

The European Union's Basic Need for Nickel Ore: Opposing The Downstreaming of Indonesian Nickel Ore

Eska Dwipayana Pulungan¹

¹Program studi Ilmu Hubungan Internasional, Fakultas Ilmu Sosial dan Ilmu Politik
Universitas Islam Negeri Syarif Hidayatullah Jakarta
Jl. Ir H. Juanda No.95. Ciputat, Tangerang Selatan, Banten 15412

Penulis untuk Korespondensi/E-mail: eska.dwi@uinjkt.ac.id

Abstract

This study discusses the European Union's dependence on Indonesian nickel ore. Indonesia is one of the world's largest importers of nickel ore. Abundant nickel ore reserves have made the European Union heavily dependent on Indonesia's natural resources. As a developing country, Indonesia sees an opportunity to undertake nickel ore downstreaming to maximize profits from natural resources, thereby achieving economic and social welfare for the Indonesian people. For the European Union, however, downstreaming is perceived as a threat that could disrupt the growth of industries heavily reliant on nickel and is feared to harm the European economy. This study employs qualitative methods and utilizes secondary data collection techniques. The findings reveal that the European Union depends on nickel ore, particularly in dominating the global market in developing renewable and environmentally friendly technologies such as electric vehicles.

Keywords: Nickel Ore; Downstreaming; Indonesia; European Union

Abstrak

Penelitian ini membahas ketergantungan uni eropa terhadap bijih nikel Indonesia. Indonesia merupakan salah satu negara pengespor bijih nikel terbesar secara global. Cadangan bijih nikel yang melimpah membuat uni eropa memiliki ketergantungan yang kuat terhadap hasil bumi Indonesia. Indonesia sebagai negara berkembang, melihat ada peluang untuk melakukan hilirisasi bijih nikel, demi mencapai keuntungan maksimum atas hasil sumber daya alam, agar terwujud kesejahteraan ekonomi dan sosial bagi rakyat Indonesia. Bagi uni eropa ternyata hilirisasi merupakan ancaman yang dinilai dapat merusak pertumbuhan industri yang sangat bergantung pada nikel dan dikhawatirkan akan merusak perekonomian masyarakat Eropa. Penelitian ini menggunakan metode kualitatif dan menggunakan teknik pengumpulan data sekunder. Hasil penelitian ditemukan bahwa, uni eropa memiliki ketergantungan yang kompleks akan bijih nikel, terutama untuk menguasai pasar global dalam pengembangan teknologi terbaharukan dan ramah lingkungan seperti kendaraan listrik.

Kata kunci: Bijih Nikel; Hilirisasi; Indonesia; Uni Eropa.

INTRODUCTION

Nickel ore has rust-resistant properties, making it one of the most sought-after natural resources in the industrial sector. Nickel is soft in its pure form, commonly known as stainless steel, and when mixed with chromium, iron, and other

metals, it can be transformed into tough stainless steel or nickel (Haryati et al., 2021). Stainless steel is a derivative of nickel ore commonly found in household items such as kitchen utensils, home decorations, and ornaments. Nickel ore derivatives are also highly sought after in the automotive industry, particularly for

producing wheels, bumpers, and exhaust pipes. Nickel ore can also be processed into a green energy source, as it can be used to make environmentally friendly electric vehicle batteries instead of relying on gasoline, which is considered harmful to the environment. Its durable, corrosion-resistant, and cost-effective properties make it highly sought after by industries on a large scale, including household goods, automotive, heavy machinery, and others.

Indonesia is one of the largest global nickel ore exporters, capable of supplying as much as 20% of global demand. In line with the government's desire to realize downstreaming, Indonesia began banning the export of raw minerals on January 11, 2022. This ban is regulated in the Minister of Energy and Mineral Resources (ESDM) Regulation (Permen) No. 11 of 2019, the second amendment to the previous ESDM Ministerial Regulation No. 25 of 2018 (Ramadhana et al., 2024). In the next stage, in the revised regulation of the Minister of Energy and Mineral Resources No. 11 of 2019 or the latest revision, the government wants restrictions on the export of raw minerals, including nickel ore, which will be effective on January 1, 2020. Based on this regulation, holders of Mining Business Permits (UIP) are only allowed to export nickel ore with a content of <1.7%, and the refining process up to 70% must be carried out in domestic smelters. It can only be exported if domestic demand has been met (Holil & Tjokorda, 2024).

The downstreaming of Indonesia's natural resources, namely nickel ore, is aimed at increasing their selling value, transforming them into commodities with higher bargaining power, thereby making exports more profitable. For example, the value of nickel ore processed into ferronickel will increase tenfold, and if processed into stainless steel, the selling value will increase 19-fold. In fact, after nickel downstreaming, nickel-derived export commodities surged from USD3.40 billion in 2019 to USD12.35 billion in 2022, growing by around 263%. Also, nickel downstreaming has created new job opportunities, attracted new investors, and strengthened the national industry globally. Furthermore, Indonesia has already been able to produce electric vehicle batteries from nickel ore development. Nevertheless, downstream processing is a fundamental action

by the state in managing natural resources without foreign intervention to alter its rules according to the plaintiff's wishes. Moreover, downstream processing results positively contribute to state revenue from export and import flows, which undoubtedly benefit the Indonesian nation, making it more prosperous and maximizing gains from its natural resources (Putra, 2022).

This government policy has angered the European Union (EU), prompting it to file a complaint with the World Trade Organization (WTO) (Ramadhana et al., 2024). The complaint is simple but very forceful and seems dictatorial, demanding that Indonesia revise its regulations on the ban on nickel ore exports. The EU argues that the world is moving towards green energy and environmental industries, and the main component supporting this movement is the supply of raw nickel ore (Sudjoko, 2021). It is quite peculiar to hear the EU's demands, which directly hinder the development of the domestic industry, especially since the resources in question are Indonesia's natural resources. Globally, the EU is the largest consumer of nickel ore exports, which they typically process into stainless steel and electric vehicle batteries. Implementing the nickel ore export ban will inevitably impact the EU's industry and economy. The EU does not want to suffer losses due to a shortage of nickel ore, especially since Indonesia is the world's largest nickel ore exporter (Tarigan et al., 2023).

METHODS

Qualitative research methods were used in this study. Qualitative research methods rely on primary and secondary data. Secondary data collection techniques were necessary in this study to explore the downstreaming of minerals and coal (Minerba) by the Indonesian government and European market demand for Indonesian nickel ore. Secondary data was obtained from books, journal articles, electronic or online data from government websites, and data obtained from national and international news. For example, a book with a title, *Indonesia's Rational Choice in the Nickel Ore Export Ban Policy*, written by Santoso et al., was the initial foundation for this paper's thinking about the importance of banning nickel ore exports. Likewise, the book, *Downstreaming as*

the First Step in Changing Indonesia from a Developing Country to an Advanced Industrial Country, written by Sinaga, further strengthens the foundation that downstreaming is a step towards an independent and prosperous Indonesia.

From this collection of data, an analytical study will be compiled to solve the main problems. The problems to be solved are: why the Indonesian government is carrying out downstreaming, what types of natural resources will be downstreamed, and what the benefits of downstreaming are for the community. The EU's dependence on Indonesian minerals and coal to support the achievement of environmentally friendly energy will also be discussed (Järvinen & Mik-Meyer, 2020).

RESULTS AND DISCUSSION

Downstreaming of Indonesian Minerals and Coal

Downstreaming means reducing raw material exports to encourage domestic industry players to utilize these raw materials by processing them into materials or goods that have higher selling value or generate greater profits when exports are reduced, for example, an increase in labor demand, the entry of foreign investors, and an increase in Gross Domestic Product (GDP). To encourage downstreaming, the Indonesian government provides fiscal and non-fiscal incentives such as easy and quick business licensing, tax breaks, and infrastructure improvements in downstreaming industrial areas (Ika, 2017).

To achieve maximum benefits from downstreaming, the government has issued regulations outlined in Minerba Act No. 4 of 2009 which was later revised into Law No. 3 of 2023 to facilitate and support mineral and coal industry players in conducting downstreaming. With these regulations in place, mining companies in the country are competing to build mining processing facilities and are beginning to explore collaborations to study mining management technologies. The downstreaming outlined in Law No. 3 of 2023 on Mineral and Coal Mining aligns with Article 33, Paragraph 3 of the 1945 Constitution, which states:

The earth, water, and natural resources contained therein are controlled by the state and utilized to the greatest extent possible for the prosperity of the Indonesian people.

The government needs to amend the law to achieve prosperity and equitable and sustainable welfare for the people, so Indonesians have sovereignty over their natural resources. It should be noted that Indonesia is the world's largest nickel ore exporter, importing 37% of global nickel ore demand. It is worth noting that nickel ore derivatives, once processed into semi-finished or finished goods, have a significantly higher market value, reaching five to ten times the base price before processing, and become even more valuable when successfully processed into lithium, electric vehicle batteries, or other derivative commodities from nickel ore processing (Sinaga, 2024).

In supporting downstreaming, the government issued policies through several ministerial regulations that confirmed the technical implementation of the export ban and sanctions for violators. One important regulation governing the implementation of the export ban is Regulation of the Minister of Energy and Mineral Resources (ESDM) Number 1 of 2014. This regulation is an initial guideline for mining companies to comply with the obligation to process and refine mining products domestically before exporting them. During the transition period, the government granted flexibility for exporting specific mineral concentrates to companies committed to building processing and refining facilities or smelters (Wau et al., 2024). This regulation reflects a gradual approach to preparing the mining sector for full downstreaming obligations. Over time, the government strengthened these regulations through the Minister of Energy and Mineral Resources Regulation No. 25 of 2018. This regulation provides more detailed mechanisms for monitoring and evaluating mining companies applying for export permits. One of the main requirements is tangible progress in smelter construction, which can be achieved through a work plan approved by the government. This provision puts additional pressure on mining companies to realize mineral processing facilities domestically immediately to increase domestic industrial capacity.

Concrete steps to accelerate downstreaming are evident in the Minister of Energy and Mineral Resources Regulation No. 11 of 2019, which targets nickel as a strategic commodity. In this regulation, the government accelerated the export ban of low-grade nickel ore below 1.7% starting in January 2020, ahead of the original schedule in 2022. This policy aims to spur investment in the construction of nickel smelters in Indonesia and support the development of the electric vehicle battery industry. This acceleration is also driven by the need to protect strategic resources from excessive exploitation without providing optimal economic benefits for the country (Azis & Abrianti, 2021).

In addition to nickel, bauxite is also the focus of the export ban policy. Minister of Energy and Mineral Resources Regulation No. 7 of 2023 stipulates a total ban on the export of raw bauxite starting in June 2023. Mining companies must process bauxite into alumina or aluminum before exporting it. This measure supports the development of the domestic aluminum-based industry, which holds significant potential in the transportation, construction, and electronics sectors. In its implementation, the government has also established strict penalties for companies that violate this policy. For example, the Ministry of Energy and Mineral Resources Regulation No. 17 of 2020 stipulates that companies that fail to meet their commitments to build smelters or are involved in illegal exports may face administrative sanctions, including revoking their business licenses. This regulation demonstrates the government's seriousness in ensuring compliance with downstreaming policies (Santoso et al., 2023).

The European Union's Dependence on Indonesian Nickel

Nickel plays a vital role in the EU's stainless steel industry. Stainless steel is an important raw material for various sectors, including automotive, construction, energy, and household appliances. A stable supply of nickel and competitive prices significantly impact the competitiveness of Europe's stainless steel industry. Therefore, nickel supply whether through imports or recycling is a key element in ensuring the sustainability and development of this industry in Europe (Thommasen, 2023). Price fluctuations and dependence on major nickel-producing countries have prompted the EU to continue ensuring the sustainability of

nickel supplies through trade policies, investment in recycling technologies, and diversification of supply sources. The nickel-based stainless steel industry significantly impacts the EU economy regarding job creation, product added value, and its contribution to global trade. Price fluctuations and dependence on major nickel-producing countries have prompted the EU to continue ensuring the sustainability of nickel supplies through trade policies, investment in recycling technologies, and diversification of supply sources. The nickel-based stainless steel industry significantly impacts the EU economy regarding job creation, product added value, and its contribution to global trade (Syafira et al., 2023).

The EU, particularly Germany, Italy, and Sweden, is the world's largest stainless steel producer. The EU produces a wide range of stainless steel products, from sheets for automotive and household appliance applications to construction products and materials for the energy sector. Stainless steel is used in various strategic sectors, such as the automotive industry, construction equipment, household appliances, and the energy and manufacturing industries (European Union, 2021a). The dependence on nickel for producing stainless steel is enormous, making nickel supply a determining factor in the stability and competitiveness of the EU stainless steel industry. The EU does not have sufficient nickel resources to meet the needs of its domestic stainless steel industry. Most of the nickel supply for the stainless steel industry in Europe is imported from major nickel-producing countries such as Indonesia, the Philippines, Australia, and Russia (Saegert et al., 2024). In recent years, Indonesia's policy to restrict exports of raw nickel ore has altered the global supply dynamics and impacted nickel supply for the European industry (Nickel Institute, 2012).

As a result of Indonesia's nickel export restrictions, the EU has taken steps to ensure the sustainability of nickel supplies by investing in nickel recycling and seeking alternative sources of supply from other countries. This is crucial to reduce dependence on specific nickel-producing countries that may experience political turmoil or trade policy changes that could affect global supplies. On the other hand, the EU is also promoting the development of nickel recycling

technology, given that stainless steel production requires a stable and sustainable supply of nickel. Moreover, the stainless steel industry in the EU is a sector worth billions of euros. According to data from the Federation of European Steel (Eurofer), the EU is the world's primary market for stainless steel, and demand for stainless steel is expected to continue to rise alongside growth in the automotive, construction, and household appliance sectors. Therefore, a stable nickel supply is critical to the European economy (Putri & Abrar, 2023).

In 2019, the stainless steel industry in the EU contributed more than €10 billion to total steel production, with more than two million tons of stainless steel produced annually. Increased demand from sectors such as the automotive industry, particularly for electric vehicles that require nickel for batteries, has supported the growth of this industry. However, fluctuations in nickel prices also affect the cost of stainless steel production in Europe. Rising nickel prices can increase the production costs of stainless steel, which in turn can raise selling prices and affect the competitiveness of the European stainless steel industry in the global market. Conversely, falling nickel prices can reduce production costs, but they can also reduce profit margins for nickel producers (APEC, 2022).

Nickel Market Trends and Their Impact on the Stainless Steel Industry in the European Union

Nickel in the EU is only produced in Finland and Greece, producing 60,000 tons/year. On the other hand, the EU needs 450,000 tons/year in 2024 and is predicted to increase to 600,000 tons in 2035. With limited natural resources for nickel ore, the EU must import from Russia, Norway, Canada, Brazil, Australia, and Indonesia. In other words, the EU has a nickel dependence range of almost 90% to drive its industry. Indonesia is significant to the EU because of its capacity to meet 20% of global needs. However, since the regulation on the ban on nickel ore exports to realize downstreaming, the EU only obtained 170 tons from Indonesia in 2023, a drastic decrease from nickel ore exports in 2019, which amounted to 20,000 tons, the last year before nickel ore ban exports was implemented (European Union, 2023). If exports continue to be disrupted specifically from Indonesia, the battery and steel industries in Europe could be hit.

In the other hand, renewable energy technologies, particularly batteries for electric vehicles (EVs), are increasingly crucial in meeting energy needs in the EU. One of the primary raw materials used to manufacture electric vehicle batteries is nickel. Nickel, which has long been used in the stainless steel industry, is a key component in lithium-ion batteries in electric vehicles and other renewable energy storage technologies. Given the importance of nickel in the renewable energy transition, it is important to understand how this technology is evolving and how EU market needs can be met. First, nickel plays a vital role in producing electric vehicle batteries. Electric vehicle batteries, particularly lithium-ion (Li-ion) batteries, consist of various chemical compounds, with nickel, cobalt, and manganese key components in the battery cathode.

Nickel plays an important role due to its ability to increase energy density and maintain battery thermal stability. Electric vehicles must store high endurance power for long and durable mileage. Nickel also has a higher energy storage capacity than cobalt or manganese. This means the more nickel used in the cathode, the higher the battery's energy capacity, enabling electric vehicles to travel farther on a single charge. Using nickel can also reduce battery costs. Nickel is more affordable and abundant in nature than cobalt, making it a viable alternative to cobalt, which is more expensive and more complicated to obtain, posing challenges for Europe. Using a higher proportion of nickel in the cathode can help reduce overall battery production costs, contributing to lower electric vehicle prices.

The durability and safety of nickel use can also provide better thermal stability, which prevents overheating risks and extends battery lifespan (Innovation Newsnetwork, 2023).

European Union Market Demand for Electric Vehicle Batteries

In 2023, the EU will need around 3.15 million EV units, increasing to 3.77 million to reach an estimated 5.6 million units in 2030. As the leader carbon emission reduction and clean energy transition efforts, has committed to increasing the adoption of EVs as part of the European Green Deal. Along with the increasing demand for electric vehicles, the demand for raw materials for electric vehicle batteries,

especially nickel, is expected to continue to increase. Three factors are driving the surge in demand for nickel in the European market (European Union, 2024).

The first factor is strict environmental policies and regulations. The EU has set targets for reducing CO₂ emissions in the transportation sector, one of the most significant contributors to greenhouse gas emissions. Since implementing the European Green Deal in 2019, the EU has aimed to achieve net-zero emissions by 2050. As part of this initiative, policies and regulations supporting the transition to electric mobility, including subsidies for electric vehicles and charging infrastructure, are the main drivers of EV market growth in Europe. Under the Euro 7 regulations adopted in April 2024, fossil fuel vehicles will be subject to higher taxes and will become increasingly difficult to sell, while electric vehicles will receive greater incentives and subsidies (European Union, 2021b). The contents of Euro 7 are as follows:

“The Euro 7 regulation establishes rules for the exhaust emissions of road vehicles, but also for other types of emissions such as tyre abrasion and brake particle emissions. It also introduces requirements for battery durability. For cars and vans, the regulation keeps the existing Euro 6 exhaust emission limits but introduces stricter requirements for solid particles. For heavy-duty buses and lorries, the regulation imposes more stringent limits for various pollutants, including some that have not been regulated until now, such as nitrous oxide (N₂O). In addition, Euro 7 introduces stricter limits for particle emissions produced when braking, with specific limits for electric vehicles. The new rules also include stricter lifetime requirements for all vehicles in terms of both mileage and lifetime”.

The second factor is the growing demand for EVs. With government incentives and falling battery prices, European demand for electric vehicles is skyrocketing. In 2020, more than 1 million EVs were sold in Europe, making it the world's largest electric vehicle market, surpassing China and the US. It is predicted that more than 50% of new vehicles sold in 2030 will be electric, with the majority being used and sourced from Europe. The third factor is investment in charging infrastructure. It is worth noting that the EU has made significant

investments in developing electric vehicle charging infrastructure, which is further accelerating the adoption of EVs. There is already a Charging Infrastructure Initiative program supporting the development of over 3.5 million charging points by the end of 2030, and this development will also accelerate the shift from fossil fuel-powered vehicles to electric vehicles. Electric vehicle charging is still concentrated in the Netherlands, Germany, and France (European Commission, 2024).

CONCLUSION

Nickel is a strategic commodity in the global energy transition towards environmentally friendly technologies, such as batteries for electric vehicles, or the primary raw material used to create anti-corrosion products commonly found in everyday life. The EU, which has ambitious sustainability goals through the European Green Deal, highly depends on nickel supplies. Indonesia's policy to ban the export of raw nickel ore and force foreign investment into the downstream sector or the construction of smelters directly affects the EU's ability to meet its industrial needs at competitive costs. For the EU, Indonesia's ban on nickel ore exports could damage the European economy. However, with downstreaming, Indonesia is trying to change its position from a raw material supplier to a producer of high-value-added goods by developing downstream industries. This reflects the efforts of peripheral countries such as Indonesia to raise their position in the hierarchy of the capitalist world system, which directly conflicts with the interests of core countries such as the EU. Indonesia's efforts align with the view that peripheral countries have the agency to challenge the dominance of core countries.

REFERENCES

- APEC. (2022). *Socio-Economic Study of Impact of EU Nickel Compounds Classification on APEC Economies* (Vol. 16, Issue 1).
- Azis, V. A. A., & Abrianti, S. (2021). Analisis Terhadap Larangan Ekspor Bijih Nikel Kadar Rendah Berdasarkan Prinsip Restriksi Kuantitatif. *Hukum Pidana Dan Pembangunan Hukum*, 3(2), 1–10. <https://doi.org/10.25105/hpph.v3i2.10358>.

- European Commission. (2024). *New Study on Accelerating EU Electric Vehicle Charging Infrastructure Roll-out*. European Commission. <https://alternative-fuels-observatory.ec.europa.eu/general-information/news/new-study-accelerating-eu-electric-vehicle-charging-infrastructure-roll>.
- European Union. (2021a). *Study on future demand and supply security of nickel for electric vehicle batteries*. Publications Office of the European Union.
- European Union. (2021b). The Council of the EU. *Political Institutions in Europe*, 32(0), 305–317. <https://doi.org/10.4324/9780203303559-22>.
- European Union. (2023). *Critical Raw Materials Act*.
- European Union. (2024). <https://www.consilium.europa.eu/en/press/press-releases/2024/04/12/euro-7-council-adopts-new-rules-on-emission-limits-for-cars-vans-and-trucks/>. European Union. <https://www.consilium.europa.eu/en/press/press-releases/2024/04/12/euro-7-council-adopts-new-rules-on-emission-limits-for-cars-vans-and-trucks/>.
- Haryati, E., Dahlan, K., Mantiri, S. Y. Y., & Bearix. (2021). *Jurnal Fisika Jambura*, 3(2), 1–15.
- Ika, S. (2017). Kebijakan Hilirisasi Mineral : Policy Reform untuk Meningkatkan Penerimaan Negara. *Kajian Ekonomi Dan Keuangan*, 1(1), 42–67. <https://doi.org/10.31685/kek.v1i1.259>.
- Innovation Newsnetwork. (2023). *The nickel market: Trends, challenges, and opportunities*. Innovation Newsnetwork. <https://www.innovationnewsnetwork.com/the-nickel-market-trends-challenges-opportunities/36487/>.
- Järvinen, M., & Mik-Meyer, N. (2020). *Qualitative Analysis: Eight Approaches for the Social Sciences*. SAGE Publications. <https://books.google.co.id/books?id=9Ei3DwAAQBAJ>.
- Nickel Institute. (2012). *Nickel in the European Union*. 24.
- Putra, T. S. A. (2022). *Gugatan Uni Eropa di World Trade Organization (WTO) Mengancam Hilirisasi Industri Pertambangan di Indonesia*. Kemenkeu Republik Indonesia. [https://www.djkn.kemenkeu.go.id/kanwil-](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)
- Putri, N. N., & Abrar, H. (2023). SEIKO : Journal of Management & Business Dampak Kebijakan Pembatasan Ekspor Nikel ke Uni Eropa: Global Trade Analysis Project (GTAP) Model. *SEIKO : Journal of Management & Business*, 6(2), 329–336.
- Ramadhana, M. A., Maulana, M. S., Nugraha, Z. F., Subagja, R. E. G., & Wijaya, M. M. (2024). Gugatan Uni Eropa Terhadap Pembatasan Ekspor Nikel Indonesia. *Doktrin: Jurnal Dunia Ilmu Hukum Dan Politik*, 2(2), 185–199. <https://doi.org/10.59581/doktrin.v2i2.2608>
- Saegert, J., Witni, V., & Nerreter, M. (2024). *Nickel for The Energu Transitions*. Deutsche Gesellschaft für Internationale Zusammenarbeit.
- Santoso, R. B., Moenardy, D. F., Muttaqin, R., & Saputera, D. (2023). Pilihan Rasional Indonesia dalam Kebijakan Larangan Ekspor Bijih Nikel. *Indonesian Perspective*, 8(1), 154–179. <https://doi.org/10.14710/ip.v8i1.56383>.
- Sinaga, J. V. (2024). *Hilirisasi Sebagai Langkah Awal Perubahan Indonesia dari Negara Berkembang Menjadi Negara Industri Maju*. Direktorat Jenderal Mineral Dan Batubara. <https://www.minerba.esdm.go.id/berita/minerba/detil/20241203-hilirisasi-sebagai-langkah-awal-perubahan-indonesia-dari-negara-berkembang-menjadi-negara-industri-maju>.
- Sudjoko, C. (2021). Strategi Pemanfaatan Kendaraan Listrik Berkelanjutan Sebagai Solusi Untuk Mengurangi Emisi Karbon. *Jurnal Paradigma: Jurnal Multidisipliner Mahasiswa Pascasarjana Indonesia*, 2(2), 54–68.
- Syafira, A. D., Putri, C. M., Widyaningsih, E., & Kusumawijaya, P. (2023). Analisis Peluang, Tantangan, Dan Dampak Larangan Ekspor Nikel Terhadap Perdagangan Internasional Di Tengah Gugatan Uni Eropa Di Wto. *Jurnal Economina*, 2(1), 1125–1135. <https://doi.org/10.55681/economina.v2i1.258>.
- Tarigan, D. H., Natasya Azhar, A., & Azhar, N. L. (2023). Kerja Sama Perdagangan Indonesia dan Uni Eropa Pasca Gugatan di

- World Trade Organization (WTO) Tahun 2019. *Jurnal Kolaboratif Sains*, 6(11), 1329–1399.
<https://doi.org/10.56338/jks.v6i11.4193>.
- Thommasen, P. (2023). *Market Trends for Stainless Steel*. Market Trends for Stainless Steel.
<https://damstahl.com/en/news/article/market-trends-for-stainless-steel-november>.
- Wau, F. T., Kiton, M. A., Wau, M., & Fau, J. F. (2024). Analisis Strategis Kebijakan Hilirisasi Mineral: Implikasi Ekonomi dan Pengaruhnya terhadap Perekonomian Indonesia. *Journal Publicuho*, 7(3), 1215–1224.
<https://doi.org/10.35817/publicuho.v7i3.481>.