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Financing critical minerals for renewable energy

The Asian Development Bank announced, at its AGM in May in Tashkent, the establishment of a critical minerals-to-manufacturing partnership facility “to prepare projects, reform policies and support public investment and private financing across critical minerals value chains via a grant window and a catalytic finance window”.

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This financing vehicle was intended to support startup¹ of such operations that were approved by a July 2025 Board Direction paper.

Critical minerals sector development

The mining and manufacturing of critical minerals have been a continuing focus of detailed studies conducted by the World Bank, UN and ASEAN and other institutions over the past few years due to concerns over whether global and regional supply chains are sufficient to meet future renewable project demand.

The ADB helped anchor a joint announcement of multilateral development banks² on April 17 2026 in Washington DC, recognising the importance of donor coordination to help build diversified, resilient and

Open mining pit with heavy machinery © Vladimirnenezic | Dreamstime.com

responsible critical minerals-to-manufacturing value chains, in order to scale up support for clean, affordable, and reliable energy access, as well as the digital and economic transformation of their respective client countries.

The supply chain

Following the official startup of its critical mineral facility, the ADB published a May 2026 market assessment of critical minerals in Mongolia prefaced by a summary of detailed global trends of critical minerals needed produce renewable energy components³. The assessment pointed specifically to:

- A global surge in adoption of electric vehicles that has increased demand for vital components like lithium-ion batteries, rare earth element-based permanent magnets, electrical steel, and power electronics. Other key critical minerals required include lithium, copper, graphite and nickel.
- Quick and significant growth of large-scale energy storage systems to reach projected demand will require lithium, nickel, cobalt, manganese and graphite, which are crucial to battery performance, longevity and energy density.
- Wind power capacity is increasing, which will raise demand for zinc, copper, and rare earth elements.
- Expanded global hydrogen demand is sharply increasing demand for nickel and platinum group metals for electrolyser technologies.
- Due to its well-established status and lower production costs, crystalline silicon technology in the photovoltaic market will enjoy continued dominance. Key critical minerals include copper and tellurium.
- Silicon-based power electronics will expand, with a growth in silicon carbide and gallium nitride technologies.
- Electricity network investment for energy transition through electrification will accelerate, where copper is a key mineral. Indeed, copper is an essential element for almost all electricity-related technologies.⁴

Indonesia

Indonesia, the world's largest nickel producer, plays a pivotal role in the global battery metals market. The country has achieved recent success in *hilirisasi* (downstream industrialisation) policy via well-publicised raw ore export bans and encouragement of foreign direct investment in metals processing.

Large scale Indonesia-based integrated industrial megaprojects can now be found not only in nickel but also in copper and aluminium.

Key takeaways on the data

- *The power of mega hubs* – Single sites like Indonesia Morowali Industrial Park in Central Sulawesi process an enormous share of total domestic output – historically capturing roughly 50% of the entire country's nickel product flow at various points of downstream infrastructure expansion.

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TABLE 1 - MAJOR INDONESIAN NICKEL PROCESSING HUBS AND OPERATORS

Producer/Industrial Park Hub	Primary Location(s)	Main Corporate Operators / Investors	Estimated Annual Volume / Production Capacity	Primary Product Types
PT Indonesia Morowali Industrial Park (IMIP)	Morowali, Central Sulawesi	Tsingshan Holding Group (China), PT Bintangdelapan Mineral (Indonesia)	> 1,000,000+ tonnes (Mined/Processed content)	Ferronickel, Nickel Pig Iron (NPI), Stainless steel, Mixed Hydroxide Precipitate (MHP)
PT Weda Bay Nickel (IWIP Hub)	Central Halmahera, North Maluku	Tsingshan, Eramet (France), PT Aneka Tambang Tbk	> 300,000 to 400,000 tonnes	NPI, Matte, High-Pressure Acid Leach (HPAL) battery-grade nickel
PT Obsidian Stainless Steel / Virtue Dragon (VDNI Hub)	Konawe, Southeast Sulawesi	Delong Group (China), China National Machinery Industry Corp	~300,000+ tonnes	NPI, Ferronickel, Stainless steel slabs
PT Vale Indonesia Tbk (PTVI)	Sorowako (South Sulawesi), Pomalaa (Southeast Sulawesi), Bahodopi (Central Sulawesi)	MIND ID (Indonesian State Mining Holding), Vale S.A., Sumitomo Metal Mining	~70,000 – 80,000 tonnes (Matte production; expanding heavily via HPAL projects)	Nickel in Matte, MHP
PT Harita Nickel (Trimegah Bangun Persada)	Obi Island, South Halmahera, North Maluku	Harita Group (Indonesia), China Lygend Mining	~120,000+ tonnes	NPI, MHP (Pioneered Indonesia's first commercial HPAL operations)
PT Aneka Tambang Tbk (ANTM)	Kolaka (Southeast Sulawesi), East Halmahera (North Maluku)	State-owned (MIND ID)	~20,000 – 25,000 tonnes (Refined), plus multi-million tons of raw ore feed	Ferronickel, Saprolite/Limonite raw ore supply

Source: Table 1 and text generated by Google Gemini, Open AI, June 16 2026

- *Production focus* – Massive capital investments into high-pressure acid leaching facilities across places like Obi Island and Weda Bay have rapidly shifted output toward battery-grade intermediate products like mixed hydroxide precipitate to fuel the global electric vehicle supply chain.
- *Energy dynamics* – Geographically, almost all of these major clusters – with the exception of Vale's legacy Sorowako plant, which uses hydropower – rely on massive captive, coal-fired power plants to run their electric smelting furnaces.

Debt financing

Debt financing resources for large scale projects have typically been provided by Chinese state-owned banks in support of Chinese investors. Such banks when financing offshore mining/minerals projects have increasingly turned to use limited recourse loan structures in lieu of direct corporate or corporate guaranteed loans. At the same time, projects without predominantly Chinese ownership have been bringing non-Chinese banks with project finance capacity.

Some projects may continue to be financing on an explicit or implied corporate basis. However, given that the long payback periods still require long term amortization structures – whether under a long-term loan or mini-term structure⁵ subject to refinancing – they bring a high level of extensive (and expensive) due diligence and debt structuring by lenders.

Noting the well-documented early-stage lead role of DBS Bank in project finance for this sector, publicly available information from its website and in press releases gives a glimpse of the development of the international bank market in Singapore's increasing role, from 2019 to the present.

- 2019 – DBS acted financial adviser and lead financing bank of a US\$960m limited recourse project financing based in Indonesia for Phase 1 and 2 of Alumina Refinery.⁶

- 2021 – DBS was lead coordinator and mandate lead arranger for a US\$625m project financing structure for Indonesia's first HPAL smelter, PT Halmahera Persada Lygend in Murowali Industrial Park.⁷
- 2024 – Nickel Industries Limited advised that it had executed a new US\$250m term loan facility, jointly provided by tier-1 banks PT Bank Negara Indonesia, Persero Tbk and DBS Bank, established to support the remaining funding requirements for the Nickel Industries' acquisition of a 55% equity interest in the Excelsior Nickel Cobalt HPAL Project, which is under construction within the IMIP.⁸
- 2026 – DBS supported PT Vale Indonesia Tbk on South-East Asia's first syndicated sustainability linked-loan for the mining sector – a US\$750m facility together with a US\$250m greenshoe syndication overallotment option. The facility, provided by 14 international banks, ties PT Vale's cost of capital to clear targets, including reducing carbon emissions intensity and increasing renewable energy use.⁹

Acceptable risk allocation

The evolution from corporate to limited recourse project financing for mining and metals is closer to resource and production-based lending than to infrastructure project lending. As such, it requires not only complex structuring and due diligence prior to project financial close but detailed monitoring throughout construction and operations during the loan repayment period.

- *Construction cost overrun and completion risk* – Construction risks associated with staying within budget and on-time performance vary depending on the nature of the project. For mining, underground projects carry considerably higher risk than surface mining. Lending structures need to take into account the need for phasing of mining and processing construction. There may also be a

need for alternatives to single point engineering, procurement and construction contracts to cover all works which may not be considered technically or commercially viable.

- **Sales volume risk** – Lenders require some form of offtake by a capable third party and so remain focused on project companies outsourcing marketing responsibility to sponsor related marketing entities or third-party trading companies.
- **Price risk** – It is assumed that commodity prices by their very nature remain highly volatile so price risk is very important to project economics. Nevertheless, it is assumed that extensive hedging may not be viable so project companies may need to bear and manage this risk. This is done via extensive price related sensitivity analysis which in turn sets base case cashflow coverage ratios used to size the maximum debt amount.
- **Raw material volume risk** – The risk of continued supply of raw ore for processing plants from dedicated mining operations typically is addressed by structuring final loan maturity based on an estimated minimum reserve tail remaining in these mines.
- **Regulatory risk** – In terms of caps on production, ability to export, imposition of new or increased royalties or taxes and other cost impositions subsequent to financial close are viewed as a major risk to project sustainability and remain important to mitigate externally.

Power supply

Electricity costs constitute a major portion of operating costs and the national utility PLN is not

in any logistical, technical or financial position to extend long distance transmission lines from the grid to metals processing facilities, so projects must incorporate their own source generation into project costing.

While the development impact of producing critical mineral inputs into the renewable energy value chain is important, historically this has almost always come at the cost of CO² emissions increases due to primary reliance on coal-fired power generation.

While most banks, including Chinese state-owned banks, are obligated by individual internal policies to reduce or eliminate lending to coal-fired projects, this has not led to any formal prohibition on lending to critical minerals mining and/or manufacturing powered by inhouse coal-fired power stations. In the past, banks followed such coal avoidance policies by simply excluding power generation as an allowable use of loan funds.

Per the old financial adage of “funds are fungible”, this simply meant that the equity component of financing could fully fund coal generation, rather than using debt. This appears to be changing this year with a major market sustainability-based loan structure having been deployed to incentivise renewable development via interest reduction triggering upon meeting predefined renewable energy targets. The borrower is now publicising this and other sustainability initiatives.

Nickel Industries cited on its website¹⁰, two programmes it has undertaken: “ i) electrification of ENC HPAL’s fleet of trucks, with the number of electric trucks increasing from eight units in 2024

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to 37 units; and ii) its solar project in IMIP, that will supply ENC with renewable power, successfully achieved financial close on January 23 2026. The SESMO project consisting of 262MWp photovoltaic and 80MWh battery energy storage system will be the largest solar and BESS in Indonesia and the first limited-recourse project financing for a renewable energy project supporting a corporate end-user in the country. The renewable energy source will enable the ENC HPAL to produce some of the lowest carbon nickel units globally.”

As cost curve reductions progress over time, sustainability loan provisions may be broadened to reflect even more ambitious renewable energy targets, including¹¹:

- i) coal or gas-fired generation built to complement solar plus BESS solutions during times of days when actual or stored electricity is not available), and as a backstop for general outage and downtime due to maintenance.
- ii) introduction of hydrogen or ammonia co-firing with coal to significantly reduce carbon emissions while maintaining grid stability and economic viability.

ADB and DFI roles

In this context, given the large role of Indonesia among ADB borrowing member countries in critical minerals mining and manufacturing, the question is what might be the most critical and effective roles that large scale development institutions might play in the current market.

As is typical of development banks, both development impact and commercial creditworthiness elements must come into play. In its July 2025 board direction paper, the ADB lays out a series of guidelines on careful selection of projects, including: high selectivity, a phased approach; continuous engagement and clear communications with stakeholders, including civil society organisations; and strong partnerships.

The ADB paper says that in the first phase, for about two years of the ADB’s involvement in critical minerals manufacturing value chains, when processing non-sovereign financing of mining projects, the ADB will focus on working with peer MDBs and experienced financial institutions on longer-tenor debt financing associated with industrial-scale critical minerals mining projects and processing projects, leveraging and learning from their expertise.¹²

Based on relatively strong growing capacity of the commercial market to fund these projects, development banks need to focus on value additions to this market such as:

- Development institution environmental and social safeguard policies in support of high standard initial implementation with satisfactory annual monitoring review which may go beyond Equator Principles, and can provide more comfort to banks and other critical project stakeholders. The World Bank Group’s historical experience in this sector would be particularly useful in transactions and could provide a good underpinning for any plans for collaboration.
- Use of lower cost and longer-term loans to target financing cost reductions to make more ambitious

sustainable energy investment plans more affordable vis-a-vis projects using electricity systems that rely only on coal generation.

The ADB, as a new entrant to this sector, may potentially face challenges in credibly delivering policy advice to governments on mining and minerals processing at the outset of its programme, but with major participation in lending to specific projects, should develop a better understanding of existing and potential binding constraints while undertaking project due diligence.

Over time this could lead not only to provision to government counterparts of policy technical assistance to bring regulations in line with international standards, but could further lead to inclusion of regulatory reforms in energy sector sovereign loans made under policy-based and results-based financing structures.

Conclusion

The next frontier of Indonesia’s mineral strategy should not only be about building more smelters and exporting more processed products; it should be about building cleaner, smarter facilities. As can be seen from the sustainable finance structures being developed this year with tangible rewards for expansion of renewable power project components, bank lenders have a role to play in this process. Between the existing pool of international project finance banks and the new entry of development banks such as the ADB, more innovative solutions can be developed to broaden renewable power and further limit the use of coal-fired power. ■

Footnotes

- 1 - Asian Development Bank Board Direction, Critical Minerals-to-Manufacturing Value Chains for Powering Progress, 2025–2029, July 2025, para 21. It would be technically a re-start in the mining component of the sector as the Board Paper stated that “ADB has not been active in financing mining activities since 1983”
- 2 - African Development Bank Group, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank, and the World Bank Group
- 3 - Asian Development Bank, Market Assessment of Critical Minerals in Mongolia, May 2025
- 4 - Ibid, verbatim for entire section, page 2
- 5 - Loans typically have a term of 3–7 years and an amortisation period of 20–25 years
- 6 - Development Bank of Singapore website
- 7 - Development Bank of Singapore website
- 8 - Nickel Industries Limited Press Release dated 23 May 2024
- 9 - PT Vale Press release dated 23 April 2026
- 10 - Nickel Industries website as of 13 June 2026, under “Sustainability – Environmental Stewardship – Energy”
- 11 - Large scale Hydropower Projects under development in Sulawesi are not included as these constitute third party risk not only for generating station and grid connection completion but for satisfactory environment and social safeguards assessments inclusive of biodiversity reviews
- 12 - Asian Development Bank Board Direction, Critical Minerals-to-Manufacturing Value Chains for Powering Progress, 2025–2029, July 2025, para 22.