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Commentary

From Hormuz to Halmahera: Geopolitical Risk Transmission and Indonesia's Energy–Food–Industry Nexus

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Abstract

Geopolitical tensions in the Middle East—particularly the confrontation between the United States and Iran—continue to exert a profound influence on global energy markets and broader macroeconomic stability. In an increasingly interconnected economy like Indonesia's, these dynamics generate cascading risks that extend beyond the energy sector, affecting food systems and industrial development. This commentary examines how potential disruptions in global oil supply, especially through strategic chokepoints such as the Strait of Hormuz, may transmit shocks to Indonesia's energy security, food security, and nickel-based industrialization trajectory. Adopting an energy–food–industry nexus perspective, the paper demonstrates how external geopolitical shocks can propagate across interdependent sectors, thereby amplifying systemic vulnerabilities. While Indonesia's expanding role in the global nickel value chain presents significant opportunities for downstream industrialization, persistent structural constraints remain, particularly due to dependence on imported energy inputs and exposure to global supply chain volatility. By integrating insights from energy geopolitics, industrial policy, and food security analysis, this paper offers a more comprehensive understanding of Indonesia's development challenges in a turbulent global context. It concludes that strengthening national resilience requires a coordinated and forward-looking strategy, centered on energy diversification, the stabilization of food systems, and deeper industrial upgrading, in order to support a more robust and sustainable long-term development trajectory.

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1. Geopolitics, Oil Markets, and the Nexus Perspective

Geopolitical tensions in energy-producing regions have long been recognized as key drivers of global economic instability. In an increasingly interconnected global economy, localized conflicts can generate far-reaching consequences, affecting energy prices, trade flows, and macroeconomic performance across distant regions (Yergin, 2020). Among these tensions, the enduring rivalry between the United States and Iran remains particularly consequential due to its direct implications for global oil supply.

The strategic importance of this rivalry is closely tied to geography. The Persian Gulf is a major hub of global oil production, and within it, the Strait of Hormuz serves as a critical chokepoint through which approximately one-fifth of global petroleum liquids consumption passes (U.S. Energy Information Administration, 2023). Any disruption in this corridor—whether actual or anticipated—can trigger significant volatility in global energy markets.

For Indonesia, these developments are highly consequential. Over the past two decades, the country has transitioned from a net oil exporter to a net importer, thereby increasing its exposure to global price fluctuations (BP, 2024). At the same time, Indonesia is pursuing an ambitious industrialization strategy centered on nickel, a key mineral in the global energy transition (International Energy Agency, 2022). Numerous nickel smelters have been established, are under construction, or are planned across several regions in Indonesia, particularly in Southeast Sulawesi, Central Sulawesi, and the Halmahera Islands.

To understand how such geopolitical shocks affect Indonesia, this essay adopts an energy–food–industry nexus perspective. This framework highlights how rising oil prices—often triggered by geopolitical instability—extend beyond energy markets into agriculture and industrial production. In the energy sector, higher oil prices increase fuel costs, electricity tariffs, and transportation expenses, contributing to inflationary pressures and fiscal burdens (OECD, 2022). In agriculture, energy is a critical input, particularly in fertilizer production, which depends heavily on natural gas (Hund et al., 2020). Industrial sectors, especially energy-intensive activities such as nickel smelting, are similarly exposed to energy price volatility (Norgate & Jahanshahi, 2011).

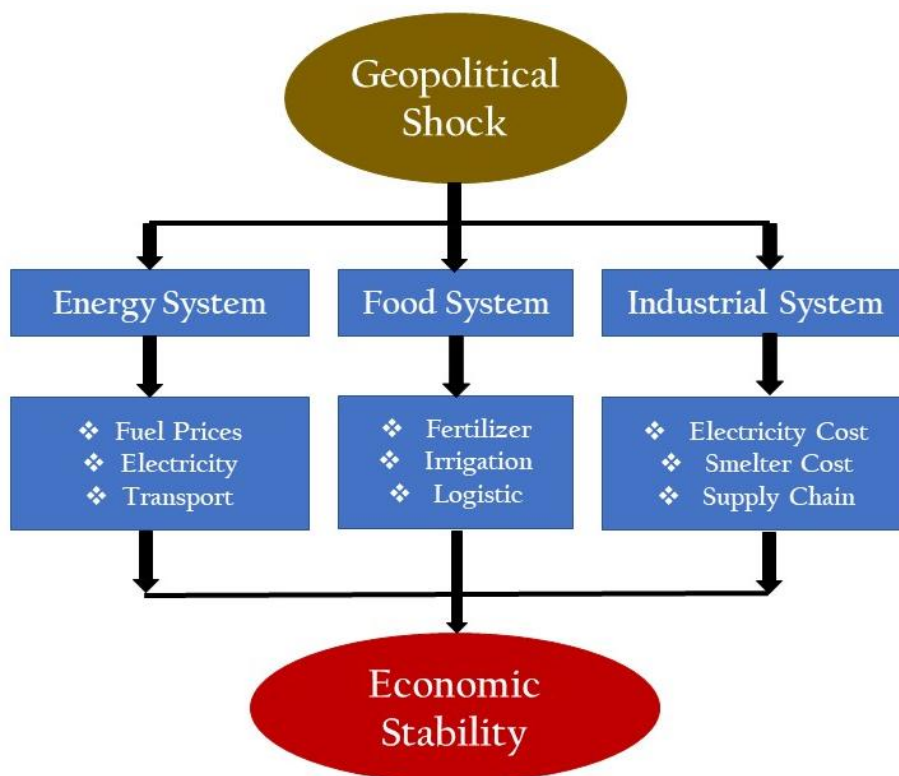


Figure 1. Energy-Food-Industry Nexus explaining Geopolitical Shock to Economic (In-)Stability

Source: author’s elaboration

These interconnections indicate that geopolitical shocks are not confined to a single sector; rather, they propagate simultaneously across multiple domains. This nexus perspective is particularly

relevant in the Indonesian context, where structural interdependencies among energy, food, and industrial systems remain pronounced. Conceptually, this framework parallels the food–energy–water (FEW) nexus approach (Nugroho, 2020), emphasizing the interconnected and mutually reinforcing nature of these critical sectors. In this context, downstream industrialization does not eliminate external vulnerability but rather reconfigures it, shifting dependence from raw material exports to critical imported inputs and global supply chains.

2. Indonesia's Energy and Food Systems under External Pressure

In the Indonesian context, it is important to differentiate between energy security and energy resilience. Energy security pertains to the dependable availability and affordability of energy resources, whereas energy resilience refers to the ability of the energy system to withstand, adapt to, and recover from external disturbances (Nugroho, 2015). Both aspects are increasingly challenged by evolving global geopolitical dynamics.

Indonesia's energy balance has undergone a profound transformation. Declining domestic oil production, combined with rising demand, has led to increasing reliance on imports (BP, 2024). This dependency exposes the economy to global price volatility, as rising oil prices increase import bills and contribute to inflationary pressures. Moreover, government subsidies for fuel and electricity can become fiscally burdensome during periods of elevated prices (OECD, 2022). Meanwhile, plans to accelerate the energy transition by increasing the share of renewable energy have not been realized as expected (Nugroho, 2019).

The country's reliance on imported refined products further amplifies vulnerability. Disruptions in global supply chains—particularly those linked to geopolitical tensions in the Middle East—can affect both price stability and physical availability (EIA, 2023). As a result, external shocks in distant regions can have immediate domestic consequences.

These energy dynamics are closely linked to food system vulnerability. Energy price fluctuations directly affect agricultural production, particularly through fertilizer costs. Nitrogen-based fertilizers rely on natural gas as a primary input, making their production highly sensitive to energy prices (Hund et al., 2020). In Indonesia, fertilizer consumption reaches several million tons annually, reflecting its central role in supporting national food production.

To maintain affordability, the government provides substantial fertilizer subsidies. However, rising energy costs increase the fiscal burden of these subsidies (World Bank, 2023). Beyond fertilizers, energy also affects irrigation, mechanization, and transportation. Higher fuel prices increase logistics costs, contributing to food price inflation and disproportionately affecting low-income households.

Taken together, these dynamics illustrate how energy shocks can cascade into food systems, reinforcing the importance of integrated policy responses.

3. Nickel Industrialization and Exposure to Global Supply Chains

Indonesia plays a central role in global nickel supply chains. As the world's largest producer, the country accounts for more than half of global nickel output (U.S. Geological Survey [USGS], 2024a). Nickel is a strategic mineral, essential for both stainless steel production and electric vehicle batteries (International Energy Agency [IEA], 2023a; U.S. Geological Survey, 2024a).

The country's industrial policy has focused on downstream processing, particularly through smelter development and export restrictions on raw ore (World Bank, 2020). This strategy reflects a broader trajectory of resource-based industrialization, aimed at capturing greater value from natural resources (Nugroho & Al-Wafiy, 2026a). The shift toward domestic processing is intended to reduce dependence on raw material exports and enhance industrial capabilities (Nugroho & Widayastuti, 2026b).

However, this industrialization pathway is not without challenges. Nickel processing is highly energy-intensive, with technologies such as RKEF and HPAL requiring substantial and stable electricity supply. In many cases, this energy is generated from coal, linking industrial competitiveness directly to energy costs (Norgate & Jahanshahi, 2011).

In addition, nickel processing depends on chemical inputs such as sulfur, whose supply is closely tied to global energy markets (USGS, 2024b). This creates additional layers of vulnerability to external

shocks. These structural characteristics imply that Indonesia's nickel industrialization is not insulated from global geopolitical dynamics but is deeply embedded within them.

Despite significant progress in expanding processing capacity, the literature highlights persistent structural constraints. The ability to capture higher value-added activities remains limited by technological dependence, global market structures, and external control over key segments of the value chain (Nugroho & Widyastuti, 2026b). This underscores the importance of not only expanding industrial capacity but also strengthening domestic capabilities in technology and innovation.

4. Systemic Shocks and Policy Implications for Resilience

The potential impact of geopolitical tensions can be illustrated through several oil price scenarios. In a limited escalation scenario (US\$80–90 per barrel), the effects are relatively manageable, with moderate increases in energy costs and inflation. In a regional instability scenario (around US\$100 per barrel), transportation costs rise significantly, fertilizer prices increase, and food inflation becomes more pronounced. In a severe disruption scenario (above US\$120 per barrel), the consequences are substantial, including intensified fiscal pressure, sharp increases in food prices, and rising industrial costs that may affect overall economic stability (IEA, 2023b, author's elaboration).

These scenarios demonstrate that oil price shocks are not merely energy events but systemic shocks that affect multiple sectors simultaneously. As such, strengthening resilience requires a strategic and coordinated policy approach that explicitly addresses cross-sectoral interdependencies.

First, energy diversification is essential. Expanding natural gas and renewable energy can reduce dependence on imported oil and enhance long-term stability (Nugroho, 2004; IEA, 2022). Indonesia's geothermal and hydropower resources offer significant potential in this regard.

Second, strengthening food systems is critical. Improving domestic fertilizer production, irrigation infrastructure, and logistics networks can reduce vulnerability to external shocks and enhance food security (World Bank, 2023).

Third, industrial policy must focus on ensuring a stable and affordable energy supply while developing domestic capabilities in key inputs. This includes not only energy infrastructure but also supporting industries, such as chemicals, that are integral to nickel processing.

Policy coherence across these sectors is essential to avoid unintended trade-offs and maximize overall resilience.

As previous studies have shown, the long-term success of Indonesia's industrialization strategy will depend not only on resource endowment but also on its ability to navigate structural constraints in global value chains (Nugroho & Al-Wafiy, 2026a).

In the broader context of *Indonesia Emas 2045*, strengthening resilience against external shocks is not merely a matter of short-term stability but a strategic imperative for long-term transformation. As Indonesia aspires to become an advanced economy, the ability to manage the interconnections between energy security, food systems, and industrial development will be critical. Without addressing these structural vulnerabilities, the benefits of resource-based industrialization—particularly in the nickel sector—may not fully translate into sustainable and inclusive economic growth.

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