Terms of Reference
Critical Minerals Value Chain of Information Technology Industries and Forest-Land Used Management in Indonesia

A. Background

In the contemporary digital age, the mining industry is undergoing significant growth, driven by the requirements of the swiftly progressing technology sector. The development discussed here is linked to the emergence of computers, communication tools based on the internet, and the notion of Industrial Revolution 4.0. In this context, the Internet assumes a central role in all stages of production, facilitating the integration of the virtual realm with manufacturing operations.

According to the 2023 We Are Social report, the world population is 8.05 billion per July 2023. There are 5.56 billion mobile phone users or 69.1% of the world's population, and the increasing number of people using the internet is now 5.19 billion, or 64.5% of the world's population.[1] Similarly, Indonesia's total population in 2023 is 276.4 million, and the internet user in Indonesia is 212.9 million or 77% of the population. Furthermore, the number of internet users in Indonesia is estimated to be 212.9 million, which accounts for around 77% of the country's population. Indonesia presently boasts 353.8 million mobile connections, accounting for 128% of its population. It is worth highlighting that the number of mobile cellular connections in Indonesia surpasses its actual population.[2]

Amidst this digital surge, one of the mining sector's growths is driven by the escalating human demand for information technologies. Information technologies encompass a broad spectrum of components, including hardware, software, networks, and services, all employed for storing, processing, transmitting, and managing data. These technologies involve computers, smartphones, servers, and other technological apparatuses facilitating communication and data processing.

Furthermore, this growth is anchored in demand for critical minerals that are essential for building technology sectors, called "technology metals,"[3] which range from precious metals to minor metals, such as cobalt, lithium carbonate, copper, nickel,[4] and Rare Earth Elements (REEs).[5,6] These technology metals

[1] We Are Social (2023)."Social Media Use Reaches New Milestone." https://wearesocial.com/uk/blog/2023/07/social-media-use-reaches-new-milestone/
[2] Datareportal (2023). "Digital 2023: Indonesia." https://datareportal.com/reports/digital-2023-indonesia?rq=indonesia
[3] TMR (2023)." What Are Technology Metals? Which Ones Can You Find With a Metal Detector? https://www.techmetalsresearch.com/guide/what-are-technology-metals/
[4] Herrington, R. (2021). "Mining our green future." in *Nat Rev Mater* **6**, p. 456–458. https://www.nature.com/articles/s41578-021-00325-9
[5] USGS (2022) "U.S Geological Survey Releases 2022 List of Critical Minerals" https://www.usgs.gov/news/national-news-release/us-geological-survey-releases-2022-list-critical-minerals
[6] Mertzman, S. (2018). "What are rare earths, crucial elements in modern technology? 4 questions answered." https://theconversation.com/what-are-rare-earths-crucial-elements-in-modern-technology-4-questions-answered-101364.

are specifically used for consumer electronics, the automotive industry, lighting & and illumination technology, alternative power sources, renewable energy technologies, and the defense industry.[7] Indonesia, with key mining sites in locations like Tin Island, Sumatra, Kalimantan, and Sulawesi,[8] is the world's largest nickel producer, the second largest for tin, and one of the largest for copper, and Indonesia is actively expanding its downstream industries for these metals.[9] However, the detailed numbers of mining permits for related IT minerals or technology metals in Indonesia would require up-to-date research, and it may vary according to market demand, regulations, and environmental considerations.

According to the findings of Giljum (2022), between 2000 and 2019, the mining sector in Indonesia was responsible for destroying almost 2000 km^2 of forest, which may be classified as direct forest loss.[10] Moreover, based on the findings presented in the 2019 World Bank study, it is observed that a significant proportion, 44% of operational mines globally, are situated within forested regions.[11] Notably, Indonesia emerges as one of the nations characterized by a considerable presence of mining sites near key biodiversity areas (KBA).[12]

In this context, it is essential to recognize that the rapid growth of big tech industries worldwide has negatively impacted various aspects, including local communities, women and vulnerable groups, land and forest governance, and waste management.[13] These impacts raise significant concerns:

1. **Local communities**: Mining activities can displace local communities and disrupt their traditional livelihoods, and health hazard problems from exposure to mining-related pollutants can affect community well-being. [14]
2. **Women and other vulnerable groups**: Mining activities impact women and other vulnerable groups differently, often subject to systemic discrimination throughout all phases of extractive industries. They have different access and control, rights, and responsibilities. Consequently, their adaptability to the risks associated with mining operations differs.[15]

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[7] World Bank (2017). "The Growing Role of Minerals and Metals for a Low Carbon Future." p.63-75 https://documents1.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf

[8] Handoko, Aryo & Sanjaya, E. (2018). Characteristics and genesis of Rare Earth Element (REE) in western Indonesia. IOP Conference Series: Earth and Environmental Science. https://iopscience.iop.org/article/10.1088/1755-1315/118/1/012077

[9] Loh Y.W., et al. (2023). "Advancing metals and mining in Southeast Asia with digital and analytics" https://www.mckinsey.com/industries/metals-and-mining/our-insights/advancing-metals-and-mining-in-southeast-asia-with-digital-and-analytics

[10] Giljum, S. et al. (2022). "A pantropical assessment of deforestation caused by industrial mining" https://www.pnas.org/doi/10.1073/pnas.2118273119

[11] World Bank. (2019). "Forest-Smart Mining: Large-Scale Mining on Forests (LSM)." p.17 https://documents1.worldbank.org/curated/en/104271560321150518/pdf/Forest-Smart-Mining-Identifying-Factors-Associated-with-the-Impacts-of-Large-Scale-Mining-on-Forests.pdf

[12] Ibid. p.34

[13] Aznar-Sánchez, José A. Et al. (2018). Mining Waste and Its Sustainable Management: Advances in Worldwide Research.https://www.researchgate.net/publication/326113458_Mining_Waste_and_Its_Sustainable_Management_Advances_in_Worldwide_Research

[14] IRMA (2018). "IRMA Standard for Responsible Mining IRMA-STD-001" https://responsiblemining.net/wp-content/uploads/2018/07/IRMA_STANDARD_v.1.0_FINAL_2018-1.pdf

[15] Hill, C., Madden, C. & Collins, N. (2017). "A Guide to Gender Impact Assessment for the Extractive Industries." https://www.oxfam.org.au/wp-content/uploads/2017/04/2017-PA-001-Gender-impact-assessments-in-mining-report_FA_WEB.pdf

3. **Land and Forest Governance**: Mining operations lead to deforestation and habitat destruction, affecting biodiversity and ecosystem services. Moreover, poor governance and weak law enforcement can lead to land disputes and conflicting interests between local communities, mining companies, and governments.
4. **Waste Problem**: Mining generates waste materials, including tailings, which can contaminate soil and water sources. Improper waste management can result in long-lasting environmental degradation. Therefore, waste management, such as mineral recycling and reuse[16], is an environmental necessity and a response to the adverse effects imposed by the rapid growth of big tech industries.[17]

B. Scope of Service

The research should encompass the following components:

1. Executive Summary
2. A descriptive document that answers the following questions:
   a. Investigates the social, economic, environmental, and gendered impacts of technology metal mining on indigenous/local communities in Indonesia. How mining activities affect ecological conditions, especially forests and their biodiversity, traditional livelihoods, community well-being, and health due to exposure to mining-related pollutants.
   b. Give a broader perspective by analyzing Indonesia's position as a major producer of technological metals in the global supply chain. The researcher can explore technology metals market trends, including who the key players are in the supply chain, and further into the financing sector.
   c. Investigate the complex dynamics of mineral resource governance in the context of technology metals mining in Indonesia. Examine how weak law enforcement and poor governance contribute to land disputes and conflicting interests among local communities, mining companies, and government entities.
   d. Examine the waste management challenges associated with technology metal mining in Indonesia. It would examine the generation of waste materials, including tailings, and the potential for soil and water contamination.
3. Provide a gap assessment of the legal and institutional framework, including allocating licenses related to critical minerals, and use case studies to explain these gaps.
4. A description of key locations of critical minerals deposits and mines key industry actors.
5. Recommendation of strategies or action plan to:
   a. Enhance governance mechanisms to ensure fair distribution of benefits and prevent land-related conflicts related to critical minerals.

[16] UNEP (2011). "Assessing Mineral Resources in Society: Metal Stocks &Recycling Rates". https://wedocs.unep.org/handle/20.500.11822/31433

[17] Hund, K. et al. (2020). "Minerals for Climate Action - The Mineral Intensity of the Clean Energy Transition" p.80. https://pubdocs.worldbank.org/en/961711588875536384/Minerals-for-Climate-Action-The-Mineral-Intensity-of-the-Clean-Energy-Transition.pdf

b. Mitigate negative impacts and enhance the positive contributions of critical mineral mining activities to local communities, especially women groups and other vulnerable groups.
c. Evaluate waste management strategies, such as mineral recycling and reuse, to mitigate environmental degradation caused by improper waste disposal and analyze these solutions' economic and environmental feasibility.

The consultant is expected to perform the following tasks:

1. Provide an inception report with a detailed narrative and methodology outline.
2. Conduct desk research and a literature review of relevant documents.
3. Conduct online interviews and focus groups (if necessary) with key and relevant resource persons.
4. Submit all the data and materials.
5. Submit a PowerPoint file of the study that will be presented to the Tifa Foundation
6. Submit the final report (Bahasa Indonesia and English)

C. Qualification

The ideal candidate should possess the following qualifications and expertise:

1. **Education**: A minimum master's degree in public policy, natural resource governance, politics, environmental science, or related fields.
2. **Professional Experience**: At least 10 years of relevant professional experience in public policy, natural resource governance, land and forest governance, and mining. Demonstrated expertise in conducting research and analysis in these fields, with a record of producing high-quality reports and publications.
3. **Previous Work Experience**: Proven experience in writing and research related to public policy, natural resource governance, land and forest governance, and mining. Please provide examples of previous work.
4. **Interdisciplinary Approach**: An interdisciplinary perspective that can address social, economic, environmental, and gender-related aspects of the study.
5. **Knowledge of Indonesian Regulations**: A deep understanding of critical minerals, land and forest governance, and mining regulations and practices in Indonesia.
6. **Analytical Skills**: Strong analytical and problem-solving skills can synthesize complex information and provide actionable recommendations.
7. **Stakeholder Engagement**: Previous experience conducting interviews and facilitating focus group discussions (FGDs) with relevant stakeholders, including government agencies, local communities, and industry representatives.
8. **Project Management**: Proven ability to manage research projects independently, meet deadlines, and deliver high-quality results.
9. **Language Proficiency**: Excellent technical writing skills in Bahasa Indonesia and English, with the ability to produce clear and concise reports in both languages.

D. Submission Document

Consultant candidates are expected to send the following documents:

a. Letter of interest (cover letter confirming interest)
b. Curriculum Vitae (CV)
c. Sample of writing product

E. Budget

The daily rate for the consultant is **Rp 2,500,000**, and the total budget for this assignment is Rp 75,000,000 for 30 days. Tifa Foundation will cover the related costs to conduct online interviews and FGDs.

F. Timeline

The assignment will last **30** non-consecutive consulting days beginning in **October 2023**. The deadline for submitting the final report is **November 14, 2023**. The proposed timeline is as follows:

Nr	Milestone	Objective	Output	Date of Submission
1	**Inception report** submitted	To establish a work plan and deliverable expectations.	Inception report indicating methodology and proposed outline of the report	1st week of October 2023
2	**1st draft** study report produced	To ensure that the draft report is in line with the ToR	Draft study report with inputs from Tifa Foundation	3rd week of October 2023
3	**2nd draft** study report produced and presented to Tifa Foundation	To discuss the findings and recommendations of the draft study report	Draft study report with inputs from Tifa Foundation	1st week of November 2023
4	**Final report** produced	The final report adheres to the ToR and includes input from the Tifa Foundation.	Cleaned and formatted Word and PDF files submitted to Tifa Foundation	November 14, 2023

G. Payment Schedule

Consultant needs to submit invoice and timesheet.

Nr	Milestone	Date of Submission
1	2nd draft produced and submitted	1st week of November 2023
2	Final Report submitted	November 14, 2023