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India's Navigation in the Geopolitical of IMEC and Regional Connectivity

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Abbstract: *As the trend of fossil fuel use declines, green hydrogen importing and exporting countries have created a new polarity for the development of the green hydrogen industry, one of which is through the India-Middle East-Europe Economic Corridor (IMEC) framework. The project, which aims to build regional connectivity for hydrogen infrastructure from Asia to Europe, has made India play a vital role in responding to various different interests ranging from the G7, the Quad, the Gulf States and the Middle East. Through qualitative research that is described explanatory, this study aims to explain India's role in navigating the dynamics of hydrogen geopolitics to reach the IMEC agreement. The results show that there is a three-way relationship dynamic between energy, international relations, and domestic politics of India with the G7, the Quad, and the Middle East countries which is manifested in the neo-mercantilism frame. This frame is seen as dominant in India's maneuvers that focus on the G2G approach to increase investment, research and technology, and regional stability, especially in the values of territorial integration and political independence.*
Keywords: *Hydrogen Geopolitics; India; IMEC; Regional Connectivity.*

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Introduction

Global energy geopolitics increasingly show the significance of the shift towards renewable energy sources, including hydrogen. For developed countries, hydrogen can be used as an instrument to achieve energy security and independence. The global energy regime that forces countries in the world to achieve net zero emissions, is starting to consider green hydrogen as the spearhead for the development of the hydrogen industry as an energy source. On the other hand, the hope for cost reductions in the green hydrogen industry indicates that investment in the fossil fuel supply chain will slowly decline over the years. This is also reinforced by a report from IRENA (2022b), which states that oil and gas commodities, each contributing 67.78% and 13.35% to the total value of energy commodity trade in 2020, are predicted to decline significantly in 2050 with contributions of only 9.28% and 6.57%. The International Renewable Energy Agency (IRENA) also recognizes that green hydrogen is capable of changing the landscape of bilateral energy relations and global trade, thereby reshaping the positions of countries with new roles as both exporters and importers. Geopolitical and geoeconomic shifts will be created due to the rapid growth of the global hydrogen economy, giving rise to new dependencies. In addition, hydrogen is predicted to give rise to regionalization of energy relations, thus giving rise to new centers of geopolitical influence. Based on IRENA (2022a), in 2050, hydrogen will contribute 12% of total global energy use. In addition, IRENA also predicts that 30% of hydrogen commodities can be traded widely by 2050. Several hydrogen-importing countries, such as Germany and Japan, have carried out special hydrogen diplomacy with countries that have begun to switch from fossil fuels to hydrogen as a form of economic diversification, such as the United Arab Emirates, Saudi Arabia, Oman, and Australia. Meanwhile, countries such as Namibia, Morocco, and Chile, which were originally energy importers, will change their roles to become green hydrogen exporters. In addition, realizing the potential of regions such as America, Africa, Oceania, and the Middle East will limit the risk of export concentration. However, many countries will need large-scale investment in infrastructure and technology. Countries such as India, Brazil, and China will begin to compete on cost in responding to global demand, which will only increase in the mid-2030s. From the European side, green hydrogen has become affordable during the natural gas boom in 2021. Focusing on improving the natural gas pipeline network will further strengthen global hydrogen demand and trade facilitation. Given the current trend, Europe, Japan, and China have started producing specialized electrolyzers and fuel cells to drive business innovation in the green energy manufacturing sector.

Broadly speaking, the distribution of hydrogen production potential across the region can be described in the following table:

Table 1. Technical Potential for Green Hydrogen Production Below USD 1.5/kg in 2050 in EJ (Exajoules)

Area	Amount in EJ
Sub-Saharan Africa	2.715 EJ
Middle East and North Africa	2.023 EJ
North America	1.314 EJ
Oceania	1.272 EJ
Latin America	1.114 EJ
Rest of Asia	684 EJ
Northeast Asia	212 EJ
Europe	88 EJ
Southeast Asia	64 EJ

Source: IRENA (2022a).

Based on the data, Africa and the Middle East have the highest technical potential in producing green hydrogen that is useful for export to Europe. In addition, countries have also specialized in the green hydrogen industry development landscape, such as China, Japan, and Europe, which are able to produce and sell low-cost electrolyzers, while India and Brazil are able to create cheap renewable energy and high gas prices. IRENA also stated that in the short and medium term, these countries and regions will assert technological leadership and industrial capacity, especially in shaping the rules of the market that is currently developing.

To realize this, countries in the world need to establish standards, rules, and governance for hydrogen trade, which will have a significant impact on determining the specific technology that will dominate the market in the future. Success in developing the hydrogen market depends on the ability to set transparent and coherent standards and norms to facilitate all parties, including all sectors, countries, and regions. The standards that are formed will later improve the safety, quality, and interoperability of various goods and services. In other words, different standards will slow down progress, thus having implications for regulatory competition, market fragmentation, and more serious trade barriers. This area can become an arena for international cooperation or geopolitical competition. Ultimately, all parties must benefit from a transparent and coherent global green hydrogen energy mechanism (IRENA, 2022b). There are at least three main ways for countries that want to use hydrogen to strengthen their energy security, namely by reducing price volatility and import dependence and increasing the flexibility and resilience of energy systems, especially through diversification.

In the geopolitical landscape of hydrogen, there are new polarized centers. First, Japan—as a pioneer in hydrogen development in the Asia Pacific—has carried out various initiatives, such as the Hydrogen Energy Ministerial Meeting and the signing of a cooperation agreement between the New Zealand Hydrogen Council and the Japan Hydrogen Association in 2022 with the aim of encouraging cooperation between industry and research institutions. Japan's initiative was influenced by the G7's commitment to reducing energy dependence on Russia while achieving a renewable energy mix. The Ministry of Economy, Trade and Industry (METI) of

Japan announced that it wants to continue building a supply chain for hydrogen in Asia, especially the Indo-Pacific region, through the expansion of hydrogen technology, which is claimed to be the world's leading one (MFTA, 2023).

Second, the European Union, through Germany, has strengthened diplomacy through the H2 Diplo Initiative as an effort to utilize hydrogen issues and strengthen political dialogue with Saudi Arabia, Angola, Ukraine, Kazakhstan, and Nigeria, founders of the G7 Hydrogen Action Pact, H2 Atlas Africa, H2 Global Scheme, and Hydrogen Council, and strengthening the development of European regional hydrogen with the Netherlands, Denmark, and Belgium through The Esjberg Declaration, as well as various hydrogen research collaboration initiatives with Central Asia, Ukraine, Canada, South Korea, Japan, New Zealand, Namibia, and Australia (Quitzow et al., 2024). Third, China focuses on creating low-cost electrolyzers and continuing the BRI (Belt Road Initiative) economic corridor project—since 2013—which will become a link between infrastructure in the Asia, Europe, and Africa regions in the fields of transportation, telecommunications, and energy. On the other hand, India has a key role that is able to become an inter-polar bridge, both in The Quad, which dominates the negotiations of the Indo-Pacific region, and in the leadership of the G-20 in 2023 in New Delhi, which resulted in the India-Middle-East-Europe Economic Corridor where the G7 countries and the Gulf States signed the agreement. Researchers see India's key role in playing a central role both geopolitically and geoeconomically as a link between hydrogen development in the Indo-Pacific, Central Asia, and Europe. Therefore, this paper aims to explain how India's role navigates the geopolitical dynamics of hydrogen to create the India-Middle East-Europe Economic Corridor (IMEC).

Previous studies have discussed the dynamics of state-to-state interactions in hydrogen geopolitics and their relevance to IMEC. IMEC faces new challenges due to regional instability in the Middle East and shifting partnerships due to the Ukraine and Palestine conflicts, as studied by Bukhari et al. (2024). The study clearly suggests that regional, diplomatic, and other strategic partnerships are needed in the Middle East to ensure economic stability. In this way, IMEC countries can protect important trade routes even amid ongoing global tensions. In contrast, Blarel (2024) sees the initiation of IMEC as an extension of the influence of the US-China rivalry in the Middle East, where India is encouraged to improve bilateral relations with China in the region. The article views that India has adapted its policies to China's increasing influence in Middle Eastern politics. India is considered to have shifted over the past decade from a strategy of blaming US security provision to a strategy of partially balancing China's strategic presence in the Middle East.

The influence of the IMEC project is considered to be the antithesis of the strategic alliance built by China through the BRI, as analyzed comparatively by Siddiqa (2023). Middle Eastern countries are forced to make strategic choices in certain industries—in this case, hydrogen—that could hinder economic and social progress in the region. However, the analysis suggests that IMEC's presence does not pose a substantial threat to the BRI. The dynamics of India's interactions with Central Asian countries have been studied primarily in terms of pipeline development to achieve energy security in

the region. The study focuses on India's position in Central Asia in formulating its foreign policy on petropolitics and pipeline diplomacy amidst the pressures of the United States, China, and Russia (Pradhan, 2020).

Global Energy Politics

In the book Global Energy Politics, Van de Graaf & Sovacool (2020) define the concept and approach of global energy politics as the act of who gets what, when, and how energy production and use are from an international perspective. The framework used in viewing the phenomenon of global energy politics is through a socio-technical systems approach. This system is interpreted as a broad conceptualization of the existing infrastructure to provide energy services for the resources and technologies themselves as well as a series of usage practices, institutions, supply networks, and cultural meanings. Van de Graaf & Sovacool (2020) also explain the three-way relationship of the challenges arising from the global energy system, namely: (1) the world energy system; (2) relations between countries; (3) domestic energy politics and governance. The interconnectedness of these three aspects can (1) explain how shifts in energy production and consumption patterns affect relations between countries and domestic politics in energy-producing and consuming countries; (2) explore how domestic energy politics affect relations between countries; (3) explore how international relations issues and domestic energy politics shape patterns of energy production and consumption.

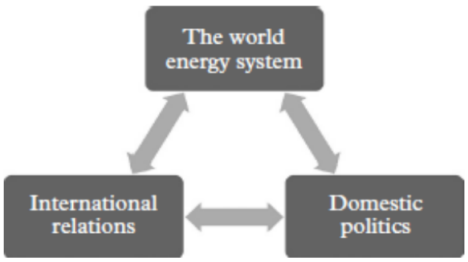

Figure 1. Three-Way Relationship between Energy, International Relations, and Domestic Politics
Source: Van de Graaf & Sovacool (2020)

The energy struggle framework in question also refers to the differences in views on the energy system divided into four archetype frameworks, namely neo-mercantilism, market liberalism, environmentalism, and egalitarianism. Each represents a different worldview, ideology, value system, and interest. Its function is to capture the complexity and diversity of views on global energy issues. Each archetype has a different view of what is happening, the causal factors, and what can be done in global energy politics.

Frames	Dominant worldviews	Prioritized component of energy security	Energy security for whom?	Underlying values and goals
Neo-mercantilism	Defense of national security	Geopolitical availability	State	Political independence and territorial integrity
Market liberalism	Technological optimism, free market libertarianism	Economic affordability	Economy	Welfare, freedom
Environmentalism	Environmental preservationists, conscientious consumption	Environmental sustainability	Earth	Respect for nature
Egalitarianism	Justice, neo-Marxism, feminism, equality	Social acceptability	Society	Equity, justice

Figure 2. Frames and Views in Global Energy Politics
Source: Van de Graaf & Zelli (2016)

The neo-mercantilism framework assumes that states are the main actors seeking to maximize their autonomy and power. Energy in this context is considered a vital and strategic commodity for national welfare and security. Thus, energy can be a source of vulnerability for countries that do not have it and a source of power for countries that do. Countries are interested in securing energy supplies whose reserves have been centralized or concentrated geographically. Concerns about the availability and access to energy supplies have increased the geopolitical power game between importers and exporters. In addition, energy statecraft strategies are also often used by countries and used as a tool in foreign policy. As a result, geopolitical disputes have escalated and resulted in conflict. In addition to state actors, the market liberalism framework also recognizes the presence of non-state actors, including companies and international organizations. Energy is seen as a commodity like other commodities. The condition of interdependence is formed by cross-border energy trade, which is expected to bring benefits to all actors and reduce the risk of conflict. Market regulation plays a bigger role than energy policy. The affordability dimension not only regulates low prices for energy consumers but also price stability to improve security and investment planning for energy producers. In this view, the development of technological innovation is believed to improve people's lives.

The support for sustainability values makes the environmentalism framework very vocal in being used to protect nature and prevent the complete depletion of non-renewable energy resources through the transition to renewable or low-carbon energy resources. The mainstream in this view believes that environmental protection can be achieved without requiring fundamental changes in the economy of modern society or political structures. Issues that are often raised include climate change, greenhouse gas emissions, land conversion, radioactivity, the spread of

toxic pollution, and the impact of water availability and quality.

In contrast to the environmentalism framework, which focuses on sustainability values, the egalitarianism framework emphasizes aspects of justice and equality. This view believes that the exploitation of natural resources is carried out to advance the capitalist class. The close ties between multinational corporations, Western countries, and local elites in resource-producing countries reflect the needs of capitalist countries. The main challenge in this perspective is the global energy system that maintains large inequalities, making many people in poor countries effectively lose access to basic energy services. Respect for the dignity and human rights of other social groups and individuals, as well as the costs to disenfranchised workers of today's global energy system, need to be addressed in every aspect of the future energy transition.

Method

To achieve the research objectives, the researcher used a qualitative research method that was described as explanatory. The data listed are secondary data obtained from books, journal articles, news, and reports related to the research issues taken using library study techniques with internet-based research instruments. Data related to the research issues, such as green hydrogen, hydrogen geopolitics, and India's role/interaction with related countries in realizing the IMEC agreement, will be analyzed using the global energy politics theory framework and the global energy politics archetype framework. For this reason, data triangulation is carried out to ensure the completeness and validity of the data so that the process of data presentation, analysis, and interpretation of meaning can be carried out carefully.

Result and Discussion

The Urgency of Increasing the Development of the Green Hydrogen Industry in the World

According to the International Renewable Energy Agency (IRENA) report, there are six countries that have the capacity to become the world's main providers of green hydrogen, namely the European Union, China, India, Japan, South Korea, and the United States. On the other hand, countries such as Australia, Chile, Japan, Saudi Arabia, and the European Union have planned a technology investment of 430 billion USD for the development of the green hydrogen industry by 2030. Moreover, Saudi Arabia will soon launch the world's largest green hydrogen project with a capacity equivalent to 600 tons of green hydrogen per day and 4 GW of wind and solar energy. Seeing this, India is not too far behind.

Efforts to reduce emissions from industries such as steel and chemicals are an old problem that governments and businesses everywhere have tried to solve. However, a consortium of gas companies in Italy, Germany, and Austria has a solution by building a 3,300-kilometer hydrogen pipeline network, similar to that proposed in the IMEC project (Thomas, 2023).

The Indo-Pacific region is vulnerable to various impacts of the climate crisis, such as drought, flooding, sea level rise, cyclones, and heat waves. Therefore, in order to strengthen climate security in the region, the Quadrilateral Security Dialogue (The Quad) formed a Working Group on Climate Change through a strategic action called "The Quad Climate Change Adaptation and

Mitigation Package" (Q-Champ), which will be able to reduce greenhouse gas emissions and build the adaptive capacity of communities in various impacts of the climate crisis, as well as maintain a stable, safe, and resilient region in order to realize the achievements of the Paris Agreement at the global level (Verma & S, 2024).

India: Key Player of Indo-Pacific, Europe and Middle East Multi-Bloc in Green Hydrogen Industry

In practice, India implements the Act East Policy while maintaining ASEAN's significance within the regional framework. In addition, India is actively involved in various initiatives, such as the Quad, the Malabar exercises, and regional institutions. In its role in navigating the dynamics of relations between China, the United States, and Russia, India faces a major challenge so that influences from various directions can be accommodated and utilized for national interests.

In addition, various strategic initiatives have been put forward by Narendra Modi as Prime Minister of India, such as Act West, Neighborhood First, the Indo-Pacific Oceans Initiative, and Security and Growth for All in the Region (SAGAR), which allow India to play a vital role both in the Indo-Pacific region through the Quad alliance and the Middle East through the IMEC initiative.

India adheres to the values of the rise of civilization known as "Vasudhaiva Kutumbakam," which includes three main ideals, namely (1) anti-colonial solidarity; (2) belief in the potential of India's great power; and (3) the importance of morality in foreign affairs. Thus, India sees itself as the hub of Asian countries in providing strong civilizational value of earth materials and supremacy in navigating trade routes and services to the rest of the world (Rout, 2024).

The National Green Hydrogen Mission of India—India's national roadmap for green hydrogen energy—seeks to make India a major hub for the production, utilization, and export of green hydrogen and its by-products in the world (Kar et al., 2023). The plan mandates an investment of 8 lakh crore for capacity building and production of 5 million metric tonnes of green hydrogen annually. This target is expected to reduce annual greenhouse gas emissions by 50 MMT and create new jobs for 6 million people. The total funding released for the mission is Rs 19,744 crore, of which Rs 17,490 crore will be utilized for the Strategic Interventions for Green Hydrogen Transition (SIGHT) programme. Meanwhile, Rs 1,466 crore will be used for pilot projects, Rs 400 crore for development and research, and Rs 388 crore will be used for other mission components (Centre for Trade and Investment Law, 2024).

To transport hydrogen, there are three types of pipelines that will be used, namely (1) a special hydrogen pipeline, built with special materials to distribute hydrogen—because hydrogen can make ordinary pipeline materials brittle, even steel; (2) a pipeline exporting hydrogen and natural gas, where the pipeline must go through a modification process; and (3) combined transportation of a small amount of green hydrogen between 5 and 10% with natural gas. In India itself, there is no special hydrogen pipeline that is interconnected across all states because the development of the green hydrogen industry is still in its early stages.

Thus, IMEC will be a good infrastructure development instrument for India by following the lead of Europe, which has built a special hydrogen transportation network through the development of an existing gas network,

namely the European Hydrogen Backbone (Centre for Trade and Investment Law, 2024).

According to the Renewables Capacity Statistics 2023, India ranks fourth in the world in installed renewable energy capacity (including large hydro), fourth in wind power, and fifth in solar power. In this regard, India has seen an increase of around 400% in installed fossil fuel capacity over the past nine years. This ambition is also reflected in the COP26 target of setting a non-fossil fuel-based energy capacity of 500 GW by 2030. In addition, seeing India's electricity demand at 8.4%—as the highest in the world today—forces it to have a big plan for the expansion of renewable energy in the world.

As a clean energy carrier, green hydrogen is gaining popularity among alternative energy sources. India is uniquely positioned to use hydrogen power, especially green hydrogen derived from solar, wind, biomass, and other renewable energy sources. This is inseparable from the high solar potential and the increasing energy needs as the population in India increases. Of course, hydrogen has a vital role in the global market for decarbonization industries, such as transportation (hydrogen car and bus pilot projects), power generation, shipping, aviation, fertilizers, the steel industry, etc. India in this case has an interest in achieving the target of zero emissions by 2050, so the use of green hydrogen needs to be doubled (Nnabuife et al., 2023).

In increasing the production and use of green hydrogen, India needs adequate incentives and subsidies. Important factors contributing to the economic viability of green hydrogen in India are significant cost reductions and increased renewable power generation. In addition, to advance electrolyzer technology, large-scale production is needed. Moreover, the development of a regulatory framework on infrastructure development and financing is believed to support India in breaking away from fossil fuel dependency (Madheswaran et al. 2024).

The reliance on green hydrogen in India's climate policy is a challenge in itself to meet more than 5% of the country's energy use. This figure results in a cumulative reduction of 80 Gt CO2 and is in line with the 1.5-degree Celsius climate scenario. Currently, India still relies on 75% of its energy demand from oil and coal. Given the potential of solar power, it is very important to integrate with green hydrogen energy while taking advantage of the trend of solar energy costs falling to 2 USD per kWh.

India's "One Nation—One Grid—One Frequency" principle is one of the largest synchronous networks in the world and is a major factor in ensuring the network is key to green hydrogen production. This ambition is also supported by the World Bank, which has approved an additional investment of 1.5 billion USD to help India achieve its net zero target in accordance with the increasing development of renewable energy, including green hydrogen.

However, there are several obstacles for India in expanding the development of the green hydrogen sector. One is the need for special infrastructure for transportation and storage due to the flammable nature of green hydrogen. In addition, integrating hydrogen into the natural gas network requires the construction of large-scale and expensive pipeline infrastructure.

The electrolyzer journey has begun with the “Made in India” program, but it is not yet at full scale, and imports continue to pressure India’s current account. The constraints are not only the high initial cost of equipment but also the large-scale

scale-up of electrolyzer capacity if India is to meet its 2030 renewable energy target of 500 GW. Hydrogen generation, which requires a lot of water, is also a national challenge as many districts in India are severely water-scarce. When it comes to scaling up the hydrogen economy, government support and financial incentives are critical.

Several strategic projects under The National Green Hydrogen Mission of India, including NHPC, NTPC, GAIL, IOCL, THDC, Indian Railways, etc., have emerged as a result of the mission, and more are expected in the future for large-scale green hydrogen. Therefore, India is economically capable of producing green hydrogen due to its extensive coastline and solar radiation and can even develop into a hydrogen export hub for neighboring countries (Song et al., 2022). Through the development of regional hydrogen corridors, India can lead the development of a green hydrogen economy with the support of collaboration with Australia, Europe, and Japan. The green hydrogen sector is sure to open new frontiers in India's journey to overcome challenges and sustainable R&D while proving itself in navigating the region's hydrogen needs (Sontakke & Jaju, 2021).

India-Middle East-Europe Economic Corridor (IMEC)

In September 2023, the India-Middle East-Europe Economic Corridor (IMEC) was announced on the sidelines of the G20 New Delhi Summit attended by several leaders from the United States, United Arab Emirates, India, Saudi Arabia, France, Italy, Germany, and the European Commission. Israel, as the country that owns the Port of Haifa, is an important actor in the ownership of an integral part of the proposed corridor. The corridor will later include data, transportation, hydrogen pipelines, and renewable electricity networks (Singh, 2023).

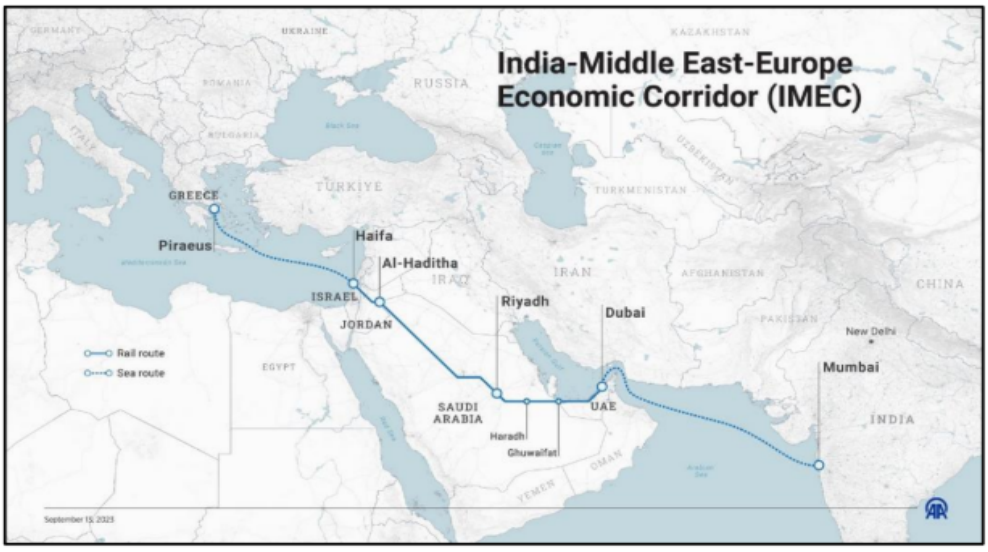

Figure 3. India-Middle East-Europe Economic Corridor (IMEC) Development Plan
Source: Khan (2024)

Geoeconomic and geopolitical considerations are the main reasons for the ratification of IMEC. If we look back, the IMEC proposal began with the ratification of the Abraham Accords in 2020 and the addition of India to the I2U2

grouping of countries (India, Israel, the United States, and the United Arab Emirates) since 2021. The I2U2 countries held their first virtual summit in July 2022 with the focus of discussion on strategic transportation networks.

In this regard, the United States considers Saudi Arabia's role to be very important for the project and also encourages the possibility of establishing diplomatic relations between Israel and Saudi Arabia. The National Security Advisors of the I2U2 countries also signaled support for a meeting with Israel as an early supporter of the IMEC project. A former Israeli minister considered the IMEC project to depict the transportation network as a peace train that would create seeds of prosperity and peace in the region.

The closure of the Suez Canal in 2021 further strained the global supply chain in the Middle East. The situation escalated when Houthi forces launched repeated missile, helicopter, drone, and boat attacks since November 21, 2023, further worsening the situation. The route is considered by the world's five largest shipping companies as a risky route for container ships and tankers heading from Asia to Europe and the US via the Cape of Good Hope. Thus, there is a detour that adds about 3,500 nautical miles, or the equivalent of 6,482 km, so that it can take an additional week and fuel costs of 1 million USD, assuming a round trip from Shanghai to Rotterdam (Stigant, 2023). In addition, the increase in insurance premiums has increased significantly, resulting in restrictions on global shipping capacity of up to 20%, thus increasing the price of goods due to the disruption of the supply chain.

In monitoring the following situation, India has an interest in securing the global supply chain because almost all of its exports are destined for the United States and European markets, which pass through this single route. Increasing integration between India and the global value chain will occur if there is improvement in infrastructure so as to reduce logistics costs.

The EU market is very important for India, as it is India's largest trading partner, with bilateral trade estimated to reach USD 136 billion in 2022-2023. In addition, the EU is also India's second-largest export market, with exports worth over USD 61 billion. In addition, the United States is India's second largest trading partner but its largest export destination, worth USD 78.5 billion in 2022-2023 (Ramachandran, 2023). Given the role of these two countries as the largest trading partners, India has a strategic interest in promoting IMEC as an alternative to the current trade routes.

From a geopolitical perspective, there is an unfavorable situation, especially for cooperation between Israel, Saudi Arabia, Jordan, and the UAE as offered by the IMEC project. In addition, there are geoeconomic concerns between Turkey and Egypt from the proposed IMEC project passing through their territories. From Egypt's side, this is seen as an unnecessary competitor to the lucrative Suez Canal monopoly, while Turkey, on the other hand, is more confident in the viability of a rail corridor from Basra through Iraq to strengthen its position as a strategic link between Europe and Asia.

India has strong ambitions to develop its green hydrogen infrastructure. The central government of India has signed a $2.1 billion incentive plan for the development of green hydrogen infrastructure to produce 5 million metric tons by 2030. Multinational companies such as Adani Enterprises, Reliance Industries, and JSW Energy have set up a

cumulative capacity of 3.5 million metric tons of green hydrogen. In line with this, Saudi Arabia and the UAE also have mature plans for expanding green hydrogen development.

IMEC as a New Threat to the Belt Road Initiative (BRI)

The US-China rivalry is increasingly visible from the launch of IMEC, which is considered a rival project to China's BRI (Belt Road Initiative) since 2013. The United States uses the IMEC project as a series of initiatives aimed at integrating partners in South Asia and the Middle East as a new geo-economic bloc. BRI and IMEC—both aiming to improve intercontinental relations—are competing visions of global development amidst the changing geopolitical landscape in the 21st century (Ahmed, 2023).

Through BRI, China wants to position itself as a leader in global infrastructure development that is growing in Africa, Oceania, Latin America, the Middle East, and Asia. Investments worth more than 1 trillion USD have been launched by China, especially in building traditional transportation infrastructure, such as railways, highways, and ports, as well as energy projects. Since the end of 2023, 155 countries have registered for the BRI project. This increase has occurred since 2016, when China became the top investor in the Middle East with a total investment of 29.7 billion USD, much higher than the United States, which was only 7 billion USD. The main locations for BRI development are the UAE, Saudi Arabia, Oman, Israel, Iran, and Egypt. In addition, the Gulf Cooperation Council States, Egypt, and Israel have also signed agreements with Chinese companies to build telecommunications infrastructure—despite diplomatic pressure from the United States to review it (Baabood, 2024).

In addition to utilizing the geoeconomic side, China also played its role in helping restore Iran-Saudi relations in March 2023. The reconciliation aims to improve the security of the implementation of BRI projects, such as important infrastructure and transportation routes that pass through the region. Thus, China is increasingly showing.

The IMEC corridor that passes through the Gulf region makes the United States and China compete in critical zones, such as the Red Sea and the Strait of Hormuz. The participation of the European Union and India in IMEC has the potential to bring greater cooperation and coordination to the Gulf states that help the United States counteract China's influence in the Middle East region more effectively. On the other hand, IMEC will also connect the regions of Jordan and Israel that are not signatories to the IMEC MoU. In other words, the Abraham Accords will reinforce the normalization of Israel's relations with Arab countries under the umbrella of IMEC with the United States as its leader (Baabood, 2024). Meanwhile, the Gulf states are using multipolarity and the new world order to try to position themselves at the center of global trade and invest more in regional supply chain connectivity (Arcas & Pandya, 2024).

Dynamics of India's Interaction with The Quad and G7

To become a champion in green hydrogen exports, Modi has conducted "hydrogen diplomacy" to secure cost-competitive export markets, especially from the Quad strategic alliance. For example, the formation of the Australia-India Green Hydrogen Taskforce, where

they will create an integrated green hydrogen supply chain in the Indo-Pacific region by accelerating technological innovation and reducing production costs.

Support for the Quad partnership was also initiated by the G7, which in 2022 formed the Partnership for Global Infrastructure and Investment (PGII). PGII is a global infrastructure investment plan worth 600 billion USD proposed by the West. The peak of the agreement took place at the 2023 G20 Summit in New Delhi, where the G7 countries, through the PGII instrument, expressed unanimous agreement to form a new IMEC to promote connectivity and integration between India and Europe through new sea and rail trade routes (Gili & Blasio, 2024).

Dynamics of India's Interaction with the Middle East and Gulf Countries

Intersecting with the efforts to boost green hydrogen development with the Quad alliance, India has simultaneously pursued strategic partnerships with Gulf countries to gain greater access to the European market. Some of the major agreements that have been concluded include those with the United Arab Emirates and Oman. In addition, a memorandum of understanding was signed between India and Saudi Arabia in October 2023 during the Middle East and North Africa (MENA) Climate Week (Gili & Blasio, 2024). The framework of the cooperation stipulates an agreement on grid interconnection and balancing, the creation of a resilient supply chain for specialty materials, and the joint development of green hydrogen energy. However, the Israel-Hamas war has also increased tensions in the region, delaying further progress on the IMEC project.

Dynamics of India's Interaction with the European Union

In its efforts to reach the European market as an importer of green hydrogen, India has made various negotiations with the European Commission, including an agreement to supply up to 10 million tonnes of green hydrogen per year to Europe. The transaction value is the basis for the EU-India Clean Energy and Climate Partnership, which was initiated in 2016. In addition, the EU-India Green Hydrogen Forum, which was first held in India in September 2022, produced a framework where India can play a vital role, especially in supporting all the objectives of the EU-India Global Gateway Strategy, such as the infrastructure, connectivity, and sustainability plan of 300 billion euros, which is being deployed to counter China's BRI scheme. The Global Gateway Strategy openly announced plans to support the increase in green hydrogen energy capacity in India while reiterating the importance of the integrity of the Indo-Pacific supply chain to accelerate the region's transition and integration with European policies. The India Hydrogen Alliance has also signed a Memorandum of Understanding with the European Investment Bank (EIB), which will provide 1 billion euros to India to finance green hydrogen projects and accelerate India's ambition to become a large-scale global green hydrogen hub. In addition, credit assistance is also provided by the EIB to the Government of India in financing the public sector with the help of private sector involvement in it (Gili & Blasio, 2024). .

Furthermore, to optimize the innovation and business aspects, the EU-India Trade and Technology (TTC) was launched in May 2023 in Brussels. TTC itself is a working group on clean and green energy technologies, including green hydrogen (66). Initiatives undertaken to support the EU Hydrogen

Strategy, which requires the European Union to produce 10 million tonnes of renewable hydrogen domestically and import the same amount by 2030.

Shifting Green Hydrogen Production and Consumption Patterns Affecting Interstate Relations and Domestic Politics in Green Hydrogen Exporting and Importing Countries

Changes in the behavior of developed countries that have begun to shift fossil fuel development to the development of green hydrogen export infrastructure (India), improvements in electrolyzer technology (China), and increasing domestic green hydrogen needs (European Union and Japan) indicate a shift in production and consumption patterns to renewable energy, including green hydrogen. The shift in production and consumption patterns of green hydrogen has influenced the interaction between exporting and importing countries. For example, from the exporter side, India as a pioneer and central player is increasingly increasing its maneuvers in the Quad strategic alliance that controls the Indo-Pacific region to accelerate technological innovation, research and competitive production financing. Moreover, the G7 countries strongly support this integration through the PGII instrument to strengthen solid regional infrastructure.

At the same time, India is strengthening its interactions with the Gulf and Middle East countries to ensure the sustainability of IMEC logistics development. Obstacles that are visible and can reappear, such as the Israel-Hamas War, the closure of the Suez Canal and the Strait of Hormuz will force India to influence the domestic politics of countries in the region in order to maintain regional stability.

In addition, the European Union as an importer of green hydrogen from India has also deployed its domestic political policies to support India's capacity building in producing hydrogen, be it financial assistance, credit, or research and technology. Investment assistance that is very beneficial to India, both from the G7 and the Quad will increase the achievement of The National Green Hydrogen Mission of India. If the value of investment and partnership relations are maintained in the long term, it will certainly make The National Green Hydrogen Mission of India a very profitable policy for the country and needs to be continued.

Domestic Energy Politics Influences Relations Between Green Hydrogen Exporting and Importing Countries

In addition to being observed through changes in production and consumption patterns of green hydrogen-exporting and -importing countries, domestic energy politics also influence relations between countries. For example, the United States has a national interest in reducing the dominance of China and Russia through investment assistance, such as PGII in the G7 and the Quad. This also influences the domestic politics of the European Union, which also slowly wants to be free from energy dependence on Russia. This mutually influencing domestic energy politics has an impact on changing the landscape of hydrogen exporter-importer relations, where Germany initially focused on controlling Africa as the largest potential store of green hydrogen but also utilized the power of the G7 to expand its supply area from the East, namely India. India's increasing needs make it necessary to improve relations between the Quad countries so that the alliance does not only focus on traditional

security issues but also ensures the strength of the Indo-Pacific hydrogen infrastructure that benefits India, Japan, Australia, and the United States. In addition, through the Act East Policy orientation, India is increasingly demonstrating the relevance of its contribution to the development of Asian and European connectivity that changes the landscape of how Germany prioritizes Africa if the IMEC project is successfully built and how the trend of changing the value of cooperation between the European Union and BRI or Russia, which have so far been their mainstay in obtaining their energy supplies. As a party that understands Europe's needs and the need to improve infrastructure on water and land routes, the Middle East region will be a new challenge for India in navigating the diverse geopolitical dynamics of hydrogen from both the West and the East.

International Relations Issues and Domestic Energy Politics Shape Green Hydrogen Production and Consumption Patterns

Berbagai masalah yang kerap kali muncul dalam Hubungan Internasional, seperti The conflict in the Strait of Hormuz and Hamas-Israel has become a real obstacle to several processes of interaction between countries, both in terms of trade and citizen mobility, as well as the development of IMEC, which was just initiated in 2023. The uncertainty of the Middle East region has also changed the behavior of green hydrogen consumption and production to be more careful in issuing investment assistance. In this case, of course, India, as a multi-bloc country, has played its role in various regions so that the European Union's consumption pattern is not disrupted and the production pattern of India and the Middle East itself can run in accordance with the investment value received and competitive costs.

Changes in hydrogen consumption and production patterns that are increasingly centralized in the IMEC region have also indirectly changed the pattern of relations between other countries that are not part of this region, such as Japan, Australia, and Africa, which are not calculated in the IMEC profit projection. It is not impossible for Japan to rethink how to build its strength in Southeast Asia so that it can still meet the national hydrogen energy mix target.

Neo-Mercantilism Frame as India's Dominant Foundation for Navigating Hydrogen Geopolitics

Based on the dynamics of interactions that have been built between India and other countries that are members of the Quad, G7, and the Gulf States, it shows that the frame/paradigm used by the Indian government to become a green hydrogen power hub is the neo-mercantilism frame. The main goal is to achieve national interests contained in the National Green Hydrogen Mission of India. India is quite careful in utilizing its strategic geopolitical position by looking at the reality of national production readiness and export markets that are close to Europe via the Middle East. The availability of green hydrogen production is a central point as well as a priority component for every decision taken both in negotiations with the Quad Alliance, the European Union, and the Gulf States as reflected through the IMEC project. Global energy political interactions are very much reflected in being used to achieve India's hydrogen energy security. The aspects of political independence and territorial integrity are the main values that underlie India's maneuvers to create green hydrogen infrastructure connectivity from Asia to Europe. On the other hand, India also supports similar

ambitions by Japan, which wants to become a global hydrogen player in the Indo-Pacific region through the unity of the Quad strategic alliance. The dominance of the G2G (government-to-government) approach is increasingly evident in how India plays its role in negotiating with the Gulf States and the Middle East to maintain regional stability. The Israel-Hamas war that has been going on since 2023 will disrupt the sustainability of the IMEC project. The dynamics of this kind of interaction cannot be carried out solely on the basis of market mechanisms, but India has a national interest in ensuring that all IMEC developments, both land and sea routes, are perfectly connected to the Middle East and to Europe. This is because this region will be the midpoint and determinant for the certainty of the availability of green hydrogen in Europe. The European Union will certainly also insist on helping India ensure regional stability so that the supply of green hydrogen is optimally distributed. In several agreements with Australia and the European Union, India emphasizes investment assistance to reduce hydrogen production costs and improve technological infrastructure; this can certainly be seen through the framework of market liberalism. However, this frame does not really reflect India's behavior in navigating hydrogen geopolitics to create an IMEC that can be said to be more burdensome to G2G interactions. Moreover, the green hydrogen market mechanism in 2024 has not been fully formed and is predicted to only be achieved in 2030. At least, in the early period since the announcement of The National Green Hydrogen Mission of India until the ratification of IMEC at the G20 in 2023, India still uses the neo-mercantilism frame. It is different if the market mechanism is ready to take off in 2030; it is likely that the market liberalism frame will be dominant in explaining the dynamics of interaction between India and related countries, such as in determining export-import prices, increasing logistics shipping capacity along with the construction of IMEC railways and ports, especially competition with other countries as fellow green hydrogen exporters.

Conclusion

The trend of changing global energy politics that is starting to shift from fossil fuels to renewable energy—including green hydrogen—has now formed the dynamics of a three-way relationship between energy, international relations, and India's domestic politics with the G7, the Quad, and the Middle Eastern countries, which is manifested in the IMEC cooperation framework. The shift in production and consumption patterns of increasingly specialized green hydrogen exporting and importing countries strengthens India's maneuvers in navigating the dynamics of global hydrogen geopolitics, starting from strengthening strategic alliance cooperation with the Quad for research and technology investment, increasing diplomatic relations with the Gulf and Middle East countries to ensure regional stability, and increasing the investment value of the European Union through high-level green hydrogen forums that mutually influence domestic political decisions and interactions between hydrogen exporting and importing countries. The ambition to realize The National Green Hydrogen Mission of India is increasingly making India expand its domestic influence on the global hydrogen market interaction order, which makes the European Union invest more so that the availability of green hydrogen supplies to the country becomes

more secure. On the other hand, India has contributed to strengthening the solidarity of the Quad in giving meaning to the relevance of the development of the hydrogen industry in the Indo-Pacific region in line with the national interests of Australia and Japan. In addition, the G7's PGII instrument is considered an extension of the United States' interests in creating a new rival to China's BRI project and influencing the European Union to reduce its dependence on Russian energy.

For the smooth development of the IMEC project, the problems of international relations that often arise, such as the closure of the Strait of Hormuz and the Hamas-Israel war, need to be a concern for India in ensuring the success of the IMEC project and strengthening its position as a global player bridging the interests of the Indo-Pacific, Europe, and the Middle East. If India fails to ensure regional stability, then the production and consumption patterns of green hydrogen exporters and importers have the potential to change.

The dominant archetypal frame in India's role in navigating the geopolitical dynamics of hydrogen to the IMEC agreement is the neo-mercantilism frame. This can be seen from all the maneuvers or initiatives carried out by India, which are more focused on the G2G approach that focuses on national energy security. Aspects such as territorial integration and political independence are seen as key values underlying India's maneuvers to create green hydrogen infrastructure connectivity from Asia to Europe.

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