of higher grades of nickel and cobalt³⁷ (also see Section 2.1). Smaller amount of cobalt is currently supplied by the production of mixed hydroxide precipitate, which contains concentrates of both nickel and cobalt. There needs to be an additional process to extract higher purity of cobalt, for example in the form of cobalt sulfate. Target to increase domestic cobalt production is expected to be alongside nickel intermediate products, which is probably the similar companies with nickel production activities. There are several news articles that covered targets in establishing cobalt smelters, including Trimegah Bangun Persada-Harita Nickel - PT. Obi Nickel Cobalt, companies within the Indonesian Morowali Industrial Park, Metallurgical Construction (Liuye), and others, which mostly are nickel-cobalt extraction projects.^{38,39,40,41,42}

2.3. Mapping of Lithium Supply Chain and The Actors

³⁷ Wahyudi, N. A. "Cadangan kobalt melimpah, ESDM dorong investasi smelter HPAL". 2023. <https://ekonomi.bisnis.com/read/20230210/44/1626883/cadangan-kobalt-melimpah-esdm-dorong-investasi-smelter-hpal> accessed 14 August 2023 at 14:24:40 GMT +7

³⁸ Kementerian ESDM, "Grand Strategy Mineral dan Batubara", 2021. <https://www.esdm.go.id/assets/media/content/content-buku-grand-strategy-komoditas-minerba.pdf>

³⁹ Wahyudi, N. A. "Cadangan kobalt melimpah, ESDM dorong investasi smelter HPAL". 2023. <https://ekonomi.bisnis.com/read/20230210/44/1626883/cadangan-kobalt-melimpah-esdm-dorong-investasi-smelter-hpal> accessed 14 August 2023 at 14:24:40 GMT +7

⁴⁰ Harita Nickel. "Harita Nickel ekspansi pabrik HPAL tahap III Rp 16 triliun". 2023. <https://tbpnickel.com/id/media/berita/harita-nickel-expands-its-hpal-plant-phase-iii-with-investment-value-of-idr-16-trillion> at 14:38:20 GMT +7

⁴¹ Indrawan, R. "Trimegah Bangun Persada mulai produksi kobalt sulfat Agustus 2023". 2023. <https://www.dunia-energi.com/trimegah-bangun-persada-mulai-produksi-kobalt-sulfat-agustus-2023/> accessed 14 August 2023 at 14:47:34 GMT+7

⁴² SMM. "Sixth smelter won the bid Indonesia OBI nickel cobalt wet process phase III project". 2022. <https://news.metal.com/newscontent/101752530/sixth-smelter-won-the-bid-indonesia-obi-nickel-cobalt-wet-process-phase-iii-project> accessed 22 August 2023 at 13:31 GMT +7

25. Globally, lithium resources are available in Chile, Bolivia, Australia, Zimbabwe, Argentina, Portugal, and other countries, but not Indonesia.^{43,44} At the extraction phase, lithium is naturally found in marine environments, sedimentary minerals, brine, and clay deposits. The most used reserves are sedimentary minerals and brines.^{45,46}
26. Lithium demand surges due to electrification and low-carbon technology, especially for battery technology. In 2008, 27% of global lithium consumption was estimated to be utilized for portable electronic product batteries⁴⁷, while the demand for electric vehicle battery is reaching more than 125 kilotons in 2022⁴⁸. For non-battery demand, lithium is used for lubricants, air conditioning systems, as well as frits and glass.

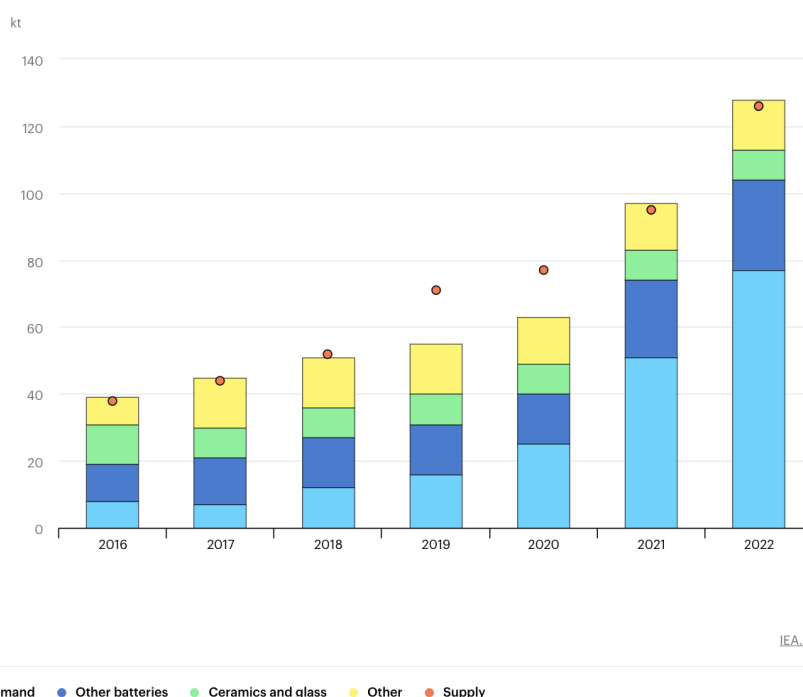


Figure 2.19. Global supply and demand of lithium for batteries by sector, 2016-2022
Source: International Energy Agency, 2023

⁴³ Gruber, P.W.; Medina, P.A.; Keoleian, G.A.; Kesler, S.E.; Everson, M.P.; Wallington, T.J. “*Global lithium availability: a constraint for electric vehicles?*” DOI: 10.1111/j.1530-9290.2011.00359.x

⁴⁴ British Geological Survey. “*Global lithium mines, deposits, and occurrences (November 2021)*”. 2021.

https://www2.bgs.ac.uk/mineralsuk/download/global_critical_metal_deposit_maps/G2122_052_V4CM_YK.pdf accessed 14 August 2023 at 19:15:31 GMT+7

⁴⁵ MinEx Consulting. “*A global overview of the geology and economics of lithium production*” [Presentation]. 2019. <https://minexconsulting.com/wp-content/uploads/2019/12/Lithium-Presentation-July-2019.pdf> accessed 14 Aug 2023 at 19:11:10 GMT+7

⁴⁶ British Geological Survey. “*Global lithium mines, deposits, and occurrences (November 2021)*”. 2021.

https://www2.bgs.ac.uk/mineralsuk/download/global_critical_metal_deposit_maps/G2122_052_V4CM_YK.pdf accessed 14 August 2023 at 19:15:31 GMT+7

⁴⁷ Gruber, P.W.; Medina, P.A.; Keoleian, G.A.; Kesler, S.E.; Everson, M.P.; Wallington, T.J. “*Global lithium availability: a constraint for electric vehicles?*” DOI: 10.1111/j.1530-9290.2011.00359.x

⁴⁸ International Energy Agency. “*Trends in batteries*”. 2023. <https://www.iea.org/reports/global-ev-outlook-2023/trends-in-batteries> accessed 14 August 2023 at 19:33:48 GMT+7

27. So far, Indonesia has yet to map the official estimate on major deposits and reserves of lithium. However, smaller deposits of lithium have been mapped as mineral ores, clay-brine, and brines in smaller amounts, which are estimated to be 14.105 tons per year. Due to the small deposit, the lithium would probably only supply the domestic demand without export.⁴⁹ Due to the lack of deposits and reserves of lithium in Indonesia, there are no processing industries to extract lithium established domestically. Domestic demands of lithium are fulfilled by imports from other countries.

2.4 The Downstream Supply Chain: Production and Assembly of Electric Vehicle Battery

Indonesia's greenhouse gas emissions are almost 600 MtCO₂-eq in 2021. The largest source of emissions is from the supply side, namely energy industries (power generation), which account for around 50% of total emissions. On the demand side, the transport sector is the largest source of emissions, accounting for 23% of total emissions. Road transportation is the most significant contributor in the transport sector, with over 90% share.⁵⁰

In 2018, the transport sector contributed to 28% of Indonesia's energy sector emissions, and it is rapidly increasing. Emissions from the transport sector are expected to rise by 53% from 2015 levels by 2030 and nearly double between 2030 and 2060. Achieving net-zero emissions will not be possible without addressing fossil fuel combustion in the transport sector.⁵¹ Electric vehicles have been included in the mitigation action of Indonesia. To meet the emission reduction target under Indonesia's Nationally Determined Contribution (NDC), 2-electric wheelers (2Ws) must reach 1.8 million by 2025 and 13 million by 2030, while 4-electric wheelers (4Ws) must reach 0.4 million by 2025 and 2 million by 2030. However, this target is still far from meeting the Paris Agreement's 1.5°C warming target. According to the IESR study, to do so, EVs must reach 110 million E2Ws and E4Ws by 2030, followed by 3 million Low Duty Vehicles (LDV) and 2.4 million buses.⁵²

As of July 2022, the Ministry of Transportation recorded nearly 23,000 registered EVs, consisting of 19,700 2Ws, 2,600 4Ws, and an assortment of 3Ws, buses and goods transport vehicles. 4W EV sales rose significantly to over 10,000 units in 2022, and around 28,000

⁴⁹ Salafudin. (2020). Sumber daya alam lithium Indonesia. DOI: 10.26760/jrh.v5i2.178-187

⁵⁰ IESR. (2023). Indonesia Electric Vehicle Outlook 2023. Electrifying Transport Sector: Tracking Indonesia EV Industries and Ecosystem Readiness. Institute for Essential Services Reform (IESR). Jakarta. <https://iesr.or.id/wp-content/uploads/2023/02/Indonesia-Electric-Vehicle-Outlook-2023.pdf>

⁵¹ Varone, A., & Ferrari, M. (2015). Power to liquid and power to gas: An option for the German Energiewende. <https://doi.org/10.1016/j.rser.2015.01.049>

⁵² IESR. (2023). Indonesia Electric Vehicle Outlook 2023. Electrifying Transport Sector: Tracking Indonesia EV Industries and Ecosystem Readiness. Institute for Essential Services Reform (IESR). Jakarta. <https://iesr.or.id/wp-content/uploads/2023/02/Indonesia-Electric-Vehicle-Outlook-2023.pdf>

electric 2Ws were sold in Q1-Q3 2022, although they remain minor relative to the market size.⁵³

In March 2023, the Indonesian Ministry of Transportation reported that users of electric vehicles reached 56,998 units.⁵⁴ Details of the 2, 3, or 4-wheeled electric and motorbikes vary. However, the 2-wheeled electric bicycles (64 types) and motorcycles/scooters (33 types) have been identified to have the most significant types relative to other kinds of electric bikes/motorcycles (see Figure 2.21).⁵⁵ The reasons to push for 2Ws and 4Ws are varied, ranging from reducing imported fuel consumption to reducing emissions, and no less important is an effort to boost the nickel-based industry.

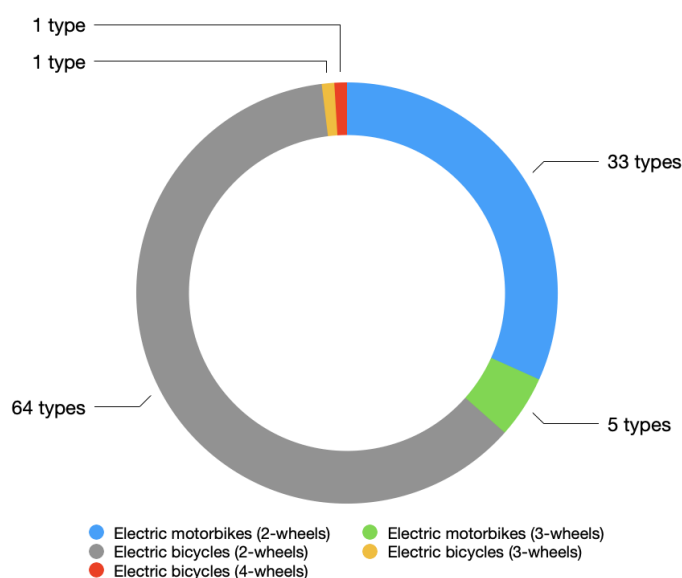


Figure 2.21. Types of electric motorcycle and bicycle in Indonesia
Source: Putra et al. (2021).

The electric vehicle demand surges exponentially for the last decade. Globally, there are more than 20 million units of electric vehicles driving on the road. The global push for electric vehicles has been to reduce emission and cut down on the utilization of fossil fuel. Accounting for both the environmental and economic benefit, the Government of Indonesia issued a Presidential Regulation No. 55/2019 on accelerating the battery-based electric vehicle program.

⁵³ Adhiguna, Putra. (2023). *Electrifying Indonesia's Road Transport*. Institute for Energy Economics and Financial Analysis. Singapore. <https://ieefa.org/resources/electrifying-indonesias-road-transport>

⁵⁴ Muhammad, D.A. "Kendaraan listrik harus lebih dikenal masyarakat Indonesia". 2023. Ferdian, A. (ed.). Kompas. <https://otomotif.kompas.com/read/2023/04/09/034100915/kendaraan-listrik-harus-lebih-dikenal-masyarakat-indonesia#:~:text=Hal%20itu%20terbukti%20dari%20banyaknya,lalu%2C%20yakni%20sebanyak%2015.437%20pengguna>. accessed 18 August 2023 at 18:46:07 GMT +7

⁵⁵ Putra, I.; Kumara, I.; Agung, I. (2022). "Status perkembangan sepeda listrik dan motor listrik di Indonesia". 2022. *Jurnal SPEKTRUM* 8(4):8-19. DOI: [10.24843/SPEKTRUM.2021.v08.i04.p2](https://doi.org/10.24843/SPEKTRUM.2021.v08.i04.p2)

Following the policy, the government also set a local content requirement to secure the role of industry within the country with timely milestones to achieve.^{56,57} This was further elaborated through policies addressing targets of investment, public procurements, and government projects, which include the Presidential Instruction No. 7/2022 on public procurement and subsidy for electric vehicle purchase that passes the local content requirement.⁵⁸ The initial timeline is to achieve 60% local content in 2024, however the timestamp target has been adjusted several times. Currently, the target is pushed back to 2024 to achieve 40% and further in 2026 for 60%.^{59,60,61}

Starting in 2023, the Indonesian government adjusted the weight of the Domestic Content Level (*Tingkat Kandungan Dalam Negeri* or TKDN) in the electric vehicle industry. The authority assessed the assembly process status; previously, 20% had been reduced to 12%, and the remaining 8% reallocated to the calculation of the main components, including batteries (35%), electric motors (12%), and car frames (11%).

The importance of TKDN in Indonesia is relevant in the context of purchasing for government procurement or projects. To support the growth of the domestic electric vehicle industry and attract investment, the Indonesian government has implemented various initiatives, including Presidential Instruction No. 7 issued in 2022, concerning public procurement and subsidy plans for purchasing electric vehicles requiring a certain percentage of TKDN.⁶²

Indonesian Association of Electric Vehicle Industries (*Gabungan Industri Kendaraan Bermotor Indonesia/GAIKINDO*) reported that battery-based EVs (BEVs) have been sold more than 10,000 units in 2022, while 5,100 units of hybrid electric cars and 10 plug-in hybrid electric cars were sold (see Figure 2.22). Indonesian electric car users have been projected to emerge from the medium to high household users, businesses, government, and other entities,

⁵⁶ Bloomberg, "Electric Vehicle Outlook 2023". <https://about.bnef.com/electric-vehicle-outlook/>

⁵⁷ Institute for Essential Services Reform (IESR), 2023. "Meninjau Kemajuan Industri Baterai Kendaraan Listrik Indonesia", <https://iesr.or.id/meninjaw-kemajuan-industri-baterai-kendaraan-listrik-indonesia>

⁵⁸ Institute for Essential Services Reform (IESR), 2023. "Meninjau Kemajuan Industri Baterai Kendaraan Listrik Indonesia", <https://iesr.or.id/meninjaw-kemajuan-industri-baterai-kendaraan-listrik-indonesia>

⁵⁹ CNN Indonesia. "Kewajiban TKDN mobil listrik buatan Indonesia mundur menjadi 2026". 2023. <https://www.cnnindonesia.com/otomotif/20230801114955-603-980368/kewajiban-tkdn-mobil-listrik-buatan-indonesia-mundur-jadi-2026> accessed 18 Aug 2023 at 18:17:46 GMT+7

⁶⁰ Andi, D.; "Kewajiban TKDN mobil listrik 40% bakal diundur di 2026". Handoyo (ed.). 2023. Kontan. <https://industri.kontan.co.id/news/kewajiban-tkdn-mobil-listrik-40-bakal-diundur-jadi-2026> accessed 18 August 2023 18:19:08 GMT +7

⁶¹ Kurniawan, R. "TKDN mobil listrik 40 persen mundur, ini kata Menperin" Ravel, S. (ed.). Kompas. <https://otomotif.kompas.com/read/2023/08/10/130200915/tkdn-mobil-listrik-40-persen-mundur-ini-kata-menperin> accessed 18 August 2023 at 18:20:37 GMT+7

⁶² Kurniawan, R. "TKDN mobil listrik 40 persen mundur, ini kata Menperin" Ravel, S. (ed.). Kompas. <https://otomotif.kompas.com/read/2023/08/10/130200915/tkdn-mobil-listrik-40-persen-mundur-ini-kata-menperin> accessed 18 August 2023 at 18:20:37 GMT+7

which accounted for 8.52% from the consumer of the state-owned energy and electric utility company, *Perusahaan Listrik Negara (PLN)*.⁶³

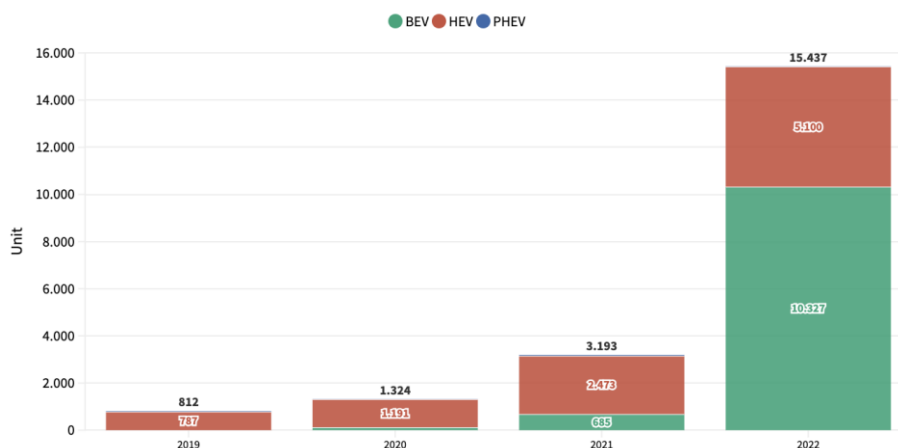


Figure 2.22. Electric car sales in Indonesia. Source: GAIKINDO in Mustajab, 2023⁶⁴

The general projection of EV use, either globally or in Indonesia, shows an increasing trend. Based on the planned energy scenario (PES), overall utilization of EV is estimated to be 88 million in 2050, consisting of 42 million units of electric car and 46 electric motorbikes. With an optimistic scenario, EV utilization is projected to reach 58 million unit electric cars and 144 million unit electric motorbikes (see Figure 2.23).⁶⁵



Figure 2.23. Projection estimate of the sales and use of (a) electric cars and (b) electric motorbikes in Indonesia. Source: Irena & Kementerian ESDM, 2022

Box 2.4. The Indonesian Electric Vehicle Ecosystem

The planned development of the electric vehicle ecosystem in Indonesia does not only cover electric vehicles and their battery demand. They involve industrial sectors from the upstream to downstream supply chain as displayed in Figure 2.24 below. The target is also developed through putting financial

⁶³ PLN Statistics in Hyundai Motors Indonesia. “*Strategi Pengembangan Kendaraan Listrik di Indonesia*”. 2021. https://igovexpo.ui.ac.id/wp-content/uploads/2021/06/3_Strategi-Pengembangan-Kendaraan-Listrik-Di-Indonesia-PT-Hyundai-Motors-Indonesia.pdf accessed 8 Aug 21:08:32 GMT+7

⁶⁴ Mustajab, I. “*Penjualan mobil listrik di Indonesia capai 15,437 unit pada 2022*”. 2023. <https://dataindonesia.id/sektor-riil/detail/penjualan-mobil-listrik-di-indonesia-capai-15437-unit-pada-2022> accessed 18 August 2023 at 18:51: 52 GMT +7

⁶⁵ DataIndonesia.id, “Indonesia Diproyeksi Punya 202 Juta Kendaraan Listrik pada 2050”, <https://dataindonesia.id/sektor-riil/detail/indonesia-diproyeksi-punya-202-juta-kendaraan-listrik-pada-2050>

incentives for the business sector (Figure 3.1) and supercharging the implementation of several regulatory frameworks (Figure 2.26).

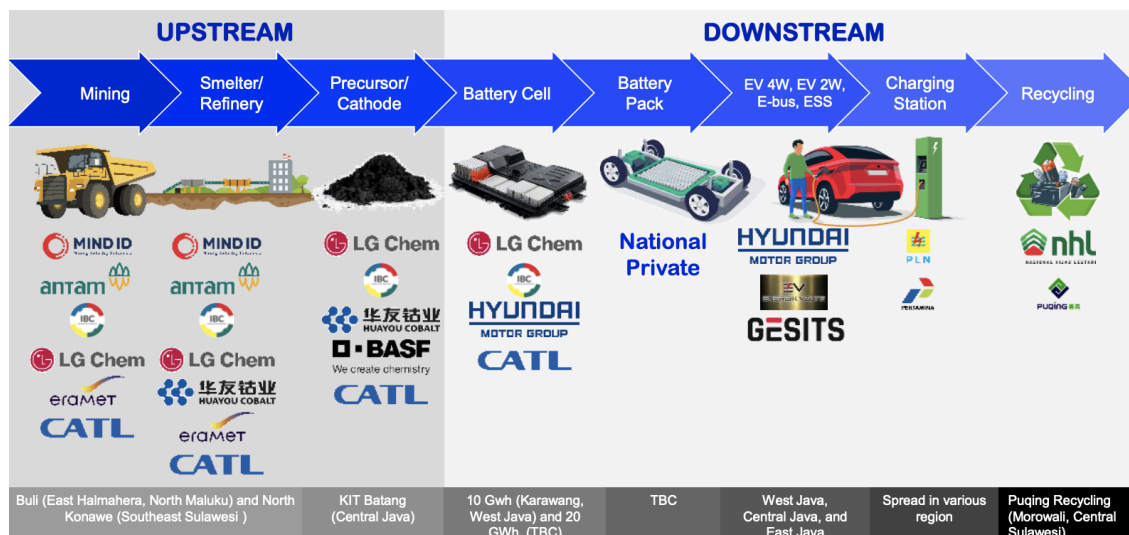


Figure 2.24. Indonesia electric vehicle ecosystem: from mining to recycling
 Source: Kementerian Investasi/BPKM, 2022⁶⁶

The ecosystem also includes developing charging stations. For charging stations, current users of EV utilize their houses to provide daily use for the energy. However, for the publicly available charging stations, the technology would be different between slow charging and fast charging stations. These two would also be different in technology options and EV/charging point ratio, especially when applied in the various use-options: toll road vs. city central; light EVs vs. electric heavy-duty vehicles (HDVs); charging station versus. battery swapping, etc.⁶⁷

Tax Allowance Government Reg. No 9/2016	Free Trade Zone	UU 32/2009 environment protect mgt act (EPMA)
Tax Holiday	Battery Electric Vehicle Program (Perpres 55/2019)	Gov Regulation 22/2021 incl. section addressing Hazardous waste mgmt.
Import Duty Facility	Luxury Taxable Goods of Motor Vehicles (Gov. Reg 73/2019)	Gov Regulation 27/2012 Environmental Permit
Green Lane Facility	Rencana Umum Energi Nasional (Gov. Reg. 22/2017)	Gov Regulation 24/2018 Online Single Submission
Super Deductible Tax	Permen ESDM No. 28/2016 ttg Tarif Listrik yang Disediakan oleh PT PLN (Persero)	Type Approval Certificate (Kemenhub)
Special Economic Zones (KEK)	SNI (11)	Others

⁶⁶ Purnomo, Cahyo. "Indonesia Investment Opportunities and Investment Updates in Automotive Supply Chain Industry". 2022. https://www.asean.or.jp/ja/wp-content/uploads/sites/2/20220825-Webinar-AJC-FTA-and-Supply-Chain_v01.pdf. Accessed 8 August 2023 18:13:30 GMT+7

⁶⁷ International Energy Agency. "Global electric vehicle outlook 2023". 2023. <https://iea.blob.core.windows.net/assets/dacf14d2-eabc-498a-8263-9f97fd5dc327/GEVO2023.pdf> accessed 21 August 2023 23:27:41 GMT+7

Figure 2.25. Relevant regulatory frameworks for accelerating the electric vehicle ecosystem.

Source: Tjahayana, 2021⁶⁸

Deloitte and the Ministry of Energy and Mineral Resources projected an increasing demand for both charging stations and battery swapping points from the current fossil fuel consumption for cars and motorbikes. The demand for charging stations is projected to increase to almost 32,000 units and battery swapping points up to 67,000 units in 2030 (see Figure 2.26).

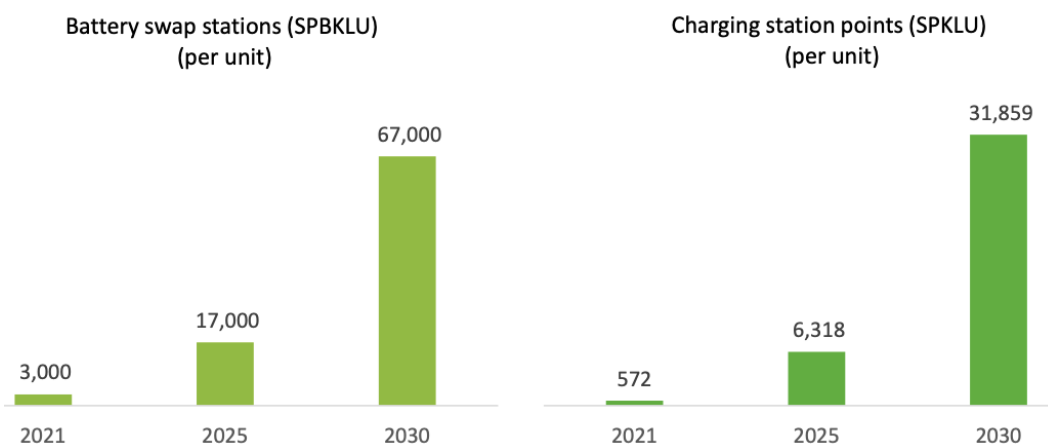


Figure 2.26. Battery swap and charging stations projections

Source: Ministry of Energy and Mineral Resources in Deloitte, 2022⁶⁹

The Asian Development Bank also has been assisting the Government of Indonesia on developing the supporting infrastructures for electric motorbikes due to the high utilization of motorcycles in the country. The report focuses on the Greater Jakarta Metropolitan area or JABODETABEK (Jakarta, Bogor, Depok, Tangerang, and Bekasi Cities).⁷⁰

Indonesia aims to reach multiple country agreements to develop the EV ecosystem domestically with other countries. Having one of the largest lithium mines in the world, Australia is one of the countries with the agreement to supply the lacking lithium for battery EV for the production in Indonesia responsibly and in an environmentally sound manner.^{71,72}

⁶⁸ Tjahajana, A. "Rencana Pengembangan Industri Baterai EV Nasional - BUMN". 2021. [Presentation] https://igovexpo.ui.ac.id/wp-content/uploads/2021/06/4_Rencana-Pengembangan-Baterai-EV-Nasional-PT-Industri-Baterai-Indonesia-dikompresi.pdf accessed 21 August 2021 19:43:01 GMT +7

⁶⁹ Deloitte. "Overview of Indonesia's EV downstream sector: a focus on nickel". 2022. <https://www2.deloitte.com/content/dam/Deloitte/id/Documents/about-deloitte/id-about-dip-edition-3-chapter-4-feb2022-en.pdf> accessed 21 August 2023 at 23:31:10 GMT+7

⁷⁰ Asian Development Bank. "Electric motorcycle charging infrastructure for Indonesia". 2022. <https://www.adb.org/sites/default/files/publication/830831/electric-motorcycle-charging-infrastructure-indonesia.pdf> accessed 21 August 2023 at 23:57:32 GMT+7

⁷¹ Kompas.com, "Luhut: Indonesia Impor Lithium dari Australia", <https://otomotif.kompas.com/read/2023/02/14/180142115/luhut-indonesia-impor-lithium-dari-australia?page=all>

⁷² Kementerian Luar Negeri. "Wamenlu RI dorong kerjasama sektor mineral kritis dan produksi baterai kendaraan listrik dengan Australia". 2023. <https://kemlu.go.id/porta/id/read/5013/berita/wamenlu-ri-dorong-kerja-sama-sektor-mineral-kritis-dan-produksi-baterai-kendaraan-listrik-dengan-australia> accessed 21:40:12 GMT+7

South Korea has signed an agreement with Indonesia for the development of charging stations based on photovoltaic (PV) technologies.⁷³ Indonesia is also working with ASEAN country members, namely Malaysia, Singapore, the Philippines, and Thailand, to develop the regional trade supply chain of the electric vehicle ecosystem in the Southeast Asian region.^{74,75,76} Figure 2.28 shows Indonesia's roadmap for battery-powered EV industries.

Component & charger	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Battery											
Battery Pack Assembly		Battery Pack Assembly									
Battery Cells Production		LIB and NIMH Cylinder Type Cell					LIB Prismatic and Pouch Type				
Battery Management System		BMS (Assembly)		Passive BMS > 90% BMS Efficiency & Integration System Can Bus			Passive BMS > 90% BMS Efficiency & Integration System Can Bus/OBD 2				
Battery Material		HPAL Smelter (MHP)									
		Nickel Sulfate & Cobalt Sulfate					Cathode and Anode Material				
End-of-Life (EOL) Recycling		Recycling of Secondary Battery (NIMH & LIB)									
Electric Motor			Non-permanent Magnet Base Efficiency 85%								> 94% Efficiency Motor
			Permanent Magnet Base Efficiency 85%								
Converter/ Inverter			> 95% Inverter Efficiency (Ultra Low Ron SiC, Low Parasitic Impedance, High Power Density)					> 95% Inverter Efficiency (High Power Density)			
Charging System		AC Level I and Level II Charger & DC Fast Charger					Ultra Fast Charger				
Minimum target of domestic components for vehicles with four wheels or more		Minimum 35%		Minimum 40%			Minimum 60%				Minimum 80%
Public passenger vehicle	Import CBU	CKD	IKD			Part by Part					
Bus and truck	CKD		IKD			Part by Part					
Private passenger vehicle	Import CBU	CKD	IKD			Part by Part					
Minimum target of domestic components for vehicles with two or three wheels		Minimum 40%			Minimum 60%		Minimum 80%				
Motorcycle	Import CBU	CKD	Part by Part								

Figure 2.27. The roadmap of battery-powered EV industries of Indonesia.

Source: Ministry of Industry 2021 in Deloitte, 2022⁷⁷

The EV battery production and assembly facilities targets are intended to supply the domestic and global demands for EV production, which include electric cars, electric motorbikes, and energy storage. Indonesia has targets to be the second largest supplier of imported electric

⁷³ Kementerian Energi dan Sumber Daya Mineral. "Indonesia-Korea Teken Kerjasama Instalasi Sistem Pengisian Kendaraan Listrik Berbasis Surya". <https://ebtke.esdm.go.id/post/2022/11/03/3319/indonesia.korea.teken.kerjasama.instalasi.sistem.pengisian.kendaraan.listrik.berbasis.surya> accessed 21 August 2023 at 21:37:18 GMT+7

⁷⁴ Putra, C. "Indonesia Bangun Kemitraan dengan Negara ASEAN Dukung Industri Baterai Kendaraan Listrik". 2023. <https://www.kompas.id/baca/nusantara/2023/05/09/indonesia-bangun-kemitraan-dengan-negara-asean-dukung-industri-baterai-kendaraan-listrik> accessed 21 August 2023 at 21:34:15 GMT+7

⁷⁵ Tempo. "Indonesia dan 4 negara jalin kontrak pengembangan baterai kendaraan listrik". 2023. <https://otomotif.tempo.co/read/1723881/indonesia-dan-4-negara-jalin-kontrak-pengembangan-baterai-kendaraan-listrik> accessed 21 August 2023 at 21:38:49 GMT+7

⁷⁶ ASEAN. "ASEAN Leaders Declaration on Developing regional electric vehicle ecosystem". 2023. <https://asean2023.id/storage/news/ASEAN%20Leaders%20Declaration%20on%20Developing%20Regional%20EV%20Ecosystem.pdf> accessed 21 August 2023 21:42:25 GMT+7

⁷⁷ Deloitte. "Overview of Indonesia's EV downstream sector: a focus on nickel". 2022. <https://www2.deloitte.com/content/dam/Deloitte/id/Documents/about-deloitte/id-about-dip-edition-3-chapter-4-feb2022-en.pdf> accessed 21 August 2023 at 23:31:10 GMT+7

vehicles in the Southeast Asian region. The best case scenario has the targets of 300,000-600,000 million sales of electric cars and 1.8-2.7 million sales of electric motorbikes.⁷⁸

Battery EV Production in Indonesia

28. There are multiple types of battery for energy storage. Specifically for vehicles, energy use and storage can be classified as internal combustion engine (ICE), plug-in hybrid electric vehicles (PHEV or hereafter “hybrid EV”), or battery electric vehicles (BEV or hereafter “battery EV”). PHEV and BEV require batteries as energy storage, while ICE is the current vehicle using fossil-based fuels as the only energy source.
29. Currently, EV vehicles either hybrid EVs or battery EVs use primarily lithium-ion, lead-acid batteries, and nickel-based batteries for the main energy storage or the supporting features.^{79,80} There are several sub-types of lead-acid battery – namely sealed lead-acid (SLA), valve-regulated lead-acid (VRLA), and absorbent glass mat (AGM), and also for lithium-ion batteries, such as lithium cobalt oxide (LiCoO₂), lithium cobalt oxide (LiMn₂O₄), lithium-nickel-manganese-cobalt oxide (NMC), lithium iron phosphate (LiFePO₄), and lithium titanate (Li₄Ti₅O₁₂) (see the projection in Figure 2.29). Nickel-based batteries include nickel-cadmium (NiCd) and nickel-metal hydride battery (NiMH). The main type of battery used in electric vehicles are lithium-ion batteries. However, there is more research and development for more efficiency towards the future of battery technology.^{81,82} Table 2.5 describes the types of lead-acid and lithium-ion batteries that are manufactured and utilized globally.
30. The actual use of each mineral is different based on the type of battery as well as batteries used in different brands of electric vehicle. Battery technology requires anodes, cathodes, and electrolytes for energy storage. The minerals are used for each of these components of the battery. In nickel-based and lithium-ion batteries, for instance, nickel is used for the cathode part, while lithium is used as the electrolytes.
31. There are also opportunities in developing batteries that are using less minerals. For instance, lithium-manganese-oxide (LMO) batteries that are not using cobalt. However, the current

⁷⁸ Tjahajana, A. “Rencana Pengembangan Industri Baterai EV Nasional - BUMN”. 2021. [Presentation] https://igovexpo.ui.ac.id/wp-content/uploads/2021/06/4_Rencana-Pengembangan-Baterai-EV-Nasional-PT-Industri-Baterai-Indonesia-dikompresi.pdf accessed 21 August 2021 19:43:01 GMT +7

⁷⁹ Sterjova, M.; Minovski, D.; Sarac, V. “Battery energy storage systems and technologies: a review”. 2021. Conference Paper: First International Conference ETIMA. North Macedonia. https://www.researchgate.net/publication/359245690_BATTERY_ENERGY_STORAGE_SYSTEMS_AND_TECHNOLOGIES_A_REVIEW

⁸⁰ Muslimin, S. et al. “Comparison of batteries used in electrical vehicles”. 2021. Conf: 5th First T1 T2 2021 International Conference: Atlantis Highlights in Engineering Vol. 9. <https://www.atlantispress.com/article/125970344.pdf> accessed 21 August 2023 at 20:15:04 GMT+7

⁸¹ Hill, R.N.; Raugei, M.; Pons, A.; Vasileiadis, N.; Ong, H.; Casuillo, L. “Environmental challenges through the life cycle of battery electric vehicles”. 2023. [https://www.europarl.europa.eu/RegData/etudes/STUD/2023/733112/IPOL_STU\(2023\)733112_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2023/733112/IPOL_STU(2023)733112_EN.pdf) accessed 21 August 2023 20:56:02 GMT+7

⁸² C Iclodean et al. “Comparison of different battery types for electric vehicles”. 2017 IOP Conf. Ser.: Mater. Sci. Eng. 252 (2017) 012058. DOI: 10.1088/1757-899X/252/1/012058

challenge in applying such a type of battery is the poorer performance, hence the current use mostly in electric bikes. Lithium-iron-phosphate (LFP) batteries also do not require either nickel or cobalt. LFP batteries are only used in several types of electric vehicles, however this type of battery can be an alternative for future development.⁸³

32. For the raw material for EV battery production, electric vehicle battery companies are lacking supplies of lithium hydroxide and graphite in Indonesia. Mining Industry Indonesia (MIND ID) estimated that 20% of lithium, graphite, manganese, cobalt are imported from other countries, which are 70,000 tons of lithium hydroxide, 44,000 tons of graphite, and 12,000 tons of cobalt annually.⁸⁴ Figure 2.30. Differences in mineral use in different types of EV batteries, including the typical amount of nickel and other minerals used in electric cars.
33. So far Indonesia has succeeded in attracting two EV car manufacturers, Hyundai and Wuling. It is interesting to note that the Wuling Air EV, which represented 75% of electric car sales in Indonesia last year, uses iron-based batteries known as Lithium Iron Phosphate or Lithium Ferro Phosphate (LFP) which are more affordable and do not contain nickel. The same trend is likely to be found in the two-wheeler segment, where lower LFP prices provide an advantage in price-sensitive markets such as Indonesia. In the first quarter of 2022, almost half of the new cars Tesla produces use LFP batteries, especially those sold in China.⁸⁵ Table 2.10. shows various batteries used in 4Ws and 2Ws sold in Indonesia.

Table 2.10. 4Ws and 2Ws sold in Indonesia with limited incentives

4-Wheelers			
Vehicle	Battery	Battery type	Nickel
Hyundai Ioniq 5	Not specified	Likely nickel-based	Yes
Wuling Air EV	LFP	LFP	No
4-Wheelers			
Vehicle	Battery	Battery type	Nickel
Gesits G1	72V 20Ah	Li-NCM	Yes
United T1800	60V 28Ah	Li-ion	No
United Tx3000	60V 28Ah	Li-ion	No

⁸³ Hill, R.N.; Raugei, M.; Pons, A.; Vasileiadis, N.; Ong, H.; Casuillo, L. (2023). "Environmental challenges through the life cycle of battery electric vehicles". 2023. [https://www.europarl.europa.eu/RegData/etudes/STUD/2023/733112/IPOL_STU\(2023\)733112_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2023/733112/IPOL_STU(2023)733112_EN.pdf) accessed 21 August 2023 20:56:02 GMT+7

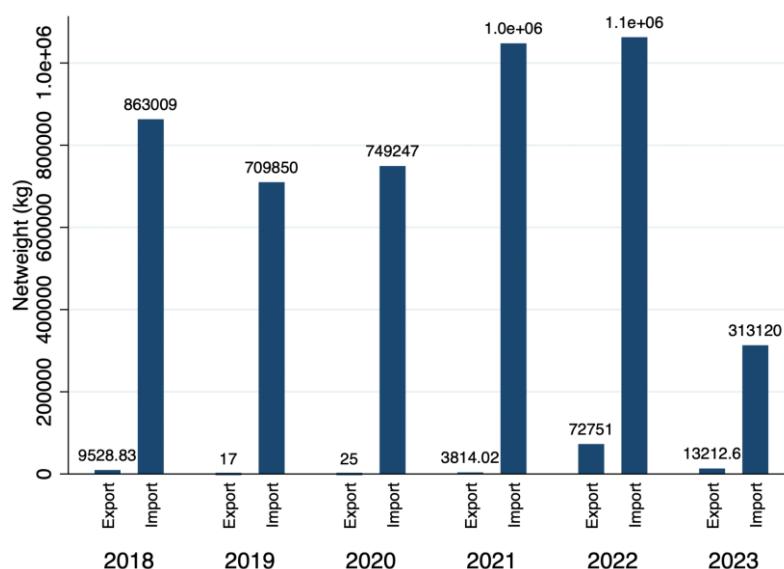
⁸⁴ Katadata, "Lithium Masih Impor, MIND ID Ingin Akuisisi Tambang di Luar Negeri", <https://katadata.co.id/happyfajrian/berita/63282906777cc/lithium-masih-impor-mind-id-ingin-akuisisi-tambang-di-luar-negeri>

⁸⁵ Putra, Adhiguna. (2023). Nikel kebanggaan Indonesia belum banyak tampak di kendaraan listriknya. IEEFA Commentary Indonesia EV incentives and nickel development. Institute for Energy Economics and Financial Analysis (IEEFA). Singapore. https://ieefa.org/sites/default/files/2023-03/IEEFA%20Commentary_Indonesia%20EV%20incentives%20and%20nickel%20development_R01_FINAL_Indonesian_PA.pdf

United Tx1800	60V 28Ah	Li-ion	No
Smoot Elektrik Tempur	64V 21.5Ah	LFP	No
Smoot Elektrik Zuzu	64V 21.5Ah	Li-ion	No
Volta 401	60V 23Ah LiFePO4	LFP	No
Selis E-MAX	60V 25Ah LiFePO4	LFP	No
Selis Agats	72V 20Ah Sealed Lead Acid, Li-on option	Lead Acid	No
Viar New Q1	60V 23Ah	Li-ion	No
Rakata X5	60V 20Ah	Li-ion	No
Rakata S9	60V 20Ah Lead Acid, Li-on option	Lead Acid/Li-ion	No
Polytron PEV30M1 (Fox-R)	72V 52Ah	LFP	No

Source: IEEFA analysis, company publication, media coverage e-commerce platform⁸⁶

34. Exports of cobalt-related commodities are relatively low compared to import. The ore has not been a primary export commodity, even before the minimum export requirement policy. Any trend of cobalt-related commodities has also yet to be observed. In 2018, 99.2% of the exports were scraps and waste of cobalt matte. In 2021, 80% of the exports were cobalt matte at 3 tons (HS81059000) with the remaining 20% were sodium and cobalt acetate at 0.75 tons (HS29152910)



⁸⁶ Putra, Adhiguna. (2023). Nikel kebanggaan Indonesia belum banyak tampak di kendaraan listriknya. IEEFA Commentary Indonesia EV incentives and nickel development. Institute for Energy Economics and Financial Analysis (IEEFA). Singapore. https://ieefa.org/sites/default/files/2023-03/IEEFA%20Commentary%20Indonesia%20EV%20incentives%20and%20nickel%20development_R01_FINAL_Indonesian_PA.pdf

Note: HS codes include 2822000, 28273910, 29152910, 81053000, 81059000
(description details are available in Annex 04.)

Figure 2.35. Export and imports of cobalt-related commodities from 2018 to June 2023
Source: Indonesia Statistics (2023)

35. Exports of lithium-ion batteries had not been present before 2022 (see Figure 2.19), however the export/import occurs for the intermediate products of lithium (see Figure 2.20 in section 2.3).

Box 2.5. Bauxite and copper: another critical minerals with export prohibition for the domestic processing requirement policy of Indonesia

Bauxite is one of the enlisted minerals in the minimum processing requirements for export policy, which later elaborated through the Circulating Letter No. T-167/MB.04/MEM.S/2022 on June 6, 2022. The letter further described an implementation date of the policy on 10 June 2023. Regarding production, Indonesia processed 13.88 million tons of ore and yielded 4.3 million tons of intermediary products in 2022. The refining and/or smelting has been carried out by four operating facilities, with the expansion target to produce 14.28 million tons of intermediate bauxite products.

Table 2.14. Middle stream bauxite industries

No	Company name	Ore input (ton/year)*	Ore input (ton/year)**	Product output (ton/year)*	Product output (ton/thn)**	Construction progress (%)†
1	PT. Indonesia Chemical Alumina	1,000,000	13.88 million	300,000	4.3 million	Operating
2	PT. Well Harvest Winning Alumni Refinery	4,039,200		1,000,000		
3	PT. Well Harvest Winning Alumni Refinery (expansion)	3,564,000		1,000,000		
4	PT. Bintan Alumina Indonesia	(N/A)		(N/A)		
5	PT. Dinamika Sejahtera Mandiri	5,200,000	23.88 million	2,000,000	8.98 million	58.5%
6	PT. Persada Pratama Cemerlang	2,524,918		1,000,000		52.6%
7	PT. Sumber Bumi Marau	2,600,000		1,000,000		50.0%
8	PT. Quality Sukses Sejahtera	3,512,058		1,500,000		57.2%
9	PT. Parenggean Makmur Sejahtera	3,000,000		986,000		58.1%
10	PT. Kalbar Bumi Perkasa	4,200,000		1,500,000		37.2%
11	PT. Laman Mining	2,850,000		1,000,000		32.3%
12	PT. Borneo Alumni Indonesia	3,529,400	3.53 million	1,000,000	1 million	23.6%

* per 2020, data source: Kementerian Energi dan Sumber Daya Mineral, 2020⁸⁷

** per January 2023, data source: Kementerian Energi dan Sumber Daya Mineral, 2023

Another critical mineral also includes copper, which is utilized for many electronics including electric vehicle components. There are 11 permits of copper mining in Indonesia covering 81,28 million

⁸⁷ Kementerian Energi dan Sumber Daya Mineral. "Energy and Mineral Overview". 2020
<https://geoportal.esdm.go.id/emo/> accessed 17 July 2023 12:34 GMT+7

hectares. Some of these permits intersect with gold mining areas, due to the natural affinity of copper and gold. These mining permit are registered in the provinces of West Nusa Tenggara, East Nusa Tenggara, Moluccas Islands, Gorontalo, South Sulawesi, East Java, and North Sumatera.

For the same minimum requirement for export policy, the government also pushed for projects to increase middle stream production projects. Per 2023, Freeport's copper smelter investment reached 62.5% or USD 1.5 billion with 60% construction progress, from their total investment target of USD 2.4 billion. Despite the delayed policy target on copper concentrate export requirement, the Government of Indonesia has been continuously pushing PT. Freeport Indonesia and PT. Amman Mineral Nusa Tenggara to accelerate their construction completion.⁸⁸

Tabel 2.15. Middle stream copper industries

No	Nama Perusahaan	Komoditas	Kapasitas Input (ton/thn)	Kapasitas Output (ton/thn)	Progress Pembangunan (%)	Tahun Selesai	Tahun	Lokasi
42	PT Amman Mineral Nusa Tenggara	Tembaga	900,000	222,000	27	2023	2021	Sumbawa Barat, Nusa Tenggara Barat
43	PT Batutua Tembaga Raya	Tembaga	1,400,000	25,000	100	2014	2014	Maluku Barat Daya, Maluku
44	PT Freeport Indonesia	Tembaga	2,000,000	500,000	5	2023	2019	Gresik, Jawa Timur
45	PT Smelting	Tembaga	1,000,000	300,000	100	2010	2010	Gresik, Jawa Timur

Source: Kementerian Energi dan Sumber Daya Mineral, 2020⁸⁹

III. SKEMA PENDANAAN

Peta Aktor dan Jasa Pelayanan Keuangannya

36. Penelusuran mengenai skema pendanaan dimulai dari menelisik lembaga-lembaga Kredit-Ekspor (Export Credit Agencies/ECAs), Bank Pembangunan seperti Bank Dunia (World Bank/WB), Bank Pembangunan Asia (Asian Development Bank/ADB), dan Bank Investasi Infrastruktur Asia (Asian Infrastructure Investment Bank/AIIB), Bank Komersial, dan Bank Nasional. Termutakhir pendanaan untuk transisi energi Indonesia sebesar US\$20 miliar yang disepakati dalam forum G20 November 2022 lalu yang disebut JETP (Just Energy Transition Partnership).⁸⁸

37. ADB sedang dalam proses pemetaan pasar tahap awal dari kebutuhan klien terkait dan solusi keuangan yang sesuai untuk lintas sektor: (i) proyek energi terbarukan dan penyimpanan baterai, (ii) manufaktur baterai, (iii) penghijauan pabrik peleburan nikel dan tembaga, dan (iv) stasiun pengisian daya dan kendaraan listrik. ADB merencanakan penyaluran sebesar USD 3,5

⁸⁸ Katadata, "Jokowi Batalkan Larangan Ekspor Tembaga, Apakah Langgar UU Minerba?".

<https://katadata.co.id/yuliawati/berita/644b65279cc98/jokowi-batalkan-larangan-ekspor-tembaga-apaakah-langgar-uu-minerba>

⁸⁹ Kementerian Energi dan Sumber Daya Mineral. "Energy and Mineral Overview". 2020

<https://geoportal.esdm.go.id/emo/> accessed 17 July 2023 12:34 GMT+7

⁸⁸ <https://www.deputi7.ekon.go.id/post/peluang-dan-tantangan-implementasi-transisi-energi-di-indonesia-pasca-ktt-g20-bali#:~:text=JETP%20adalah%20kemitraan%20pendanaan%20perubahan,listrik%20berbasis%20fosil%20di%20Indonesia>. Diunduh 27 Juli 2023.

miliar hingga USD 4 miliar di tahun-tahun mendatang. Pipeline untuk proyek *RE+ Storage* sekitar 300-400MW dan *Emobility* adalah yang paling dekat dan paling maju dalam pembahasan pembiayaan pada 2023-2024. Di dalam dokumen yang ada per Oktober 2022 ini, baru terlihat skema yang akan didanai melalui tangan ADB, sementara untuk Bank Dunia (IBRD dan IFC) masih belum terlihat dengan jelas skemanya.

38. Dalam rantai pasok pertambangan untuk kendaraan listrik, berbagai bank dapat terlibat dalam penyediaan layanan keuangan dan dukungan kepada berbagai pemangku kepentingan. Pada umumnya, berikut adalah beberapa contoh jasa pendanaan yang diberikan bank yang dapat terlibat dalam berbagai tahapan rantai pasokan: **1. Project Financing Banks /Bank Pendanaan Proyek; 2. Export Financing Banks/Bank Pendanaan Ekspor; 3. Commodity Trading Banks/Bank Pendanaan Perdagangan Komoditas; 4. Infrastructure Financing Banks/ Bank Pendanaan Infrastruktur; 5. Supply Chain Financing Banks/Bank Pendanaan Rantai Pasok.**
39. Bank-bank komersial (lokal maupun internasional) memainkan peran penting dalam memberikan pendanaan proyek, memberikan pinjaman kapital (*capital loans*) yang ditujukan untuk mendukung infrastruktur dan pelayanan keuangan lainnya kepada perusahaan yang terlibat dalam pengadaan EV dari mulai hulu (pertambangan) sampai ke hilir. Berikut beberapa bank yang dikenal memberikan pelayanan keuangan dalam rantai pasok industri kendaraan listrik: **1. HSBC⁸⁹. 2. Citigroup. 3. Standard Chartered. 4. Bank of America. 5. DBS Bank.**
40. Perlu dicatat bahwa keterlibatan bank-bank dalam rantai pasok tambang untuk kendaraan listrik akan bervariasi tergantung beberapa faktor seperti lokasi proyek, besaran proyek, struktur kepemilikan, dan persyaratan keuangan. Seberapa jauh bank-bank tersebut terlibat dan jenis jasa yang ditawarkan juga akan bervariasi. Berikut beberapa investor swasta internasional yang biasa terlibat dalam investasi pertambangan:
- 1. Lembaga-lembaga Keuangan dan Pendanaan (Financial Institutions and Funds):** Seperti BlackRock Inc., Vanguard Group⁹⁰, Street GlobalAdvisor, Capital Group, Fidelity Investments
 - 2. Perusahaan Ekuitas dan Investasi Swasta (Private Equity and Investment Firms):** The Carlyle Group, Warburg Pincus LLC, Brookfield Asset Management, Apollo Global Management, KKR & Co. Inc.
 - 3. Dana Kekayaan Negara (Sovereign Wealth Funds):** China Investment Corporation (CIC), Abu Dhabi Investment Authority (ADIA), Government Pension Fund of Norway (GPF), Singapore's GIC Private Limited, Qatar Investment Authority (QIA)

⁸⁹ <https://www.kompas.id/baca/ekonomi/2023/03/08/hilirisasi-nikel-mulai-membuahkan-hasil> diakses 14 September 2023

⁹⁰ <https://fund-docs.vanguard.com/etf-annual-report.pdf>

41. Bank Nasional: Bank Mandiri, PT. Bank Pembangunan Daerah Jawa Barat dan Banten Tbk. (BJB), PT. Bank Pembangunan Daerah Sulawesi Selatan dan Sulawesi Barat (Bank Sulselbar)

42. Pendanaan Mandiri oleh Perusahaan dan Perusahaan Pertambangan

Izin pertambangan untuk Nikel di Indonesia sampai sekarang berjumlah 337 (secara rinci dapat dilihat di *Annex 02. "Operating Nickle Middle Stream Companies, Per 2021"*, berikut beberapa yang terbesar:

- PT Vale Indonesia Tbk (sebelumnya PT International Nickel Indonesia Tbk)
- PT Aneka Tambang Tbk (Antam)
- Tsingshan Holding Group
- Solway Investment Group
- PT Indonesia Asahan Aluminium (Inalum)
- PT Bumi Resources Minerals Tbk
- MIN.ID

HULU

43. Pemerintah Indonesia memberikan kemudahan fiskal yang mencakup Fasilitas Bea Impor, seperti pembebasan bea masuk atas impor mesin, atas impor barang dan bahan untuk keperluan produksi, dan pembebasan bea masuk atas impor barang dan bahan saat menggunakan mesin domestik. Kemudian diadakan kemudahan pajak sebesar 30% dari nilai investasi, pengurangan pajak penghasilan neto perusahaan selama 6 tahun, 5% setiap tahunnya. Ini berlaku untuk 166 Bidang Usaha dan 17 Bidang Usaha Tertentu di lokasi tertentu. Selanjutnya ada Tax Holiday, yaitu persentase pengurangan PPh Badan 100% dengan nilai investasi di atas Rp. 500 miliar - Rp. 5 Triliun selama 5 tahun, nilai investasi Rp. 5 Triliun - Rp. 15 Triliun selama 10 tahun, nilai investasi Rp. 15 Triliun - Rp. 30 Triliun selama 15 tahun, dan nilai investasi di atas Rp. 30 Triliun selama 20 tahun. Di daerah pertambangan diadakan, berlaku Insentif Daerah berupa pengurangan atau pembebasan pajak dan retribusi lokal, pemberian bantuan modal, menyediakan fasilitas dan infrastruktur, serta menyediakan tanah atau lokasi bantuan teknis.

Kemudahan Akses dan Infrastruktur

44. Pembangunan infrastruktur penunjang pertambangan, seperti lintas jalan darat, dan dibentuknya berbagai Kawasan Industri di berbagai tempat adalah upaya pemerintah untuk memudahkan investasi pertambangan untuk EV. Kawasan Industri pengolahan nikel yang telah terbangun ada di dua kawasan yaitu di Morowali, Sulawesi Tenggara (Indonesia Morowali Industrial Park/IMIP), dan Kawasan Industri Weda Bay/Indonesia Weda Bay Industrial Park (IWIP) di Halmahera, Maluku Utara. Investasi di kedua kawasan industri pengolahan nikel ini berasal dari asing (PMA) dan nasional (PMDN). Salah satu investor dari PMA adalah Tsingshan, produsen baja tahan karat terbesar di dunia.
45. Dalam perencanaan IMIP akan ada empat pabrik terkait baterai EV yang dibangun. Yakni; PT Huayue Nickel Cobalt yang memiliki kapasitas produksi 70.000 ton *nickel cobalt* (Ni-Co) per tahun; PT QMB New Energy Material yang berkapasitas produksi 50.000 ton *nickel sulfide & Ni-Co* per tahun; PT Fajar Metal Industry yang berkapasitas 60.000 ton *nickel sulfide* per tahun; dan PT Teluk Metal Industry berkapasitas 60.000 ton *nickel sulfide* per tahun. Saat ini sudah

ada satu pabrik yang beroperasi, yaitu milik Huayue Nickel Cobalt. Sementara tiga pabrik yang lain tengah dalam tahap penyelesaian.⁹¹ Di kawasan IMIP juga akan dibangun pabrik daur ulang baterai EV.

46. Tambahan lagi, telah dibangun juga Kawasan Industri di Konawe (Sulawesi Tenggara) dengan investasi Rp. 67.5 triliun dan Kawasan Industri Bantaeng (Sulawesi Selatan) dengan investasi Rp. 45.5 triliun yang di dalamnya sudah tersedia Bandara, Pelabuhan Jetty, dan lintas jalan darat.

47. Skema Pendanaan untuk 5 Perusahaan Tambang Nikel Terbesar. Berikut adalah Lima perusahaan tambang Nikel terbesar yaitu:⁹²

1. PT. Vale Indonesia: 118.017 ha

Tambang Sorowako - Sulawesi Selatan yang dimiliki oleh PT. Vale (Brasil). Pemegang saham terbesar adalah Vale Canada (43,79%), MIND.ID/ PT. Inalum (20%), Sumitomo Metal Mining (15,03%), dan publik (21,18%).⁹³ Kemudian PT. Vale Indonesia ekspansi ke Pomalaa⁹⁴. Mereka juga menargetkan Morowali sebagai lokasi strategis lainnya. Dengan rencana investasi sekitar US\$ 2,6 miliar, perusahaan berambisi membangun sebuah smelter di sana. PT Vale memiliki visi jangka panjang yang rencananya akan membangun tiga pabrik pengolahan nikel untuk mendukung ekosistem mobil listrik di Indonesia dan global. Dengan investasi yang mencapai lebih dari AS\$9 miliar.

2. Tsingshan Holding Group (Tiongkok)

PT IWIP (Indonesia Weda Bay Industrial Park), Maluku Utara adalah perusahaan patungan dari tiga investor asal Tiongkok, yaitu Tsingshan Holding Group, Huayou Holding Group, dan Zhenshi Holding Group Co., Ltd. Mayoritas sahamnya dimiliki oleh Tsingshan (40%) melalui anak perusahaan Perlux Technology Co.Ltd. Sementara Zhenshi dan Huayou menguasai saham masing-masing 30%.⁹⁵ Sedangkan pemegang saham untuk PT. Weda Bay Nickel (WBN) 90% dimiliki oleh Strand Mineralindo PTE Ltd (Singapura), dan 10 % dimiliki oleh PT. Aneka Tambang.⁹⁶ Tsingshan juga bermitra dengan Sulawesi Cahaya Mineral – yang memiliki IUP seluas 21.000 hektar– untuk mengembangkan kawasan industri yang berfokus pada nikel dan bahan baterai, dikenal sebagai Indonesia Konawe Industrial Park (IKIP)⁹⁷.

⁹¹ <https://jelajahekonomi.kontan.co.id/pariwisata/news/nikel-indonesia-morowali-industrial-park-imip-berubahnya-wajah-ekonomi-bahodopi>. Diunduh 27 Juli 2023

⁹² <https://pintu.co.id/blog/tambang-nikel-terbesar-di-indonesia#tambang-sorowako>. Diunduh 16 Agustus 2023

⁹³ <https://www.vale.com/in/indonesia/informasi-pemegang-saham>. Diunduh 16 Agustus 2023

⁹⁴ Vale Indonesia, 2022. Laporan Tahunan 2022 : <https://www.vale.com/documents/d/guest/pt-vale-indonesia-tbk-executive-summary-report-2022>

⁹⁵ <https://indoprogress.com/2023/01/oligarki-lingkaran-jokowi-di-pertambangan-halmahera-tengah/#:~:text=Sekilas%20tentang%20PT%20IWIP&text=Mengutip%20Mongabay%2C%20mayoritas%20sahamnya%20dimiliki,saham%20masing%20masing%2030%25>. Diunduh 16 Agustus 2023

⁹⁶ <https://modi.esdm.go.id/portal/detailPerusahaan/8025>. Diunduh 16 Agustus 2023

⁹⁷ [Merdeka Copper Gold, 2023. Significant Resource Upgrade to 6.4 Million Ounces of Gold : https://merdekcoppergold.com/wp-content/uploads/2023/02/Pani-February-2023-Mineral-Resource-Estimate.pdf](https://merdekcoppergold.com/wp-content/uploads/2023/02/Pani-February-2023-Mineral-Resource-Estimate.pdf)

3. Solway Investment Group (Swiss)

Proyek Asera - Sulawesi Tenggara dan Tambang Bahoomahi - Sulawesi Tengah dimiliki oleh Solway Investment Group (Swiss). Solway Investment Group adalah perusahaan investasi global yang berbasis di Swiss. Perusahaan yang fokus pada bisnis pertambangan dan logam ini memiliki sejumlah pabrik maupun tambang logam di berbagai negara, termasuk Indonesia.

Emiten tambang batu bara dan nikel PT Harum Energy Tbk (HRUM) melalui anak perusahaan PT Tanito Harum Nickel telah mengakuisisi 24,5% saham PT Infei Metal Industry (IMI). Nilai transaksi ini mencapai US\$68,6 juta atau setara Rp960,4 miliar pada 19 Februari 2021. PT. Tanito Harum Nickel juga mengakuisisi 51% saham PT. Position milik Aquila Nickel Pte Ltd, anak perusahaan Solway Investment Group, jumlah transaksi ini setara US\$80,32 juta atau sekitar Rp. 1,12 triliun.⁹⁸

4. PT. Aneka Tambang (Antam) Tbk

PT Antam mengoperasikan tiga tambang dan pabrik pengolahan feronikel (feni) di Pomalaa. PT Antam telah memulai penambangan feronikel sejak 5 Juli 1968. Kapasitas produksi nikel di tambang ini mencapai 6000 Tni/A (Ton Nikel per tahun). Hasil produksi baik berupa ore (tanah mengandung nikel) maupun nikel itu sendiri diekspor ke Jepang, China, dan Eropa.⁹⁹ Namun sejak ada larangan ekspor nikel mentah, maka hasil tambang nikel ini diolah melalui Smelter.

Dalam industri nikel, ANTAM memiliki beberapa lokasi pertambangan strategis yang tersebar di berbagai wilayah Indonesia. Di Tanjung Buli, Halmahera Timur, Maluku Utara, ANTAM mengoperasikan salah satu area pertambangan nikel terbesarnya. Sementara di Pomalaa, Sulawesi Tenggara, perusahaan ini tidak hanya melakukan kegiatan pertambangan, tetapi juga memiliki fasilitas pengolahan dan pemurnian nikel. Selain itu, Pulau Gag di Papua Barat pernah menjadi lokasi pertambangan nikel ANTAM, meskipun kegiatan di sana sempat dihentikan karena alasan lingkungan dan sosial.

5. Wana Kencana Mineral - 24.700 ha

Perusahaan ini memiliki sejumlah pemegang saham, diantaranya Transwitama Mitra Aviation dengan persentase kepemilikan sebesar 2.1%, Multi Agro Pangan Lestari sebesar 1.15%, Marina Ancol Green Hotel sebesar 6.75%, Global Putra Utama sebesar 25%, Sejahtera Ajya Prima sebesar 25%, dan Baja Selatan Lintas Nusantara dengan persentase terbesar yaitu 40%. Dalam bidang perizinan, perusahaan ini memiliki IUP dengan nomor 299/KPTS/MU/2016 untuk kegiatan Operasi Produksi nikel di area seluas 24.700,00 ha yang berlokasi di Kab. Halmahera Timur, dengan masa berlaku dari tanggal 9 Mei 2016 hingga 9 Mei 2036.

ANTARA

⁹⁸ <https://www.trenasia.com/harum-energy-akuisisi-smelter-nikel-infei-metal-nyaris-rp1-triliun>. Diunduh 16 Agustus 2023

⁹⁹ <https://www.djkn.kemenkeu.go.id/berita/baca/1185/Pomalaa-Pusat-Pengolahan-Nikel-Sulawesi-Tenggara.html>. Diunduh 17 Agustus 2023

48. Skema Pendanaan untuk Smelter

1. Tsingshan merupakan pemilik Indonesia Morowali Industrial Park (IMIP) melalui Shanghai Decent Investment (Group) Co Ltd yang menguasai 49,69%. Di kawasan tersebut anak usahanya memproduksi NPI yang selanjutnya dioper ke perusahaan dalam kawasan industri yang sama untuk memproduksi baja nirkarat (*stainless steel*).¹⁰⁰ Di tahun 2018, PT. IWIP bekerja sama dengan PT. Aneka Tambang (Antam) Tbk mengembangkan deposit bijih nikel dan smelter sehingga PT IWIP menjadi kawasan industri terpadu pertama di dunia yang mengolah sumber daya mineral dari mulut tambang hingga produk akhir berupa baterai kendaraan listrik dan besi baja. PT IWIP juga memfasilitasi investor untuk membangun fasilitas pengolahan industri hilir dengan beroperasinya dua anak perusahaan Tsingshan di kawasan itu, yakni Weda Bay Nickel Projects (tambang) dan Weda Bay Nikel (smelter). Juga ada smelter yang dikelola oleh PT Yashi Indonesia Investment yang dimiliki oleh Tsingshan dan Zhenshi. Sumber pendanaan PT. IWIP adalah melalui dana perusahaan dan publik melalui pembagian saham.

2. GPT. Aquila Cobalt Nickel (ACN), Solway Group - Swiss

Dalam kawasan PT. IWIP per Oktober 2020 telah beroperasi juga smelter yang dikelola oleh PT. Aquila Cobalt Nickel (ACN) anak perusahaan Solway Investment Group yang berbasis di Swiss. Mendukung rencana pemerintah Indonesia untuk menjadikan Indonesia sebagai pusat manufaktur kendaraan listrik global, Solway Group sedang mengembangkan fasilitas peleburan nikel di Morowali, Sulawesi Tengah. Tiga deposit nikel di sekitar pulau Sulawesi akan mendukung proyek Aquila: Asera, Bahomoahi, dan Sorowalo, dengan perkiraan sumber daya bijih nikel saprolit 50 juta watt dan bijih nikel limonit 40 juta watt. Pabrik peleburan Morowali akan memiliki kapasitas untuk memproses hingga 5 juta watt bijih saprolit dan nikel-limonit dan menghasilkan hingga 50,000 metrik ton tiga Proyek Aquila yang akan dilaksanakan dalam beberapa fase (produksi awal akan dimulai pada 2023-2024).¹⁰¹ Sumber pendanaan ACN berasal dari perusahaan induknya, yaitu Solway Group.

3. Smelter di Pomaala- Sulawesi Tenggara¹⁰²

Pembangunan smelter nikel di Blok Pomalaa, Kabupaten Kolaka, Sulawesi Tenggara pada Kawasan industri nikel Blok Pomalaa ini merupakan kerja sama PT Vale Indonesia Tbk dengan perusahaan China Zhejiang Huayou Cobalt Company. Setelah beroperasi, pabriknya diperkirakan bisa menghasilkan 120 ribu ton nikel per tahun. Diperkirakan sumber dana pembangunan smelter berasal dari PT. Vale Indonesia dan China Zhejiang Huayou Cobalt Company.

¹⁰⁰ <https://www.cnbcindonesia.com/market/20220309104209-17-321240/nikel-terbang-pemilik-smelter-ri-asal-china-rugi-rp-115-t#:~:text=Pendiri%20Tsingshan%2C%20Xiang%20Guangda%2C%20mengatakan,dan%20apa%20yang%20sedang%20dinegosiasikan>. Diunduh 17 Agustus 2023.

¹⁰¹ <https://kabartotabuan.com/proyek-smelter-nikel-morowali-solway-investment-group-bekerja-sama-dengan-perusahaan-milik-negara-indonesia/>. Diunduh 17 Agustus 2023

¹⁰² <https://www.cnnindonesia.com/ekonomi/20221128075140-85-879563/smelter-nikel-dengan-produksi-terbesar-dunia-dibangun-di-pomalaa>. Diunduh 18 Agustus 2023

4. Antam telah mendirikan anak usaha bernama PT Sumber Daya Arindo (SDA), yang memiliki tambang nikel. Perusahaan inilah yang akan dikerjasamakan dengan Ningbo Contemporary Brunp Lygend (CBL), anak usaha CATL, dalam proyek pengembangan ekosistem baterai EV. Merujuk laporan riset Daiwa, CATL menugaskan anak usahanya CBL untuk menggarap proyek nikel di Indonesia bersama Antam. Lygend, produsen bahan baku baterai EV Tiongkok, tercatat memegang 30% saham CBL. Ada tiga proyek yang dikerjakan Antam bersama CBL. Pertama, pengembangan tambang nikel, *smelter* feronikel, dan proyek *high pressure leach acid* (HPAL) untuk menghasilkan *mixed hydroxide precipitate* (MHP), dengan investasi masing-masing US\$ 226 juta, US\$ 1,8 miliar, dan US\$ 1,3 miliar. Laporan itu menyebutkan, di proyek pengembangan nikel, Antam menjadi pemegang saham mayoritas dengan kepemilikan 49%, lalu di feronikel dan HPAL, CBL masing-masing memegang 60% dan 70% saham. Antam dan CBL akan mengucurkan investasi sesuai dengan kepemilikan saham.¹⁰³

HILIR

49. Di bagian hilir tercatat beberapa perusahaan multinasional tertarik untuk melakukan investasi baterai untuk kendaraan, sebagai berikut:

1. Indonesia Battery Corporation (IBC) adalah perusahaan BUMN yang bergerak di ekosistem *Battery Electric Vehicle* (BEV) dan *Electric Vehicle* (EV). Dengan komposisi saham 25% PT. Antam, 25% MIND.ID, 25% Pertamina, dan 25% PLN.¹⁰⁴
2. LG Energy Solution Ltd (LGES), Korea Selatan
3. Britishvolt, Inggris
Britishvolt adalah perusahaan manufaktur pembuat baterai lithium untuk kendaraan berbasis listrik yang berasal dari Inggris. Nilai kesepakatan investasi mencapai 160 juta pounds atau setara Rp 3,01 triliun dengan kurs (Rp 18.870 per poundsterling)
4. Contemporary Amperex Technology Co. (CATL)
Contemporary Amperex Technology Co. (CATL) lewat konsorsiumnya di Indonesia, PT Ningbo Contemporary Brunp Lygend Co, Ltd. (CBL) berkomitmen melakukan investasi senilai US\$6 miliar atau setara dengan Rp92,48 triliun (asumsi kurs Rp15.349 per US\$)

Total investasi CBL di proyek bersama Antam dan IBC mencapai US\$ 5,9 miliar.¹⁰⁵

5. Foxconn Technology Group
Foxconn Technology Group merupakan nama dagang dari Hon Hai Precision Industry yang berbasis di Taiwan. Adapun kerjasama Foxconn untuk membangun ekosistem kendaraan listrik di Indonesia memiliki nilai investasi sebesar US\$ 8 miliar.¹⁰⁶

¹⁰³ Antam Disebut Akan Tukar Guling Saham dengan CATL <https://investor.id/market/336977/antam-disebut-akan-tukar-guling-saham-dengan-catl> diakses 19 augustus 2023 14.13 WIB

¹⁰⁴ <https://www.indonesiabatterycorp.com/id/about-us/who-behind>. Diunduh 18 Agustus 2023

¹⁰⁵ op. cit note 94 Antam Disebut Akan Tukar Guling Saham dengan CATL <https://investor.id/market/336977/antam-disebut-akan-tukar-guling-saham-dengan-catl> diakses 19 augustus 2023 14.13 WIB

¹⁰⁶ <https://www.cnbcindonesia.com/market/20230202074618-17-410260/foxconn-bangun-fasilitas-mobil-listrik-di-ri-kuartal-i-2023>. Diakses 19 Agustus 2023.



TEMUAN

1. Kami melakukan tinjauan atas 73 Peraturan perundang-undangan yang berhubungan dengan pertambangan mineral EV, 26 di tingkat UU, 24 di tingkat PP, dan 23 Di tingkat Kepmen. Dalam konteks peraturan mineral kritis di level *upstream* di Indonesia, terdapat ketiadaan peraturan yang secara spesifik mengatur tentang mineral kritis seperti nikel, kobalt, lithium, copper, dan mangan. Ketiadaan regulasi ini dapat mengakibatkan penambangan dan pengolahan mineral yang tidak optimal, perlindungan lingkungan yang minim, serta ketidakadilan bagi masyarakat yang terkena dampak.
2. Sampai sekarang telah ada 29 Ijin pertambangan (IUP) dan kelak akan ada 47 IUP yang kewenangannya tumpang tindih antara pemerintah pusat dan pemerintah daerah, maupun antar kementerian, terutama kementerian ESDM dan kementerian Industri dan Perdagangan. Kondisi ini berpotensi lemahnya pengawasan akan pelaksanaan perizinan yang sudah dikeluarkan.
3. Kebanyakan sumber pendanaan untuk mineral EV berasal dari bank komersial, penguasaan saham, maupun pendanaan mandiri yang tidak/belum memiliki kebijakan *safeguard* dalam proses pendanaannya. Dari menelusuri rantai pasok hulu ke hilir, terlihat terjadi pengaburan pertanggungjawaban publik atas aktivitas entitas yang terkait dalam rantai pasok tambang EV, terutama untuk BUMN. BUMN yang memproduksi bahan tambang untuk EV bergabung dalam BUMN Holding dengan nama MIND.ID, beranggotakan PT. Antam, Bukit Asam Tbk, PT. Freeport Indonesia, PT. Inalum dan PT. Timah Tbk. Secara sendiri-sendiri, masing-masing anggota MIND.ID memiliki saham di berbagai perusahaan swasta pertambangan. Misal PT. Inalum memiliki 20% saham di Tambang Sorowako, sedangkan PT. Antam memiliki 10% saham di PT. Weda Bay. Kemudian PT. Antam, MIND.ID, Pertamina dan PLN mendirikan IBC (Indonesia Battery Corporation), masing-masing memegang saham sebesar 25%. Belum

ditemukan juga apakah pemerintah menerapkan prinsip *due diligence* (lacak rekam jejak) kepada para (calon) investor mengingat adanya praktik perusahaan induk yang kerap membuat anak (anak) perusahaan, sehingga mengaburkan jejak akuntabilitas perusahaan induk melalui anak-anak perusahaannya.

4. Dalam keseluruhan proses ini, pemerintah belum ditemukan sudah menerapkan **Prinsip Free and Prior Informed Consent (FPIC)**. Keputusan transisi energi dari energi kotor ke energi bersih, masih diartikan hanya sebagai menyediakan kendaraan listrik bersifat *top down*. Padahal dalam konteks potensi energi baru dan terbarukan yang dimiliki Indonesia terdiri dari banyak sumber energi. Seperti tercantum di dalam RUEN 2017 memuat Panas Bumi, Tenaga Air, Minihidro dan Mikrohidro, Bioenergi, Tenaga Surya, Bayu, dan Arus Gelombang Laut, yang menurut ESDM memiliki potensi sebesar 3.686 GW (Giga Watt). Ini menunjukkan proses transisi energi Indonesia memiliki banyak pilihan sumber energi dan tidak harus berfokus kepada industri baterai dan kendaraan listrik.
5. Indonesia belum memiliki *road map* atau blueprint terkait EV dan inisiatifnya karena masih tersebar di beberapa yurisdiksi. Begitupun komitmen kerjasama, keuangan, dan lainnya sudah muncul tetapi koridornya belum jelas. Peraturan terkait minerba yang dikeluarkan juga sangat banyak dan sering berubah-ubah sehingga berpotensi menjadi masalah dalam implementasi dan penegakan. Kondisi ini menunjukkan bahwa rencana pembangunan dan pengembangan terkait kendaraan listrik masih belum menyeluruh/komprehensif.

REKOMENDASI

1. Penting adanya regulasi yang efektif, jelas, akuntabel dan terintegrasi antar kementerian/lembaga (K/L). Oleh karena itu, penting bagi pemerintah untuk mengembangkan peraturan yang spesifik dan partisipatif dengan melibatkan semua pemangku kepentingan untuk memastikan pengembangan industri yang berkelanjutan, inklusif, dan ramah lingkungan di Indonesia.
2. Perlunya roadmap EV yang terintegrasi, transparan dan akuntabel, sehingga membuka peluang kontrol dari publik. Pertambangan terkait EV melibatkan beberapa kementerian/lembaga pemerintah, industri, serta pemerintah daerah. Diperlukan koordinasi antar-kementerian yang kuat dan terintegrasi, seperti pada sektor perdagangan, lingkungan hidup dan kehutanan, serta mineral dan sumber daya alam.
3. Skema pendanaan dan perjanjian yang akan dibentuk untuk pembangunan rendah karbon tidak boleh memanfaatkan kelemahan hukum di Indonesia dan di institusi peminjam. Regulasi dan perjanjian yang mengikat aktor-aktor terkait harus selaras dan akuntabel dengan peraturan internasional, termasuk yang terkait lingkungan dan HAM. Karena itu perlu ada *standar safeguard* dalam proses pendanaan mineral untuk EV untuk mencegah eksploitasi lingkungan, tenaga kerja dan pelanggaran HAM.