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Southeast Asia's Search for Energy Security Amidst Geopolitical Shocks

Center for Energy
and Climate

Thibault MICHEL

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Executive summary

Following the Hormuz disruption, energy security is now at center stage for the Association of Southeast Asian Nations (ASEAN) countries. Maintaining coal's importance at its current level in power systems appears unlikely in Malaysia and Thailand, possible in Vietnam (which faces a sharp rise in electricity demand), whereas Indonesia and the Philippines—the countries with the highest levels of dependence on this energy source—have not yet initiated concrete planning to effectively limit coal consumption's growth.

The Hormuz crisis exposed the fragility of several liquefied natural gas (LNG)-related infrastructure projects (natural gas-fired power plants and import terminals), notably in Vietnam and the Philippines. There is a high number of projects being canceled or shelved, such as 5.9 gigawatts (GW) of gas-fired capacity in the Philippines between January and August 2026.

Thailand, Indonesia, and especially Malaysia have shown greater resilience (partly due to their domestic production). Despite cancellations, the project pipeline remains substantial. The 2026 crisis is thus prompting countries in the region to adjust their trajectories and reduce their exposure—notably through supply diversification and renewable energy capacity development— without fundamentally modifying the momentum of their transition toward an increased role for natural gas.

Countries in the region have developed ambitious Power Development Plans (PDPs) that place strong emphasis on solar photovoltaics (PV), natural gas, and Battery Energy Storage Systems (BESS), as well as, to a lesser extent,

wind and hydroelectric power. However, realizing these ambitions faces several obstacles: high capital costs (particularly in Indonesia and Vietnam); the need for electricity market reforms to encourage private investment (Indonesia, Malaysia, Thailand, and Vietnam operate under a single buyer model for their electricity system); political instability; and undersized power grids. Regarding the latter, the ASEAN Power Grid project holds clear potential, yet its development remains hampered by financing issues and, above all, governance and planning challenges. Singapore's chairmanship of ASEAN in 2027 is a strong window of opportunity for this initiative.

Economic growth in the region has slowed but remains resilient, particularly in Malaysia, Indonesia, and—most notably—Vietnam. Value chains' integration—especially in sectors of the energy and digital transitions—remains a key objective. However, the region's economies face vulnerabilities beyond the 2026 crisis, notably pressures stemming from the United States–China rivalry (abandonment of certain projects, tariffs, fierce competition and deindustrialization). This situation makes diversifying trade and investment relationships increasingly critical—as seen, for instance, in Indonesia's move to join the BRICS; Indonesia and Thailand's Organisation for Economic Co-operation and Development (OECD) accession process; the European Union (EU)–Indonesia and EU–Philippines trade agreements, and ongoing discussions with Malaysia and even more so Thailand.

This diversification also requires adapting to rising environmental standards in export markets (such as the EU Carbon Border Adjustment Mechanism, CBAM), a primary driver of corporate decarbonization. ASEAN exports of steel and aluminum CBAM-covered items to the EU have grown sixfold over the last decade, and the EU market represents up to one quarter of total exports for Thai and Vietnamese steel items. Some investments in decarbonizing the steel industry are visible, but projects betting on process electrification to cut emissions will need substantial volumes of low-carbon electricity.

Decarbonization strategies are also elaborated by state-owned oil and gas companies (Pertamina, Petronas, PTT, PetroVietnam), which are expanding into new businesses such as Carbon Capture and Storage (CCS) and biofuels, including Sustainable Aviation Fuel (SAF). SAF production is progressing since 2025, while Indonesia, Malaysia, and Thailand—recognizing the economic and energy security potential of biofuels—are seeking to foster these segments. However, Singapore remains the only country with a significant active SAF mandate currently in place. The main challenge lies in scaling up projects and pilot sites into full-scale industrial facilities, particularly for CCS and, even more so, for low-carbon hydrogen.

Résumé

La sécurité énergétique est devenue une priorité pour les pays de l'Association des Nations d'Asie du Sud-Est (ASEAN), priorité pour laquelle ces États misent notamment sur la diversification de leurs approvisionnements et le développement des énergies renouvelables. La crise d'Ormuz a renforcé cette dynamique, sans remettre en cause le rôle croissant du gaz naturel. Le charbon a amorcé un léger recul en Malaisie et en Thaïlande, recul qui reste incertain au Vietnam, tandis que l'Indonésie et les Philippines n'ont pas encore engagé de plans concrets afin de réduire son importance. Les plans de développement des secteurs électriques privilégient le solaire, le gaz et les batteries de stockage, mais restent entravés par les coûts d'investissement, l'insuffisante ouverture des marchés de l'électricité à l'investissement privé, l'instabilité politique et l'insuffisance des réseaux.

La croissance des économies de l'ASEAN demeure résiliente et ses États cherchent à renforcer leur intégration dans les chaînes de valeur des transitions énergétiques et numériques. Les tensions sino-américaines et les nouvelles exigences environnementales, notamment le Mécanisme d'ajustement carbone aux frontières (MACF) européen, renforcent la nécessité de diversifier les partenariats commerciaux et d'investissement. Les compagnies pétrolières et gazières nationales développent également le captage et stockage du dioxyde de carbone (CCS) et les biocarburants, notamment les carburants d'aviation durable (*sustainable aviation fuel*, SAF). Malgré de nombreux projets lancés, le passage à l'échelle industrielle, en particulier pour le CCS et l'hydrogène bas-carbone, reste un défi majeur.

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Introduction

Southeast Asia is increasingly important in global energy and industrial value chains. This role is set to strengthen in the coming years, amid economic and population growth and rising electricity demand. The region already represents a population of 700 million people and a gross domestic product (GDP) of USD4,100 billion. According to the International Energy Agency (IEA), Southeast Asia is expected to account for 20% of the increase in global energy demand to 2035, and power consumption in the region is projected to rise by around 75 terawatt-hours (TWh) per year by that time (under its Current and Stated Policies scenarios).[1]

Figure 1. Demographic expansion of ASEAN's most populated member states, 2015-2030f

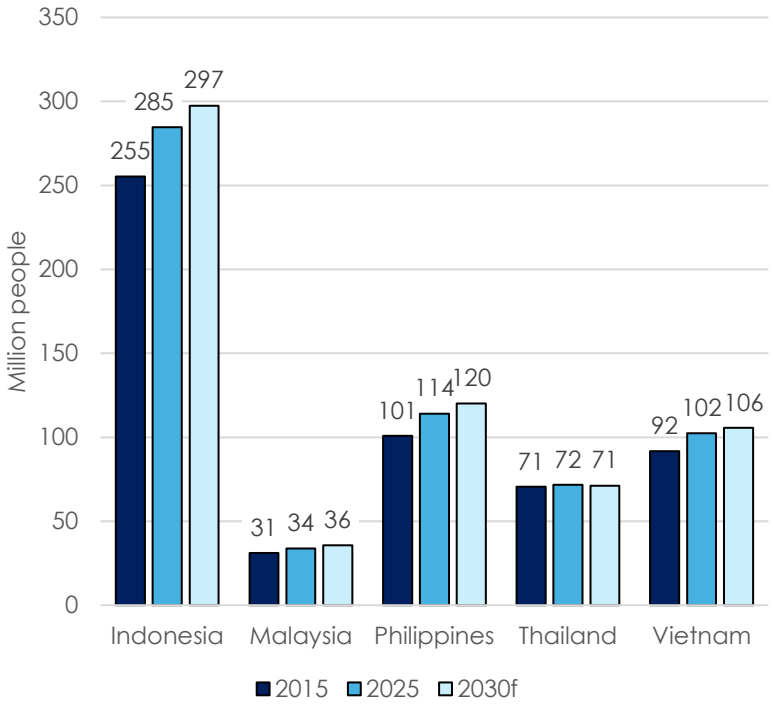
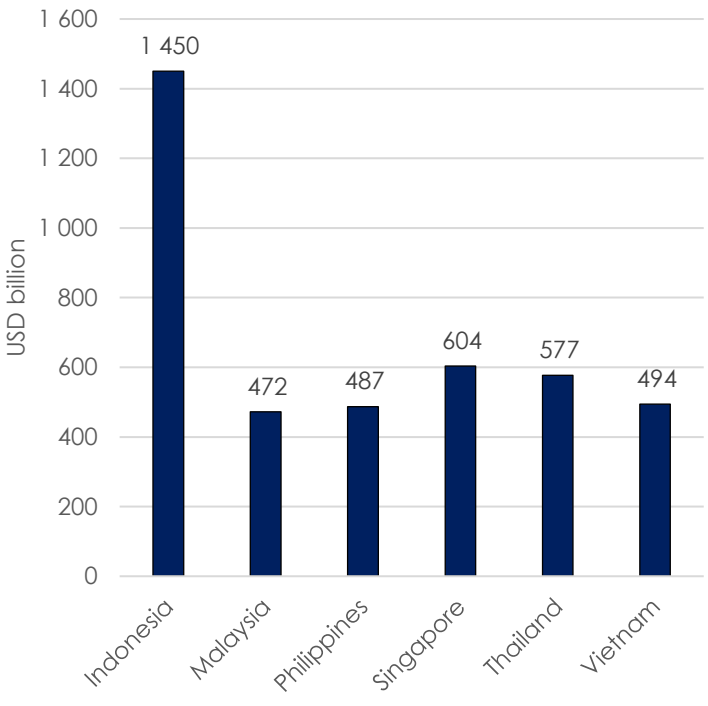


Figure 2. Nominal GDP, current prices, 2025



Source: Ifri, based on data from the International Monetary Fund (IMF).

However, Southeast Asia remains largely dependent on external supplies to meet its energy needs. Oil and gas production in the Association of Southeast Asian Nations (ASEAN) is experiencing a structural decline, making imports increasingly important. As a result, the region has been particularly

1. "Southeast Asia Energy Outlook 2026", IEA, June 2026, p. 61, available at: www.iea.org.

vulnerable to the effects of the Hormuz crisis since February 2026, with the Middle East being one of its main oil suppliers.

Current energy supply relies heavily on coal, a local resource that accounts for 30% of the region's final energy consumption but carries significant negative externalities, including greenhouse gas (GHG) emissions and air pollution. Renewable energy sources remain underdeveloped despite some recent progress and significant potential, notably in solar photovoltaics (PV), hydropower or geothermal energy.

Southeast Asia thus faces the need to transform its model and the challenge of reconciling continued economic growth with decarbonization imperatives. This challenge is made even more complex by the geopolitical situation of the ASEAN countries, situated at the core of the China–United States (US) competition, a position that presents both opportunities and risks. Diversifying trade relations toward third-party partners is therefore emerging as a priority for economic security.

This *Paper* explores whether Southeast Asia can genuinely transform its energy and industrial model by effectively implementing its countries' decarbonization and economic development agendas. How is the Hormuz disruption shaping the energy strategies of the ASEAN member States? The focus is on the five largest ASEAN countries—Indonesia, Malaysia, Thailand, Vietnam, and the Philippines—which together account for 87% of the region's population and 82% of its GDP. Specific information regarding Singapore is also included.

The crisis in the Middle East reinforces the quest for energy security and diversification

Southeast Asia has been severely impacted by the Hormuz crisis. Supplies of oil and petroleum products to the region have been significantly reduced, particularly for Thailand, Vietnam, and the Philippines, which had the highest levels of dependence on the Middle East (59%, 86%, and 96% for crude oil in 2024, respectively, according to the IEA.[2]

Significant but differentiated effects depending on the countries

These tensions have been reflected in particular in fuel prices. Approximately 90% of crude oil consumed in ASEAN is usually processed by intra-regional refineries, resulting in low exposure to imports of petroleum products.[3] However, this refining activity relied heavily on crude oil supplies from the Middle East, which have been sharply reduced due to the Hormuz crisis. Regional refineries then lacked the necessary feedstock, forcing countries in the region to import high-priced refined petroleum products directly.

The effects on prices have been most pronounced in the Philippines, which had low storage levels and declared an “energy emergency” in early March. While the energy markets in Indonesia, Malaysia, Thailand, and Vietnam are relatively vertically integrated, the Philippines has liberalized markets and smaller players with less leverage to renegotiate contracts globally. Indonesia and, to an even greater extent, Malaysia saw more limited domestic retail price increases, most notably because they maintained pre-crisis price levels for subsidized fuels, resulting in higher national budget expenditures. Malaysia has thus reduced the individual quota for subsidized fuel from 300 to 200 liters,[4] while Indonesia has cut the frequency of its free meal program from six to five days a week to reduce government spending.

Japan and Singapore are now spearheading efforts to coordinate a common crude stock holding and release system that would involve other countries in the region.

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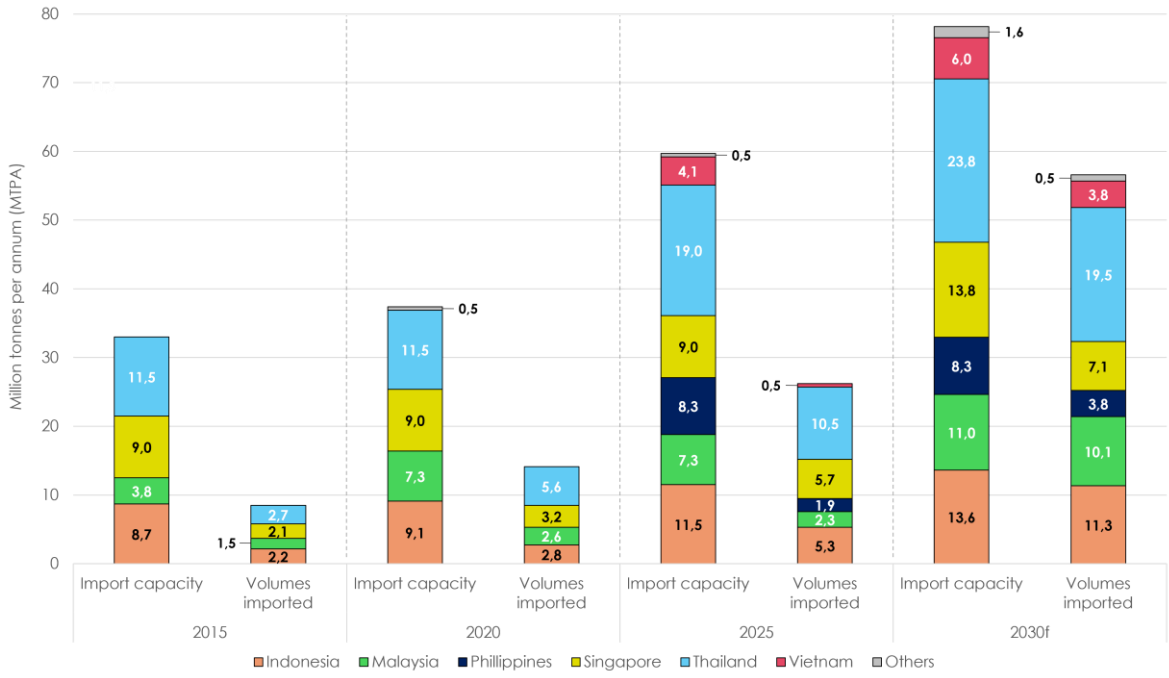
2. “Southeast Asia Energy Outlook 2026”, IEA, June 2026, available at: www.iea.org.
3. “ASEAN Energy Security Review", IEA, October 2026, p. 36, available at: www.iea.org.
4. L. Amin, C. Nyen Yiau, “Monthly subsidised RON95 to be capped at 200 litres from April 1, confirming The Edge report”, The Edge Malaysia, 26 March 2026, available at: https://theedgemalaysia.com.

Natural gas: growing role amidst vulnerability to price shocks

In terms of liquefied natural gas (LNG), the Gulf countries accounted for a moderate share of these five countries' supplies: 28% for Thailand in 2025, 20% for Vietnam, 11% for the Philippines, and less than 5% for Malaysia and Indonesia.[5] The effects—particularly on prices—were most pronounced in Thailand, a country whose economy is significantly more gas-dependent (and less coal-dependent) than its neighbors, with gas accounting for about 30% of Thailand's energy mix and more than 60% of electricity generation. Thailand also sources a large portion of its LNG supplies from spot markets (40% in 2025), a pattern also seen in Singapore (70%), Vietnam (75%), and in the Philippines (more than 90%).[6]

Despite these challenges, the growing role of natural gas in regional economies does not appear to be in jeopardy in the coming years. Gas consumption is being driven upward, in particular, by the electricity sector, which accounts for 50% of regional gas consumption, with an additional 24 gigawatts (GW) of gas-fired power plants announced by 2030,[7] accompanied by a 30% increase in LNG import capacity (see Figure 3).

Figure 3. Southeast Asia's LNG import capacity and imported volumes, 2015-2030f



Source: Ifri, based on data from the GIIGNL report and "ASEAN Energy Security Review", IEA, October 2026, p. 63, available at: www.iea.org.

5. GIIGNL Annual Report 2026, available at: www.giignl.org.
6. "ASEAN Energy Security Review", IEA, October 2026, p. 67, available at: www.iea.org.
7. Ibid., p. 55.

The Hormuz crisis, however, highlights vulnerabilities in the region's natural gas development, which vary in severity across markets.

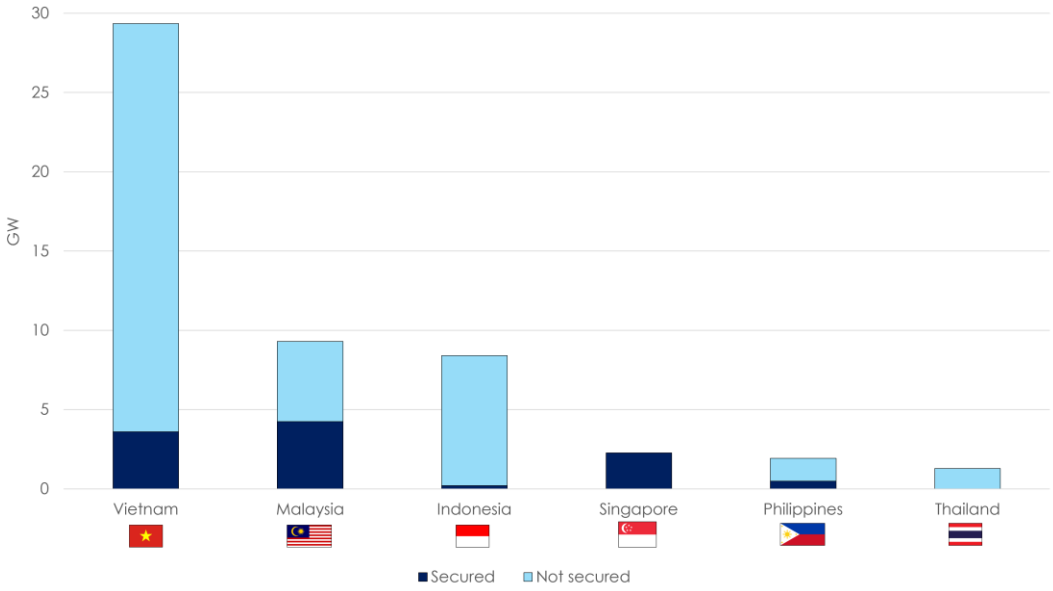
The countries most affected are emerging markets, particularly the Philippines and Vietnam. Beyond rising LNG prices and supply constraints, these two countries are facing particular difficulty in securing gas turbines for their power plant projects—lead times for acquiring new turbines now reach five years due to manufacturers' backlogs.[8] The weakening of local currencies (the Vietnamese dong and the Philippine peso) against the dollar (USD) is also driving up the cost of equipment imported from abroad.[9] These factors undermine the ability to finance new gas-fired power plant projects and, by extension, new LNG import terminals. As a result, few new power plants were actually commissioned between 2021 and 2025 in the Philippines and Vietnam.[10] The 2026 situation has exacerbated these vulnerabilities: in the Philippines, 11.2 GW of new gas-fired capacity was shelved or canceled during H2-2025 and H1-2026, reducing the project pipeline from 19.7 GW in January 2026 to 13.8 GW in August. Furthermore, these projects remain largely in the early stages.[11]

These vulnerabilities also exist in Thailand, but to a lesser extent. Securing turbines remains a complex challenge, but Thailand's needs are more limited than Vietnam's, in particular. The Thai sector, which is larger, also benefits from economies of scale and a well-established natural gas industry. Thailand has thus been able to bring more new gas-fired power plant projects to completion in recent years.[12]

For its part, Malaysia demonstrates a strong capacity to implement gas infrastructure projects: a significant portion of its turbine supply is secured, while 4.2 GW of power plants began construction in H1-2026, with no project cancellations. As of August, 10.8 GW were under development, including 5.3 GW under construction.[13] Plans for new power plants are also part of a relatively long-standing regional electricity sector development plan (adopted in 2023). Furthermore, domestic gas production allows for flexibility and strengthens the projects' appeal to investors. Indonesia benefits from domestic production as well, though it faces greater challenges in securing turbines.

8. "Southeast Asia to Deliver Less Than One-Third of Planned Gas Power Capacity by 2030", Wood Mackenzie, August 4, 2026, available at: www.woodmac.com.
9. S. Reynolds, C. Doleman, "LNG-to-Power in Emerging Asia: A Five-Year Review of Project Outcomes", Institute for Energy Economics and Financial Analysis, November, 2026, p. 14, available at: https://ieefa.org.
10. Ibid., p. 19.
11. W. Ajaz, "Supply Disruptions in the Strait of Hormuz Stress Test Southeast Asia's Gas Buildout", *Global Energy Monitor*, September, 2026, available at: https://globalenergymonitor.org.
12. S. Reynolds, C. Doleman, "LNG-to-Power in Emerging Asia", op. cit., p. 19.
13. W. Ajaz, "Supply Disruptions in the Strait of Hormuz Stress Test Southeast Asia's Gas Buildout", op. cit.

Figure 4. Secured and non-secured turbines for gas-fired power projects (scheduled for 2026-2030) in Southeast Asia, as of August 2026



Source: Ifri, based on Wood Mackenzie, available at: www.woodmac.com.

Regarding Singapore, the country's financial strength and ability to anticipate equipment needs support the soundness of its projects, as evidenced by its ability to secure turbines for upcoming capacity additions.

The diversity of national circumstances and the degree of market maturity also affect the ability to secure long-term contracts. In this regard, domestic production in Indonesia and Malaysia represents a significant advantage. Indonesia's state-owned electricity provider, PLN, and gas provider, PGN, have signed agreements to significantly increase their supplies from Indonesia in 2026,[14] as domestic gas production shows growth potential through 2030.[15] Malaysia is pursuing a strategy to diversify its portfolio, with a 2 million tons per annum (MTPA) agreement signed with QatarEnergy in February 2026 (for a 20-year period),[16] which has not been called into question since the start of the crisis. For its part, Thailand secured just over 1 million tons (MT) of LNG supplies in 2026 through contracts between Gulf and ENGIE (0.8 MTPA, signed in January)[17] and Brunei LNG (volume not publicly disclosed, signed in June).[18]

14. "Searah, Pertamina and Partners Sign Three Long-Term LNG Supply Agreements with PLN and PGN", Searah, October 28, 2026, available at: https://searah.com/newsroom.
15. "ASEAN Energy Security Review", op. cit., p. 56.
16. "PETRONAS Signs 20-Year LNG Supply Agreement with QatarEnergy", Petronas, February 4, 2026, available at: www.petronas.com.
17. "ENGIE and Gulf Sign 15-Year LNG Agreement to Strengthen Thailand's Energy Security", ENGIE, January 13, 2026, available at: https://engie-sem.com.
18. "Brunei LNG Seals Another SPA with PTT", GIIGNL, June 5, 2026, available at: www.giignl.org.

Vietnam has successfully secured its first long-term contracts with Shell (0.4 MTPA for 2027–2031)[19] and Novatek (0.5 MTPA). The Philippines has a contract with Vitol set to begin in 2025, but the volumes under that contract (0.8 MTPA)[20] cover less than half of the country's 2025 imports (1.9 MTPA).

Some manufacturers are turning to natural gas, with growing interest from the steel sector: Esteel Enterprise Sabah (Malaysia),[21] Southern Steel (Vietnam), which switched reheating furnaces from fuel oil to natural gas,[22] and more recently PT Krakatau Steel (Indonesia).[23] Gas demand, however, remains primarily driven by the power sector.

The 2026 crisis thus highlighted preexisting vulnerabilities that were unevenly distributed across the region, with emerging markets—whose projects were the less advanced and resilient—being the hardest hit. While some projects have been weakened or even canceled, the pipeline of gas-fired power plants and LNG import terminals remains substantial.[24]

Governments have also realized that LNG import capacity does not guarantee either volume or affordable prices. This situation is prompting certain countries—Thailand and Vietnam in particular—to reassess their exposure and adjust their trajectories by promoting the growth of renewable energy, without, however, calling into question the fundamentals underpinning the growing role of natural gas at the regional level, namely the need to meet rising electricity demand. Despite the challenges encountered in 2026, gas consumption in Thailand's electricity sector increased during the first three quarters of 2026 (+13% year-over-year), as did LNG imports (+30%).[25]

Responses: diversification, domestic production, substitution

This crisis has given renewed importance to the concept of energy security, which translates into various strategies and ambitions:

- **Efforts to diversify supply sources**, particularly for LNG, with renewed emphasis on partners such as Australia and the US.
- **Intensification of domestic exploration and production of oil and gas** in Malaysia and Indonesia, which represent 70% of the current

19. "Shell and PV Gas Seal LNG Supply Deal", GIIGNL, July 10, 2026, available at: www.giignl.org.
20. "Vitol, LNGPH Sign Long Term Gas Supply Deal into the Philippines", Vitol, March 4, 2025, available at: www.vitol.com.
21. S. Lee, "Sabah Inks RM1bil Gas Supply Deal to Boost Green Steel Industry", *The Star*, February 25, 2025, available at: www.thestar.com.my.
22. "Critical Improvements of Steel Industry Required", CPA Vietnam, November 24, 2026, available at: https://cpavietnam.vn/en.
23. "Krakatau Steel and JOVO Sign MoU to Develop LNG terminal in Cilegon", SteelOrbis, November 24, 2026, available at: www.steelorbis.com.
24. W. Ajaz, "Supply Disruptions in the Strait of Hormuz Stress Test Southeast Asia's Gas Buildout", op. cit.
25. "Global Gas Security Review 2026", October 31, 2026, p. 49, available at: www.iea.org.

regional natural gas production (150 billion cubic meters per year).[26] This strategy also allows these two countries to strengthen their territorial presence in the South China Sea, as most deposits lie along the northern coast of the island of Borneo, in often disputed areas. In Malaysia, this expansion remains constrained by a conflict between Petronas, the national oil and gas company, and Petros, the Sarawak state-owned company, over the exploitation of the state's oil and gas reserves.[27]

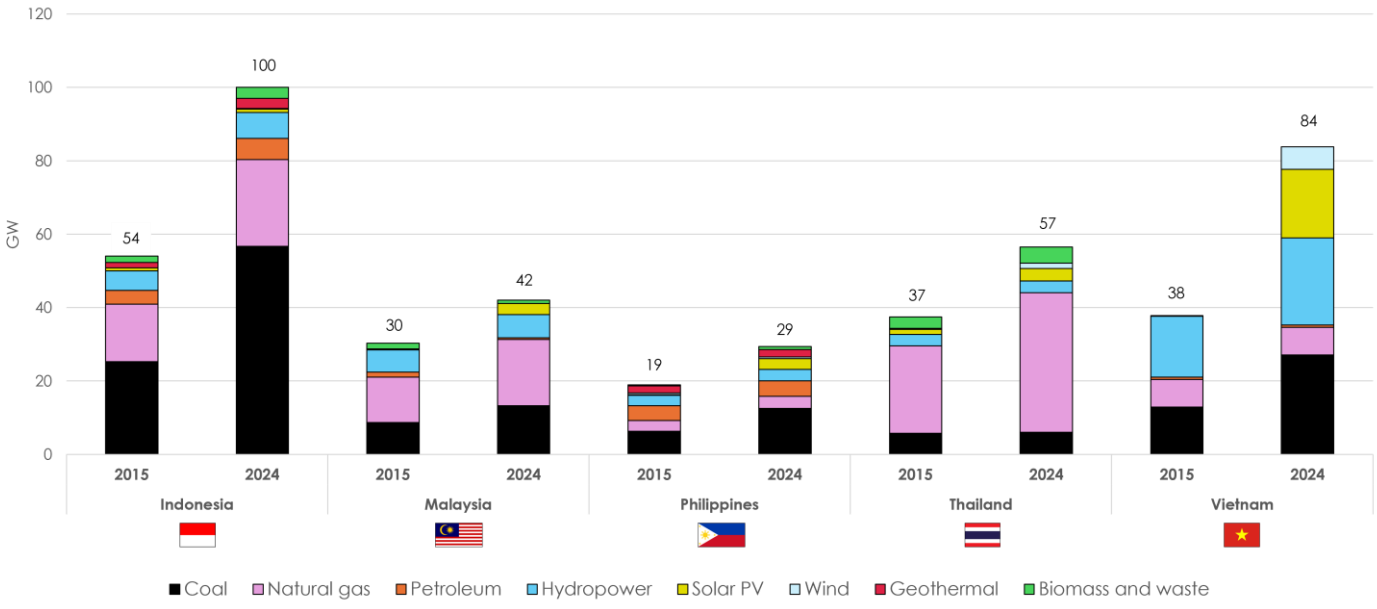
- **Energy substitution and transition**: growing awareness of dependence on hydrocarbons is driving greater interest in developing renewable electricity sources. This trend is particularly pronounced in Thailand, where the Minister of Energy recently announced a goal to increase the share of renewable energy in the national electricity mix to 60% by 2050.[28] However, Thailand is a special case because of its high dependence on natural gas. In the other four countries, renewable energy—particularly solar power—is also gaining momentum, but this is not expected to reduce the role of natural gas in the near term, especially since coal still accounts for at least 40% of electricity generation in these countries.

26. "ASEAN Energy Security Review", IEA, October 2026, p. 51, available at: www.iea.org.
27. "Petronas-Petros Deal Down to Final Details, Says PM", Sarawak Tribune, September 16, 2026, available at: www.sarawaktribune.com.
28. "Thailand to Shift from LNG Towards Renewables in Wake of Iran War", *The Straits Times*, August 27, 2026, available at: www.straitstimes.com.

What transformations lie ahead for the electricity sectors?

The last decade has seen the development of renewable electricity capacity (see Figure 5), particularly solar PV (+27 GW) and wind (+8 GW), in Vietnam and, to a lesser extent, in Thailand, Malaysia and the Philippines. However, fossil fuel capacity increased more (86 GW, of which 57 GW is coal and 28 GW is gas) than renewables (47 GW).

Figure 5. Installed electricity capacity in selected ASEAN countries in 2015 and 2024



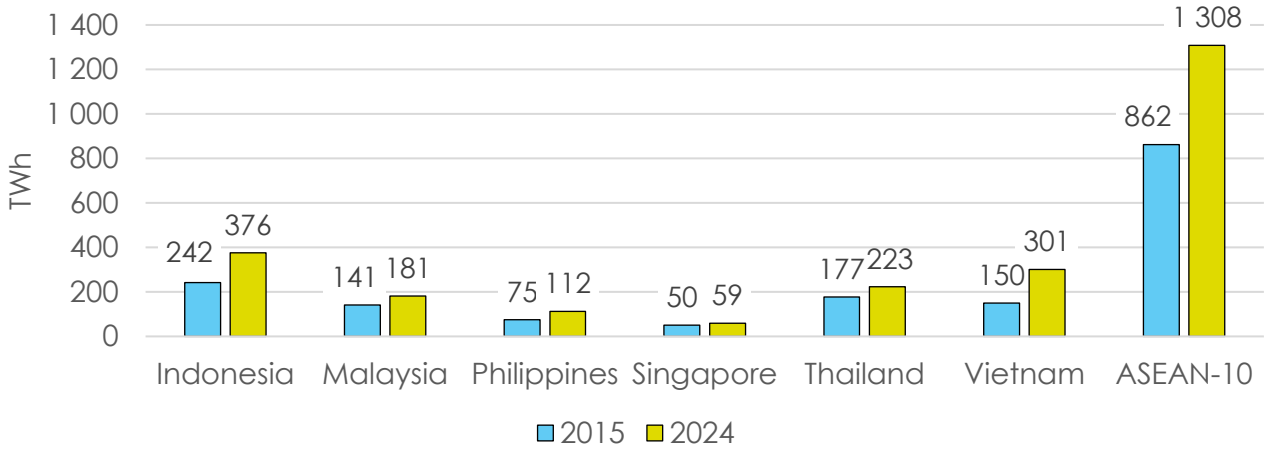
Source: Ifri, based on data from Ember, available at: https://ember-energy.org.

Power development plans: strong momentum for solar PV, gas, and BESS

This new capacity has helped to meet the sharp rise in electricity demand (6% average increase per year since 2015): over this period, electricity consumption in Vietnam has doubled (+150 TWh),[29] whilst that of Indonesia and the Philippines has increased by 50%. Despite smaller increases, notably due to higher living standards, Malaysia and Thailand have recorded increases of around 30%.

29. US Energy Information Agency, available at: www.eia.gov.

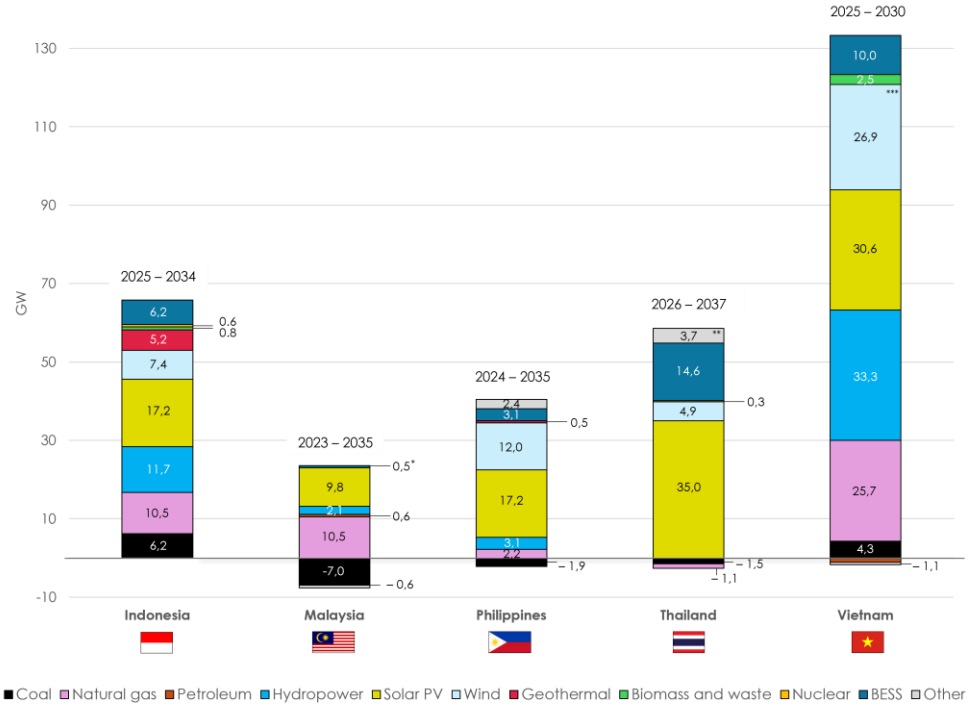
Figure 6. Power consumption evolution in ASEAN countries, 2015-2024



Source: Ifri, based on data from the US Energy Information Administration, available at: www.eia.gov.

In recent years, Malaysia, Vietnam, the Philippines and Indonesia have presented power development plans (PDPs) or similar documents, with varying timelines (see Figure 7). Thailand's PDP is still in draft form and is expected by the end of 2026. The assumptions made here are based on a draft published in early September, the latest known version of the Thai strategy.

Figure 7. Net capacity additions in selected ASEAN countries, according to the national PDPs



Source: Ifri, based on data from the national PDPs (RUPTL 2025-2034 for Indonesia; National Energy Transition Roadmap for Malaysia; PDP 2023-2050 – Scenario CES-1 for the Philippines;

PDP 2026 Draft presented in early September 2026 for Thailand – therefore not definitive; PDP8 revised version of 2025 for Vietnam).

Note: Vietnam's revised PDP8 (2025) presents low and high targets for most energy sources. Values presented here are the low targets.
Targets displayed in Indonesia's RUPTL 2025-2034 are capacity additions. This document does not detail capacity retirements. Power plant retirements in Indonesia are considered negligible here, especially since the government said no coal power plant retirements will take place before 2034.
The Philippines' PDP 2023-2050 presents several scenarios, none of them having been formally adopted. The assumptions made here are based on the Clean Energy Sources 1 (CES 1) scenario, an intermediary between the baseline scenario and CES 2, which is more ambitious on wind.
Some countries have included nuclear capacity targets for the coming years: Vietnam (4 to 6 GW to be commissioned between 2030 and 2035, especially through the Ninh Thuận 1 and 2 projects), Indonesia (0.6 GW by 2034), Thailand (0.3 GW by 2037). The Philippines' PDP includes a capacity target of 4.8 GW by 2050 in its CES 1 Scenario (intermediary).
* Malaysia's National Energy Transition Roadmap – published in 2023 – does not display targets on BESS, and the country has not set precise national targets since then. As a result, the value presented here is likely to be revised significantly upward in the coming years.
** In the case of Thailand, the category "Other" can include, among others, bioenergy and geothermal, as details for renewable energy sources other than solar and wind were not displayed.
*** Vietnam initially set a target of 26.9 (low) to 49.9 (high) GW of net wind – onshore and offshore – additional capacity by 2030. Because of implementation delays, the target for offshore wind (6-17 GW) was postponed to 2035.

Indonesia and Vietnam plan to add coal-fired capacity in the coming years. Malaysia and Thailand plan to reduce such capacity, an ambition that appears realistic given actual reductions over the last two years. In the context of the energy crisis, a policy shift—notably the construction of new coal-fired power plants after the set deadlines for ceasing the addition of new coal-fired capacity—seems unlikely in Malaysia and Thailand but remains a possibility in Vietnam (where the construction of new power plants is planned to be stopped by 2030) and in a country facing a sharp increase in electricity demand. Indonesia and the Philippines have not announced official dates for halting the construction of new coal-fired power plants or extension of existing coal-fired capacity.

Natural gas, viewed as a transition fuel for the electricity system, is set to see significant new capacity additions in Vietnam, Malaysia and Indonesia. However, as mentioned above, integrating this new capacity is likely to be hampered by imbalances in the gas turbine market. Only Thailand is expected to reduce its gas-fired power generation capacity, which currently accounts for 67% of the country's installed capacity.

Solar power, whose potential is fairly evenly distributed across the region, is the main driver of new renewable capacity, ahead of hydropower. Areas with a high wind capacity factor are concentrated along the Vietnamese coast, in the north of the Philippines, and in Southeastern Indonesia. Vietnam aims to install 21–33 GW of onshore wind and 6–17 GW of offshore

wind by 2035 (the offshore-wind target date was originally 2030 but has been pushed back to 2035 due to delays). The past and future addition of this solar and wind capacity is driving the market for battery energy storage systems (BESS), with many Chinese players establishing a presence in Vietnam to market BESS for the residential, commercial and industrial sectors in a new and highly competitive market. This roll-out is supported by Vietnam's decision, as part of its revised PDP8 (2025), to require utility-scale solar projects to install BESS equivalent to 10% of installed capacity, with a minimum storage duration of two hours.[30] Some countries, particularly those that published decarbonization pathways several years ago (such as Malaysia, whose National Energy Transition Roadmap dates back to 2023), have not set a specific timetable for BESS deployment or have set modest targets that are likely to be revised upward.

A genuine shift in stance on nuclear energy has taken place. After facing strong opposition, energy security concerns have sparked significant interest, particularly in small modular reactors (SMRs). Indonesia and Vietnam have incorporated formal nuclear capacity targets into their strategies—though meeting the timelines remains uncertain—, and planning reflections are underway in Thailand (0.3 GW should be included in the new PDP) and the Philippines. This also applies to Malaysia, where opposition to nuclear power was arguably the fiercest; with the government re-establishing, in 2025, an agency tasked with steering and coordinating the revival of a Malaysian civil nuclear program (MyPower).

Numerous obstacles to overcome to reach PDPs' targets

The pathways outlined face several obstacles, particularly in developing renewable capacity.

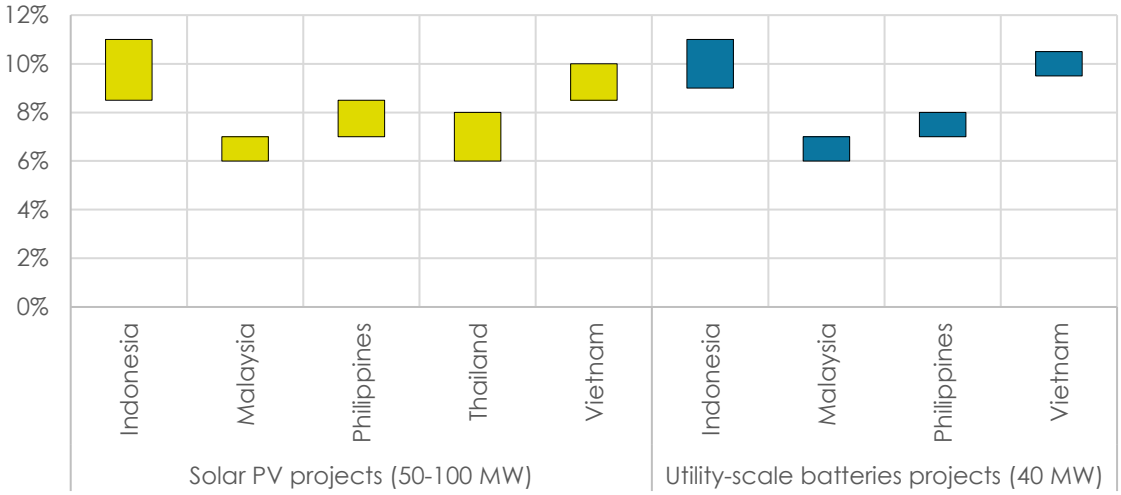
Projects' bankability

Project financing remains challenging, with a high cost of capital. According to the IEA, the weighted average cost of capital (WACC) for developing renewable energy capacity in Southeast Asian economies ranges from 6% to 11% (see Figure 8), placing countries in the region above advanced economies (5-6.5% for solar PV). Whilst these rates are lower than those in emerging economies such as Brazil, India or South Africa, the volume of investment attracted by ASEAN countries is significantly lower, due in particular to greater political instability, less clear objectives and smaller markets. There are significant disparities between the five countries, with Thailand—and Malaysia even more so—benefiting from lower WACCs than Indonesia or

30. "Development of Battery Energy Storage Systems in Vietnam", Norton Rose Fullbright, June 2025, available at: www.nortonrosefulbright.com.

Vietnam. Local banks' financing capacity remains limited, and multilateral development banks appear necessary to support decarbonization projects.

Figure 8. Weighted average cost of capital in ASEAN countries for solar PV and BESS in 2024 (year of investment decision)



Source: Ifri, based on data from the IEA, available at: www.iea.org.

Electricity systems' structures

Beyond a lack of capital, difficulties accessing finance are also linked to the structure of the region's electricity markets. Except for the Philippines, these countries operate under a single-buyer model, in which a public entity either generates the country's electricity or purchases it from independent power producers (IPPs). This entity is therefore indispensable for private project developers, and it is not possible to sign direct power purchase agreements (DPPAs) without going through it. While this system can provide a structured framework, it also forces this operator to play an all-encompassing role, limiting the opportunities for external actors to develop renewable energy projects independently.

Attempts to transform this model are underway, but progress remains limited. Through Decree 57-2025, Vietnam has authorized DPPA since March 2025, including by using the national electricity grid operated by Électricité du Vietnam (EVN). However, the significant expansion of solar and wind capacity in the late 2010s occurred through highly attractive feed-in tariffs (FiTs) (USD93.5/MWh) and in a relatively uncoordinated manner.[31] These high FiTs resulted in substantial financial losses for EVN (USD1 billion in 2023), to the extent that a retroactive reduction in FiTs was announced for 173 projects in January 2025. These decisions have significantly undermined investor confidence, increased the cost of capital, and risk making it difficult to achieve the (ambitious) targets Vietnam set for 2030. The postponement

31. P. Nguyen, G. Hauber, "From Boom to Balance in Vietnam's Clean Energy Transition", Institute for Energy Economics and Financial Analysis (IEEFA), June 17, 2025, available at: https://ieefa.org.

of the 6-17 GW target for installed offshore wind power capacity from 2030 to 2035 is a case in point.

Malaysia and Thailand are also introducing targeted exemptions from the single-buyer rule, notably to meet demand for low-carbon electricity from data centers,[32] which are moving away from the traditional hub of Singapore because of cost and space constraints, as well as Singapore's more selective project policies. Malaysia has therefore developed its Corporate Renewable Energy Supply Scheme (CRESS), which allows direct contracts between private producers and consumers, using the national electricity grid. However, grid-use costs remain very high, to the point of being prohibitive.[33] Thai initiatives are still in their early stages of development. It should also be noted that Thailand imposes fairly strict conditions on foreign investment in certain sectors, such as renewable energy, under its Foreign Business Act, such as a cap on foreign shareholding at 49% or the "2:1:4" rule, which stipulates that the employment of one foreign worker is conditional upon an investment of THB2 million (around USD60,000) and the employment of four Thai workers.[34]

Indonesia remains the most vertically integrated and closed model, with the national electricity company, PLN, playing an omnipresent role. This necessary step makes it difficult to rapidly develop low-carbon capacity, notably by independent power producers. To foster renewable energy development in Indonesia, a Just Energy Transition Partnership (JETP) was established in 2022 between the country and the International Partners Group (IPG)—notably involving several G7 countries—and was backed by an initial USD20 billion financing package (both public and private) to support the country's energy transition, but its implementation has proven challenging. A reform of its governance structure in late 2025 and early 2026 could help to make it more operational. A similar JETP was signed with Vietnam in December 2022, backed by USD15.5 billion in public and private finance. Despite their limitations—notably the difficulty in translating announced financing commitments into concrete investments—these partnerships provide a framework for cooperation between governments and international and private-sector actors, including development banks, investors and companies, by facilitating collaboration and fostering mutual understanding.[35]

Finally, while the Philippines' liberalized model allows easier entry for foreign investors, Manila still faces the fact that a significant proportion of its electricity is generated by private operators using fossil fuels, making an

32. D. Raj Markandu, « Decarbonising Malaysia's Electricity", Institute of Strategic and International Studies (ISIS) Malaysia, March 2026, p. 26, available at: www.isis.org.my.
33. Z. Zaikariah, "Extracting Green Premiums from Datacenters", ISIS Malaysia, June 2026, p. 10, available at: www.isis.org.my.
34. Foreign Business Ownership in Thailand, LexBangkok, available at: https://lexbangkok.com.
35. D. Thang Nam, A. Halimatussadiah, P. Burke, F. Jotzo, "Just Energy Transition Partnerships at Risk in Indonesia and Vietnam", ANU Research, Australian National University, 2026, available at: https://openresearch-repository.anu.edu.au.

early phase-out of these power stations difficult and costly because of stranded contract costs.[36]

Political instability

Political instability and the lack of long-term targets create regulatory uncertainty and affect investment inflows. The Philippines and Thailand are experiencing significant political instability, with Thailand seeing three changes in Prime minister since 2023. However, the victory of the new Prime Minister, Anutin Charnvirakul, in the February 2026 general election has given the country a relatively stable majority for the new government (as parliamentary terms last four years). Malaysia has enjoyed a degree of stability since 2022 under Prime Minister Anwar Ibrahim, but his majority remains fragile, relying in particular on the support of the states of Sarawak and Sabah on the island of Borneo,[37] which has forced him to make concessions on energy policy (notably regarding the dispute over the exploitation of Malaysian oil and gas reserves in Sarawak). The next Malaysian general election is due to be held by February 2028 at the latest.

Since late 2024, Indonesia has been governed by President Prabowo Subianto in a relative spirit of continuity with previous presidencies. However, flaws in the governance model and the culture of consensus can delay decision-making, as illustrated by the latest PDP (RUPTL 2025–2034), which was long awaited before its publication last year. There have also been numerous cabinet reshuffles since the start of Prabowo's presidency (eight so far), as well as the recent resignation of Vice President Gibran, the son of former President Jokowi, whose role as vice President had been the foundation of cooperation between Prabowo and Jokowi after they had faced off in the two previous presidential elections.

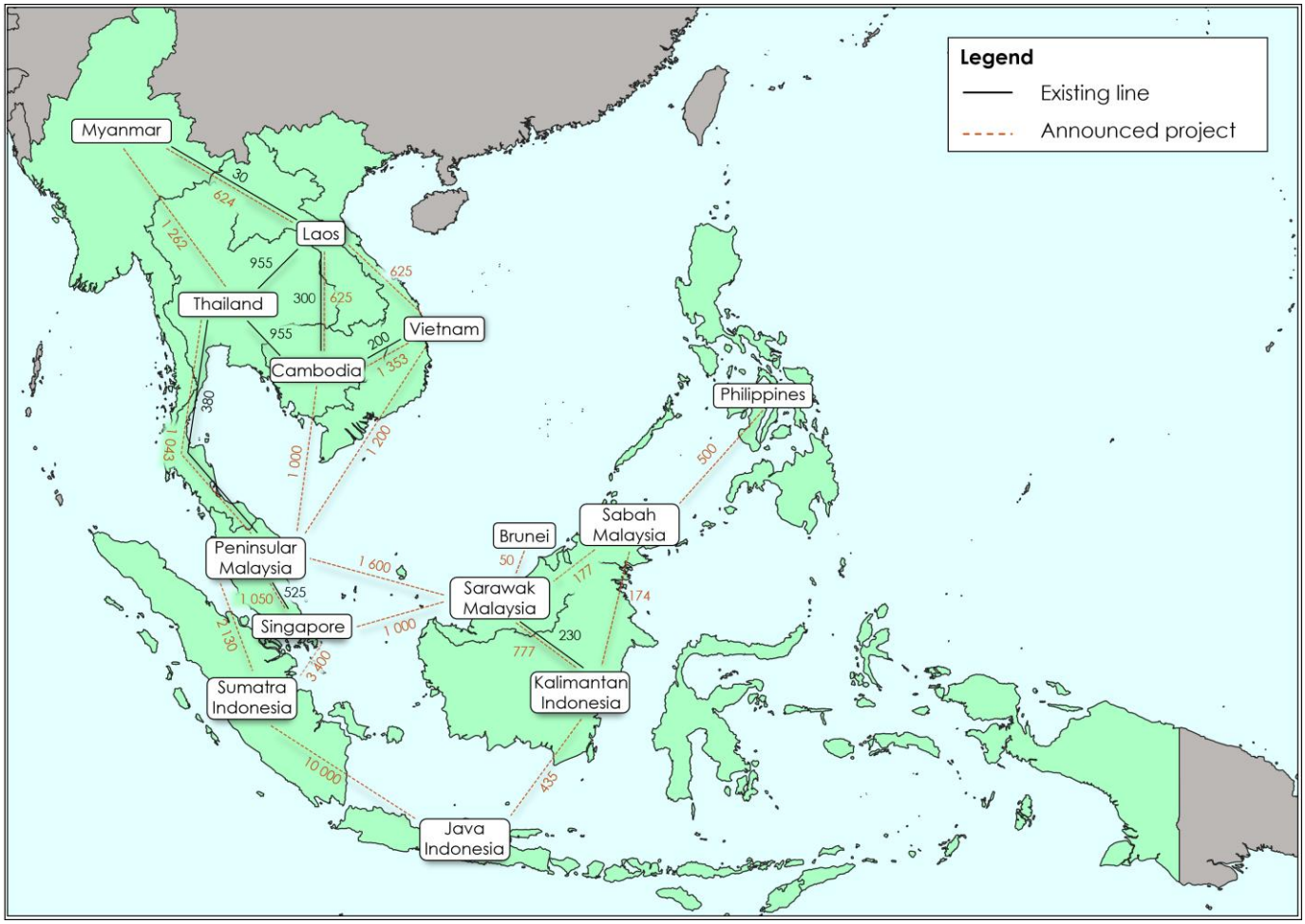
The need for large-scale and densified power grids

A major challenge remains the electricity grid, where the needs are very high. The region's geography complicates the development of large-scale grid networks. Vietnam's main solar and wind power generation sites are in the eastern regions of the country and are therefore relatively far from the major demand centers, namely Hanoi and Ho Chi Minh City. This requires constructing national-scale transmission lines, a task made more difficult by the country's elongated shape (a coastline of 3,260 km and a maximum width of 600 km). Malaysia is divided into two parts: the peninsular region connected to the mainland (accounting for around four-fifths of national electricity demand) and the island region of Borneo, which has significant

36. "OECD Economic Surveys: Philippines 2026", OECD, February 2026, available at: www.oecd.org.
37. G. Facal, J. Jammes (eds.), "L'Asie du Sud-Est 2026. Bilan, enjeux et perspectives", IRASEC, 2026, p. 281.

hydroelectric generation capacity and potential in Sarawak, but currently no power connection to peninsular Malaysia. The Philippines and Indonesia are constrained by their archipelagic geography, making inter-island connections via submarine cables complex and costly. The three major Indonesian islands of Java, Sumatra and Kalimantan (the Indonesian part of Borneo) are not interconnected. The ASEAN-wide interconnected power grid project (ASEAN Power Grid, APG), launched in 1999, is progressing slowly (see Figure 9).

Figure 9. ASEAN Power Grid existing and planned power interconnectors in 2026



Source: Ifri, based on data from announcements and L. Pham, "The ASEAN Power Grid: Why Every Year of Delay Matters", Ember, available at: https://ember-energy.org.

This project is of major interest to Singapore, whose decarbonization strategy relies heavily on importing carbon-free electricity from other ASEAN members, notably via hydropower generation in Laos. A Laos–Thailand–Malaysia–Singapore (LTMS) interconnector has been operational since 2022, with a maximum import capacity of 100 MW to Singapore, and phase 2 (increasing capacity to 200 MW) was announced in late 2025. However, this interconnector will need significant expansion to help

Singapore meet its target of importing 6 GW of capacity by 2035.[38] The Thailand–Laos interconnections are also heavily utilized by Thailand itself (32 TWh of net electricity imports by the country in 2024,[39] the vast majority of which came from Laos); the Thai grid remains in a state of under-capacity in the southern and central parts of the country; and the Thailand–Malaysia high-voltage direct current (HVDC) link is aging.

Singapore is also banking on links with other partners, through projects such as the Vietnam–Malaysia–Singapore (VMS) scheme, which would enable Vietnam to export its future renewable energy generation and for which discussions are ongoing, but which face certain difficulties, notably the low density of the Malaysian grid on the east coast of the peninsula (where the link would be established). The Sarawak–Singapore project, which would use a 700–900 km subsea cable to provide 1 GW of capacity, is at a more advanced stage, but no final investment decision (FID) has yet been taken. The project is further complicated because most of the proposed route passes through Indonesian territorial waters, and Jakarta is likely to request that its own infrastructure be incorporated into the route, which would make it significantly more complex and costly. However, the timetable presents a window of opportunity for Singapore, which will hold the ASEAN chairmanship in 2027.

The APG continues to face major challenges, such as investment requirements (USD27 billion by 2040 to deliver the announced projects),[40] for which an APG Financing Initiative was launched in late 2025 in partnership with the Asian Development Bank (ADB) and the World Bank. The ADB has also committed to investing up to USD10 billion in the APG over the next ten years.[41] Beyond the financial challenges, governance issues are primarily holding back the APG. In fact, no real regional planning body exists:[42] the ASEAN Center for Energy (ACE) plays a coordinating and organizational role, but member states remain responsible for projects and planning. Most interconnections have been designed or are being considered bilaterally, rather than as part of a regional exchange framework.[43] This creates a need to densify national networks, not just build new interconnections. In May 2026, the ACE published Phase 3 of its Interconnection Masterplan Study III, intended to serve as a strategic roadmap to establish the regulatory frameworks and governmental structures needed to accelerate the project and enable actual cross-border

38. "Low-Carbon Electricity Import", Ministry of Trade and Industry Singapore, August 20, 2026, available at: www.mti.gov.sg.
39. "Electricity Net Imports", US Energy Information Administration, available at: www.eia.gov.
40. "Financing the ASEAN Power Grid", IEA, March 2026, p. 41, available at: www.iea.org.
41. "ADB and World Bank Group Launch the ASEAN Power Grid Financing Initiative with the ASEAN Secretariat and the ASEAN Centre for Energy (ACE)", ASEAN, October 15, 2025, available at: https://asean.org.
42. A. Demoral, D. Setyawati, "Currents Beneath Currents: Overcoming ASEAN's Subsea Power Cable Governance Challenges", Ember, June 19, 2026, available at: https://ember-energy.org.
43. "Financing the ASEAN Power Grid", op. cit., p. 8-9.

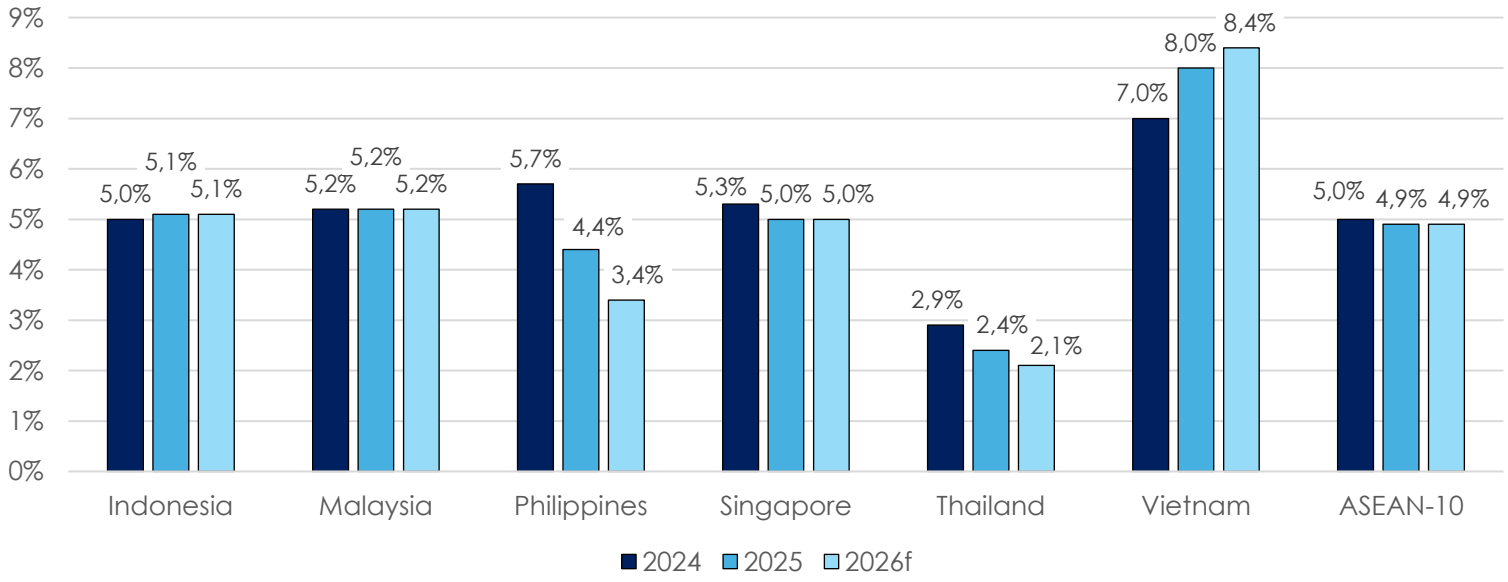
electricity trade.[44] It notably includes governance changes and the creation of common market rules, grid codes and technical standards. This document represents an important step in that it sets out concrete priorities in areas that have received little attention in the past, taking a pragmatic approach; however, their implementation—in particular the transformation of the governance and planning model—will depend on action by member states.

44. "ASEAN Interconnection Masterplan Study (AIMS) III Phase 3: Implementation Strategy for Multilateral Power Trade in ASEAN", ASEAN, May 4, 2026, available at: https://aseanenergy.org.

Resilient economic growth, economic vulnerabilities drive diversification strategies

The Hormuz crisis has been affecting some ASEAN member states' growth rates, with a decrease in Thailand (from 2.4% in 2025 to 2.1% expected for 2026)[45] and a sharp decline in the Philippines (from 4.4% to 3.4%). On the other hand, robust growth remains for Indonesia, Malaysia, Singapore and even more so for Vietnam (see Figure 10).

Figure 10. Annual GDP growth rates for ASEAN countries, 2024-2026f



Source: Ifri, based on data from the IMF, available at: www.imf.org.

In the Philippines, the sharp rise in inflation expected for 2026 (from 1.7% to 5.6%) and an unemployment rate of 5% are impacting the national economy, 70% of which relies on domestic consumption. Despite a very low unemployment rate (which nevertheless masks issues of job insecurity), the Thai economy is, for its part, being held back by more structural factors: deflationary pressures (which have only been offset by the inflation resulting from the crisis) and weak demographic dynamics, leading to insufficient levels of domestic consumption. Demand-side stimulus policies introduced in recent years have failed to resolve this problem, as households have used

45. "World Economic Outlook (October 2026)", IMF, available at: www.imf.org.

the funds primarily to reduce debt, which remains relatively high.[46] Malaysian growth remains robust, driven notably by the electrical and electronics (E&E) sector, particularly semiconductors.

Figure 11. Estimated inflation rates for ASEAN-6 countries, 2025-2026f

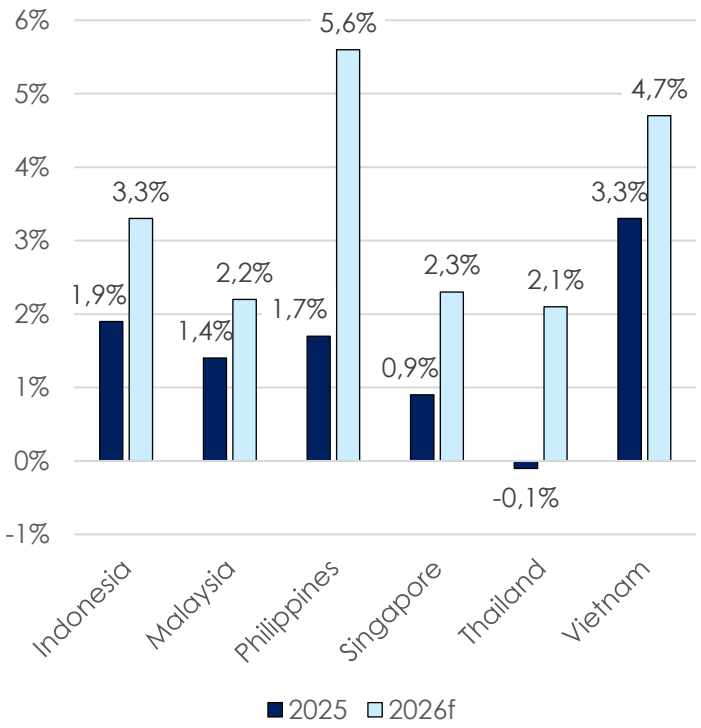
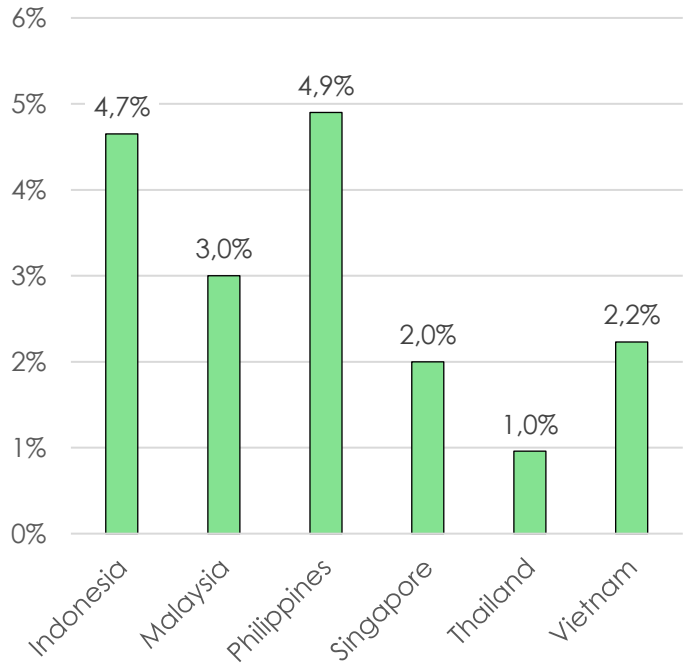


Figure 12. Unemployment rates for ASEAN-6 countries, 2026-Q2



Source: Ifri, based on data from the IMF, available at: www.imf.org; and "Southeast Asia Quarterly Economic Review", McKinsey & Company, 2026, available at: www.mckinsey.com.

Indonesia is expected to grow 5% in 2026, stable with previous years but still far from the 8% target set for 2029, which is widely doubted. President Prabowo is adopting an interventionist strategy, including centralizing exports of certain products (coal, palm oil, ferroalloys) from January 2027 and creating a second sovereign wealth fund for Indonesia in 2025: Danantara. Danantara has a capital of USD20 billion and is also responsible for managing a portfolio of public assets, comprising 1,000 state-owned companies, representing USD900 billion in capital.[47] Jakarta is thus seeking to attract investors and develop partnerships. The Indonesian government is also prioritizing major policy initiatives, the latest of which is its free meals program, launched last year but plagued by numerous shortcomings, notably linked to corruption and the military's omnipresent involvement in its management.[48] These projects entail high expenditure, coupled with a surge

46. D. Hutt, "Could Thailand's Cash Handout Scheme Have Worked?", *The Diplomat*, July 2025, available at: https://thediplomat.com.
47. "Danantara Indonesia Undertakes Several International Collaborations to Reform Global Assets and Investment Standards", Danantara Indonesia, July 14, 2025, available at: www.danantaraindonesia.co.id.
48. G. Facal, J. Jammes (eds.), "L'Asie du Sud-Est 2026. Bilan, enjeux et perspectives", op. cit., p.226-227.

in energy subsidies against the backdrop of the Middle East crisis, prompting the government to seek ways to increase revenue. This includes raising royalties on nickel mining and levying a USD6.8 billion charge on funds officially derived from Danantara's profits.[49]

Finally, Vietnam boasts the highest growth rates in ASEAN (8.4% expected for 2026), with an economy heavily dependent on exports. In 2026, Hanoi launched its new five-year plan (2026–2030), which targets ambitious growth rates (averaging 10% per year)[50], driven by industry (particularly in the technology and energy sectors), a strengthened role for public investment and improved administrative efficiency, achieved by reducing the number of provinces and municipalities. Dependence on exports also compels the government to maintain the country's attractiveness—based in particular on low energy costs—and limits the potential rise in electricity tariffs that could enable greater investment in the grid.

Industrial value chain upscaling: the first economic priority

The main industrial ambition of Southeast Asian countries remains the upgrading of their industries, particularly those involved in the energy and digital transitions. ASEAN member states play a key role in certain mineral value chains, with a gradual expansion into downstream stages, notably in the case of nickel with Indonesia, as well as rare earths, with Malaysia's role in refining (via the Australian company Lynas, which is the current leading alternative to Chinese refiners in this field) and in metallization in Vietnam, with the South Korean company LS Eco Energy.[51] ASEAN also accounts for a significant share of global tin production, a metal whose price has increased by 70% since January 2024, driven by the growing needs of the digital and AI industries. Southeast Asian countries are seeking to build integrated value chains, as exemplified by Indonesia's export restrictions on minerals (nickel, copper, bauxite) and Malaysia's strategy to develop a complete value chain for rare-earth permanent magnets. However, this strategy is currently being held back by internal governance issues between the federal government and the states, particularly in the upstream sector.

ASEAN has also established a significant industrial base in solar PV manufacturing (1.4% of global polysilicon production, 3.2% of wafers, 6.6% of cells, and 5.7% of modules in 2024—in markets where China dominate to the end of 93%, 96%, 90%, and 87%),[52] and is increasingly active in the

49. G. Sihombing, "Danantara to Remit $6.8 Billion to Prop Up Indonesia Budget", Bloomberg, August 28, 2026, available at: www.bloomberg.com.
50. "Vietnam's Next Growth Cycle. Journey to 2030", KPMG in Vietnam, October 2026, available at: https://assets.kpmg.com.
51. Q. Kassim, Z. Zaikariah, F. Ijlal Nizam, "From Mine to Magnet. Positioning Malaysia as a Robust Player in the Emerging Global Supply Chain", ISIS Malaysia, October 2025, available at: www.isis.org.my.
52. "Trends in PV Applications 2025", IEA, available at: https://iea-pvps.org.

battery sector, with factories notably in Thailand and Indonesia, and in the electric vehicle (EV) sector, with a significant manufacturing base in Thailand and the growth of the Vietnamese company VinFast. Malaysia also plays an important role in the semiconductor sector, particularly in assembly, testing, and packaging, and is seeking to ensure the industry's expansion through the National Semiconductor Strategy published in 2024. Governments are attempting to attract investment to drive upmarket development through dedicated strategies and plans: a strong emphasis on local content requirements in Indonesia (TKND); a Supporting Industry Development Program for 2026–2035 that emphasizes the capture of local added value in Vietnam; and the Malaysian strategy aimed at making support for businesses conditional on results in terms of local value capture (skilled jobs for Malaysians; training; development of industrial clusters), notably through the recent 2026 New Incentive Framework.

Between Beijing and Washington, the increasing need for diversification

The US–China confrontation makes Southeast Asia a coveted region, situated at the crossroads of Beijing's and Washington's ambitions. Whilst this position offers advantages, it can also prove counterproductive. The ASEAN solar industry has thus benefited significantly from US tariffs on Chinese solar products, prompting Chinese manufacturers to set up operations in the region to circumvent this tariff policy. However, the production chains developed in this way mainly involved assembly stages. New US tariffs targeting companies circumventing the tariffs based in Malaysia, Thailand, Vietnam and Cambodia quickly caused these countries to lose their strategic advantage. This led to production halts (LONGi; Trina Solar; Jinko Solar), and the companies concerned are transferring investment to non-targeted regions (notably Africa and the Middle East).[53] In September 2026, the US Department of Commerce announced antidumping and countervailing duty rates for Indonesian, Laotian, and Indian solar industries.[54]

US pressure has also intensified since Donald Trump's return to the White House, with a wave of high tariffs announced in April 2025, which were ultimately scaled back in exchange for significant concessions (Figure 13). For Thailand, Vietnam and Malaysia, this mainly concerns removing barriers to importing goods from the US, as well as commitments to purchase American goods (Boeing aircraft, cars, LNG, agricultural products, etc.).[55] Malaysia also abandoned plans to set up 3,000 AI servers using Huawei

53. H. Pitt, S. Movalia, K. Jain, "Localizing Solar Panel Manufacturing in Saudi Arabia: A High-stakes Shift with LONGi and First Solar", Rhodium Group, June 25, 2026, available at: https://rhg.com.
54. K. Errick, "US Finds Solar Imports from India, Indonesia, Laos Threaten Domestic Factories", S&P Global, October 15, 2026, available at: www.spglobal.com.
55. "Joint Statement on United States-Malaysia Agreement on Reciprocal Trade", US Mission to ASEAN, October 26, 2025, available at: https://asean.usmission.gov.

components and announced new restrictions on US-manufactured AI chips to prevent them from being channeled to China.[56] In addition, Indonesia announced certain exemptions to its local content policy (TKND) for US products.[57]

Figure 13. Levels of US tariffs on ASEAN countries

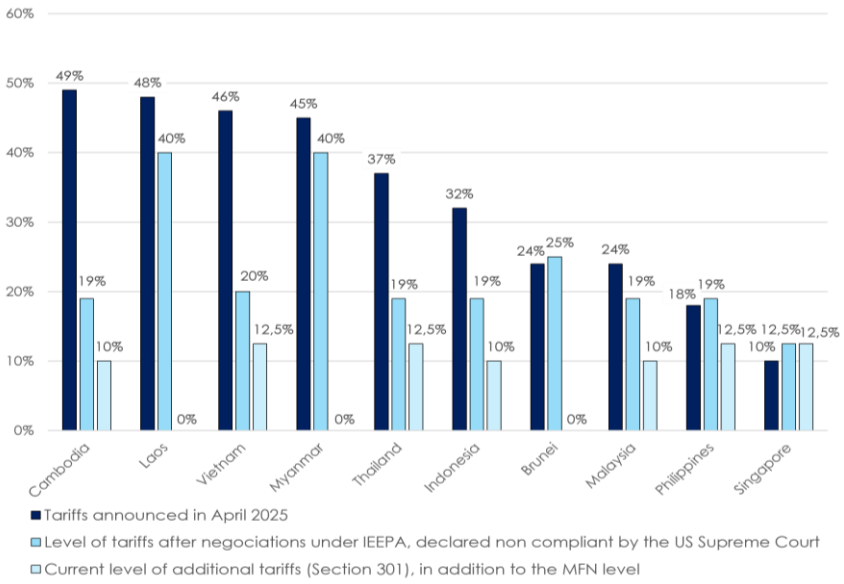
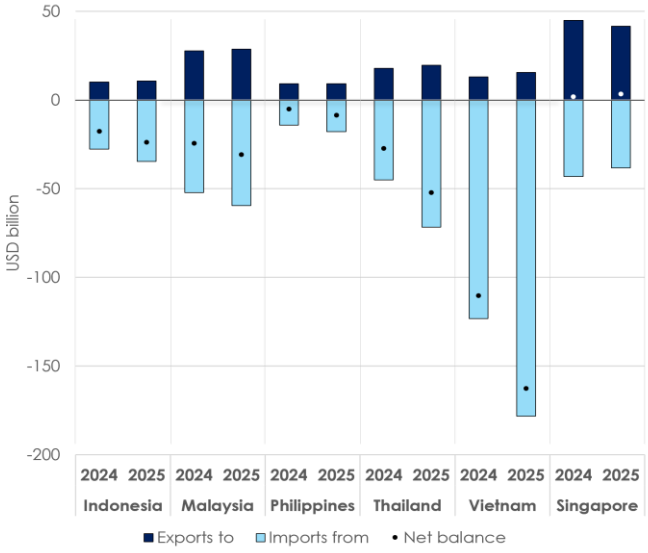


Figure 14. US trade balance with ASEAN-6 countries for 2024 and 2025



Source: Ifri, based on announcements and the Office of the US Trade Representative, available at: https://ustr.gov.

The US Supreme Court ruled that the "reciprocal" tariffs imposed under these agreements (pursuant to the International Emergency Economic Powers Act, IEEPA) were unlawful. In response, the White House imposed new tariffs under Section 301 of the Trade Act of 1974, which added to the most-favored-nation (MFN) rate the US applies to a given product. However, the Supreme Court's decision changed the tariff rates applied to Southeast Asian countries but did not eliminate the concessions the US obtained under the trade agreements that had been concluded. US tariff pressure does not appear to have stemmed the rise in exports to the US, which continued in 2025. On November 25, the Office of the United States Trade Representative (USTR) proposed increasing tariffs on 14 trading partners (including the EU and all ASEAN-6 countries, except the Philippines) under Section 301, with rates ranging from 18% to 35% for ASEAN countries. These measures would be taken because "structural excess capacity and production in

56. H. Hassan, "Malaysia Backtracks on Huawei Chips Project Amid US-China AI Rivalry", *The Straits Times*, May 22, 2025.
57. Alfitria Nefi Pratiwi, "Some US Goods Exempt from Indonesia's Local Content Rules", *Tempo*, February 23, 2026, available at: https://en.tempo.co.

manufacturing sectors [in those countries] are unreasonable and burden or restrict US commerce."[58]

Beijing's pressure is less overt than Washington's, but it plays out notably through economic competition. Thanks to rapid advances in automation, robotization and artificial intelligence (AI), as well as economies of scale, China is posing a serious challenge to industrial production in Southeast Asia, particularly in the automotive and textile sectors.[59] Wage levels are no longer sufficient to guarantee competitiveness. Industry's share of GDP has declined overall over the last fifteen years, except in Vietnam. To protect its automotive industry, Thailand has introduced a framework of subsidies and customs duty exemptions conditional on a commitment to produce at least two battery electric vehicles (BEVs) domestically by the end of 2026 for every imported BEV sold in 2024 and 2025.[60] In July 2026, Malaysia introduced a new framework requiring fully overseas-assembled imported EVs to have a value (CIF) of at least MYR200,000 (USD49,000) and a motor output of at least 180 kilowatt (kW) or 241 horsepower.[61] Vietnam has achieved high sales figures for BEVs and Plug-in hybrid electric vehicles (PHEVs) through the production of its national manufacturer, VinFast, whose sales are growing across the region, particularly in Indonesia.

Figure 15. Share of EVs (BEVs and PHEVs) in car sales in ASEAN countries, 2025

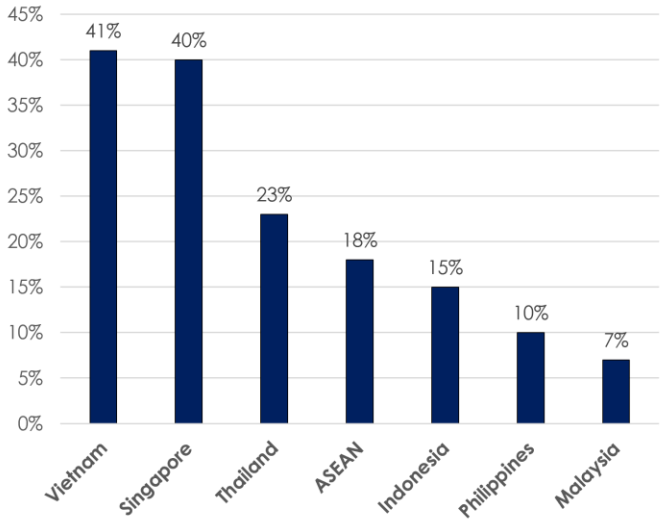
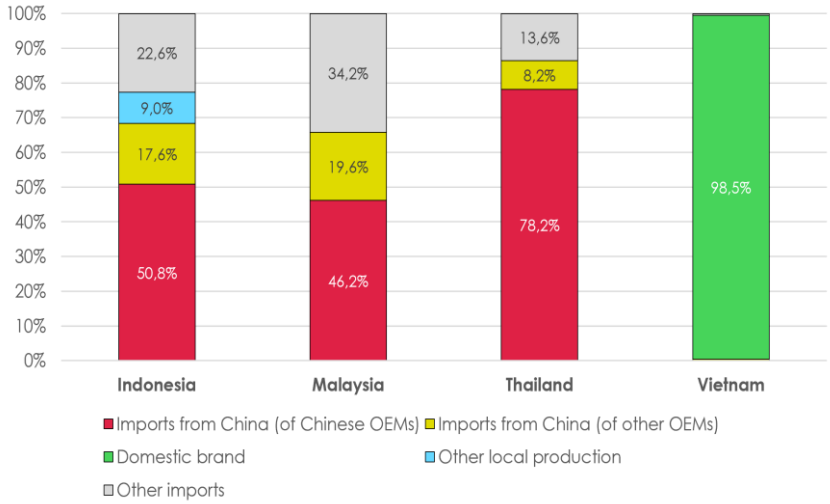


Figure 16. Origin of EVs (BEVs and PHEVs) sold in selected Southeast Asian markets, 2024



Source: Ifri, based on data from "How Accelerating Electrification Could Strengthen Energy Security in Southeast Asia", IEA, available at: www.iea.org; "Trends in Electric Car Markets", IEA, available at: www.iea.org.

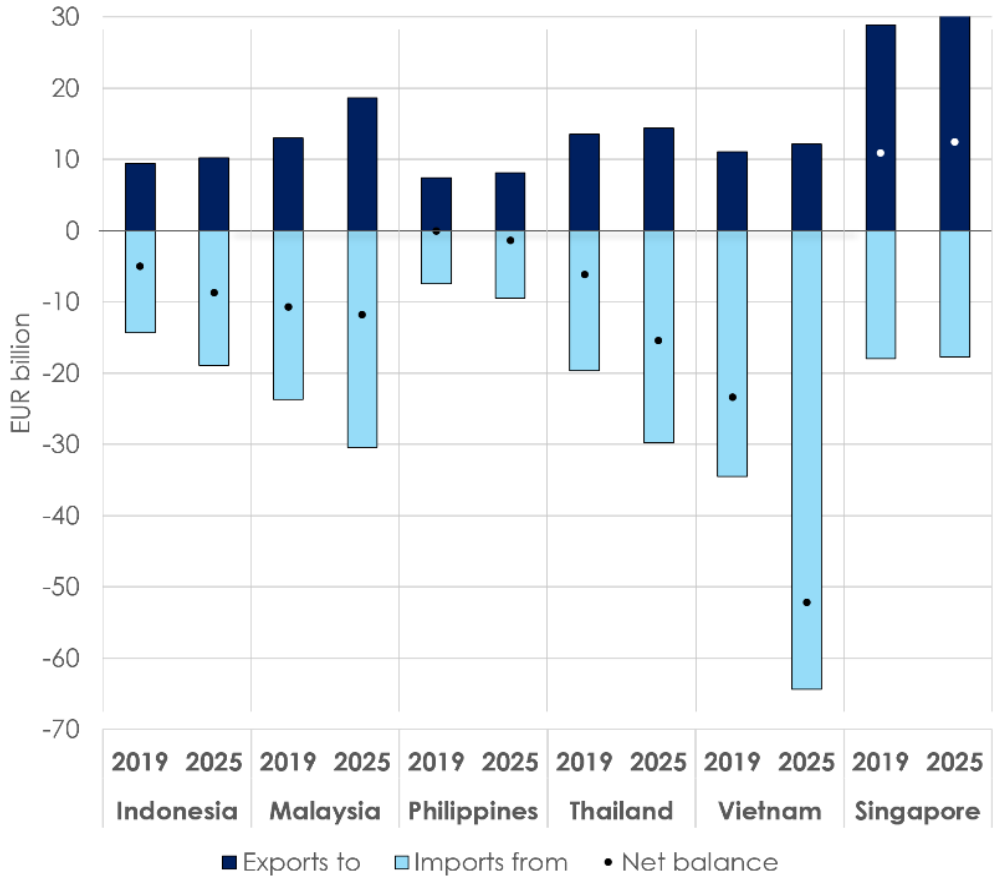
58. "USTR Makes Determinations and Proposes Actions in 14 Section 301 Investigations Relating to Structural Excess Capacity and Production in Manufacturing Sectors", Office of the United States Trade Representative, November 25, 2026, available at: https://ustr.gov.
59. H. Storey, "ASEAN Countries Confront Chinese Export Glut", Lowy Institute, November 4, 2024, available at: www.lowyinstitute.org.
60. "EV 3.5", Thailand Board of Investment, available at: www.boi.go.th.
61. "Malaysia to Impose New Rules on Imports of Electric Vehicles Assembled Overseas from July", Reuters, May 6, 2026, available at: www.reuters.com.

The logic of not having to choose between China and the US is thus proving increasingly difficult to sustain. US pressure has eased somewhat against the backdrop of the war in Iran but could be reignited at short notice. Countries in Southeast Asia are therefore strengthening their partnerships as part of a diversification strategy. Indonesia became the tenth member of the BRICS in 2025, whilst Malaysia, Thailand and Vietnam have held 'partner' status since then. This status remains somewhat unclear and could be explained by both these countries' desire to maintain close ties with the organization without committing too strongly and the original BRICS members' wish not to expand too rapidly. Indonesia and Thailand began their accession processes to the OECD in 2024, and OECD committees are currently conducting technical reviews of these applications. This process generally takes several years, culminating in a unanimous decision by the Council and the signing of the accession agreement.

The EU holds a significant place in this diversification of partnerships, although it does not carry the same weight as China or the US. The current geopolitical context has, however, reignited negotiations on trade agreements between the EU and countries in the region, such as Thailand in 2023 (following a hiatus in 2014)—15 of the 24 announced negotiation chapters concluded by the EU as of June 2026;[62] and Malaysia in 2025. After nine years of negotiations, the EU and Indonesia also signed a free trade agreement (FTA) in November 2026, which has yet to be formally adopted. This agreement notably includes provisions on energy and raw materials (Chapter 14).[63] Whilst it does not provide direct physical security of supply for the EU, it reduces regulatory risks for European companies and promotes trade (by removing 98.5% of tariff lines on European products entering Indonesia). The EU also recently reached an agreement to sign an FTA with the Philippines.[64] Finally, the EU has an FTA with Vietnam, which came into force in 2020. However, in recent years this agreement has led to very strong growth in Vietnamese exports of goods to the EU, which nearly doubled between 2019 and 2025 (EUR+30 billion), whilst European exports of goods to Vietnam have grown by only USD1 billion. The EU continues to run a trade deficit with all members of the ASEAN-6, except for Singapore (surplus of EUR12 billion).

62. "EU-Thailand Free Trade Agreement (FTA)", European Parliament, available at: www.europarl.europa.eu.
63. "EU-Indonesia: Text of the Agreement", European Commission, available at: https://policy.trade.ec.europa.eu.
64. "Substantial Agreement on EU-Philippines Trade Deal", European Commission, September 22, available at: https://ec.europa.eu.

Figure 17. EU trade balance with ASEAN-6 countries for 2019 and 2025



Source: Ifri, based on data from Eurostat.

Decarbonizing large hard-to-abate industries: the challenge of bankability remains central

As part of international climate negotiations, ASEAN member states have submitted Nationally Determined Contributions (NDCs) with emission reduction targets for 2030 and 2035 (see Table 1).

Table 1. NDCs and GHG emissions of ASEAN member States

	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Date of submission	October 2025	October 2025	September 2026	February 2025	November 2025	November 2022
2030 objective	GHG emissions peak in 2030: 1,345.7 to 1,491.5 $MTCO_2e$	GHG emissions expected to peak between 2029 and 2034; Malaysia aims to peak emissions by 2030 (peak not quantified)	-	-	GHG emissions peak to be reached before 2030	GHG emissions reduction of 15.8% (146.3 $MTCO_2e$) unconditionally, and up to 43.5% (403.7 $MTCO_2e$) conditional on international support, relative to a BAU scenario
2035 objective	Projected GHG emissions: 1,257.7 to 1,488.9 $MTCO_2e$	Reduction of 15 to 30 $MTCO_2e$ from peak emissions	75% reduction and/or avoidance of cumulative GHG emissions relative to a BAU scenario over 2025–2035 (7% unconditional; 68% conditional on international support)	GHG emissions target: 45 to 50 $MTCO_2e$	GHG emissions target: 152 $MTCO_2e$ (47% reduction from 2019)	
National GHG emissions in 2025 (MTCO2e/y)	1,358.9	337.3	270.2	72.8	401.4	547.6
GHG emissions per capita in 2025 (TCO2e/y)	4.8	9.7	2.3	11.8	5.8	5.3

Source: Ifri, based on announcements and data from the European Commission, available at: https://edgar.jrc.ec.europa.eu.

Note: GHG emissions refer to greenhouse gas emissions. BAU refers to business as usual.

International carbon taxation as a primary driver for industrial decarbonization

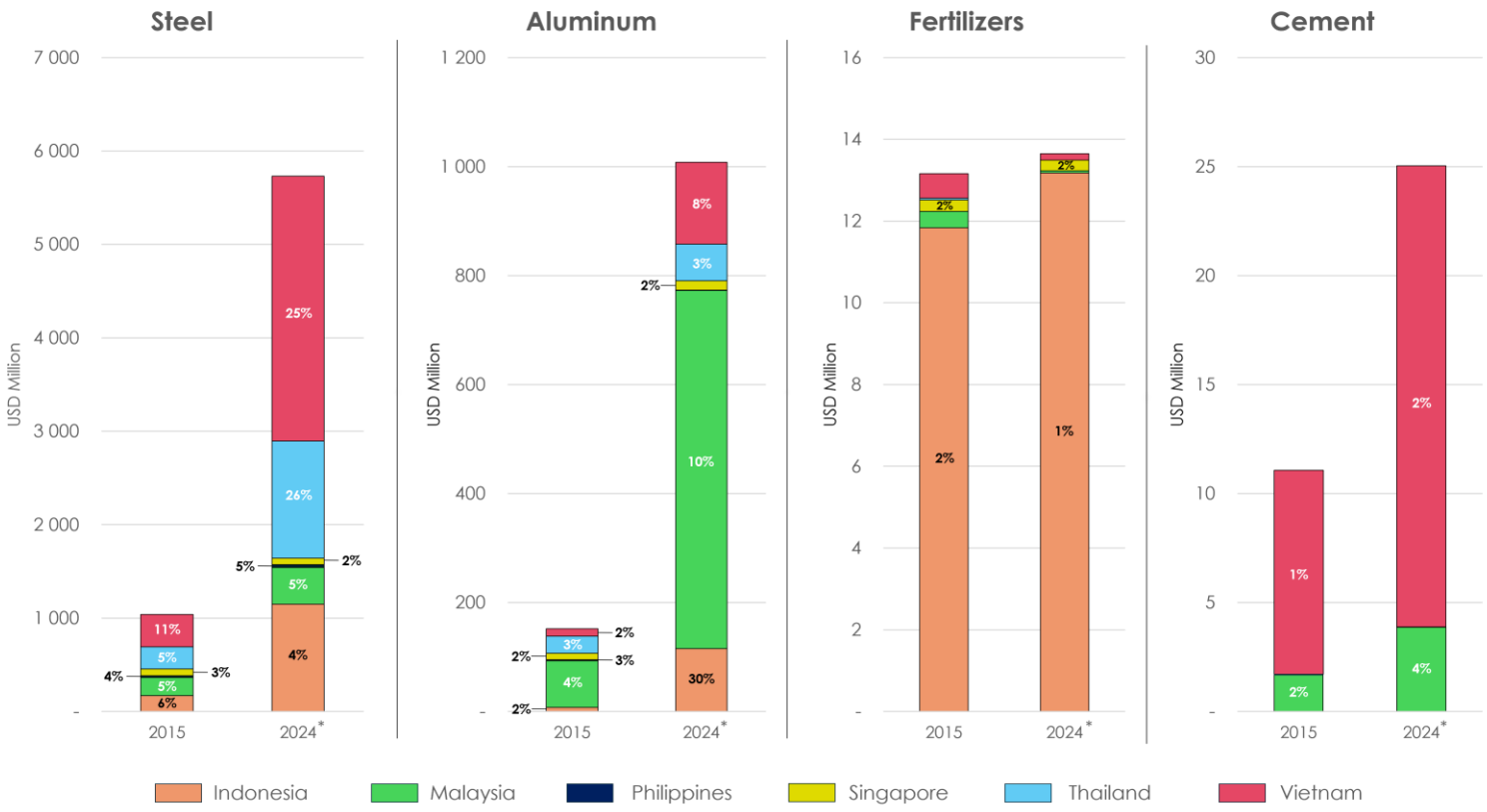
Only Singapore has an effective, large-scale carbon tax scheme (covering 80% of emissions, at SGD45/tCO_2eq., i.e. USD35, in 2026–2027). Emissions Trading System (ETS) schemes have been introduced in Indonesia (since 2023 for fossil-fuel power stations) and Vietnam (for fossil-fuel power stations, steelworks and cement works) but currently rely almost exclusively on free allowances. The Malaysian government proposed a carbon tax on the iron/steel and electricity sectors for 2026, but has postponed it amid the energy crisis.[65] Thailand is considering a proposed ETS scheme, but it has not yet been finalized. Carbon market models are also emerging, with fledgling schemes in Indonesia and Vietnam, as well as voluntary markets in Malaysia and Thailand. Since 2024, Singaporean companies subject to the carbon tax have been able to offset up to 5% of their taxable emissions using international carbon credits, for which the Singaporean government is developing bilateral agreements under Article 6 of the Paris Agreement (so far, agreements have notably been concluded with Thailand and Vietnam).[66]

Industries in Southeast Asia are developing progressive decarbonization strategies. Compliance with international market standards remains a primary driver behind these policies, particularly for sectors covered by the EU's Carbon Border Adjustment Mechanism (CBAM), notably steel and aluminum. Domestic demand for low-carbon production is still underdeveloped and does not provide effective incentives.

Exports of CBAM-covered steel products to the EU total nearly USD6 billion, and USD1 billion for aluminum—volumes that have increased sixfold over the past decade. For some countries, the EU accounts for a significant share of total exports, particularly for Thai steel (26% of Thailand's CBAM-covered steel exports in 2024), Vietnamese steel (25% in 2023), Indonesian aluminum (30% in 2024), and Malaysian aluminum (10% in 2024). For fertilizers and cement, export volumes and the EU's shares of exports are relatively low. In addition to export growth, the amount subject to taxation could increase as CBAM is planned to extend to more downstream products—although this has not yet been adopted as of November 2026.

65. "Malaysia's Carbon Tax Delayed Due to Middle East Uncertainties", *The Straits Times*, June 18, 2026.
66. Carbon Markets Cooperation, Singapore Government, August 3, 2026, available at: www.carbonmarkets-cooperation.gov.sg.

Figure 18. Exports of CBAM-covered items to the EU by ASEAN-6 countries and share of the EU in total exports for these items, 2015-2024*



Source: Ifri, based on data from the United Nations Comtrade.

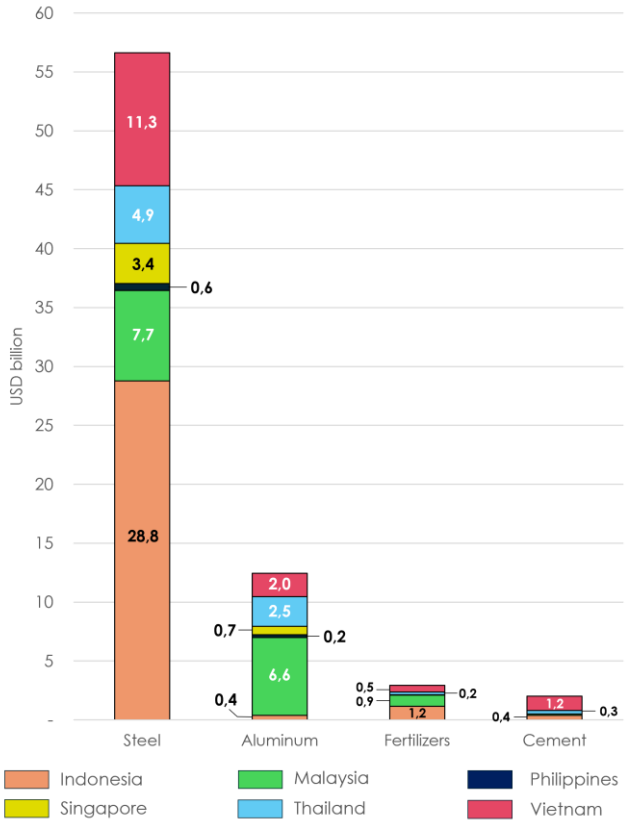
Note: The percentages shown represent the EU's share as a destination for exports of the four products for each ASEAN-6 country. They do not represent a share of the total exports of these six countries combined.
Exports cover the HS codes included in the CBAM legislation as adopted in 2023.
Export volumes of hydrogen and electricity (also included in the CBAM scope) are not presented here, as there is no significant trade in these products between the EU and ASEAN.
*Vietnam's 2024 export data were not available. The data used for Vietnam are from 2023.

Some initial investments in the industrial decarbonization of CBAM-covered sectors are emerging, mostly in the steel industry. The Indonesian steel manufacturer PT Gunung Raja Paksi Tbk (GRP) has signed an agreement with the International Finance Corporation (USD60 million) to support its shift to low-carbon steel production and the upgrade of its electric arc furnace (EAF) infrastructure.[67] The Singapore-based company Meranti is investing USD2 billion in a 2.5 million tonnes per year EAF steel facility in Thailand, with green steel production scheduled to begin in 2028. The company aims to export 70% of this production to Europe and mentioned CBAM compliance as

67. D. Stanway, "World Bank's IFC Signs Green Financing Deal with Indonesian Steel Mill", Reuters, September 5, 2024, available at: www.reuters.com.

a key factor for this project.[68] However, the carbon footprint of steel production via EAFs remains constrained by the limited availability of low-carbon electricity, although emissions from electricity consumption are not yet included under the CBAM framework for steel and aluminum.

Figure 19. Total exports of CBAM-covered items by ASEAN-6 countries, 2024*



Source: Ifri, based on data from United Nations Comtrade.

Note: Exports cover the HS codes included in the CBAM legislation as adopted in 2023. Export volumes of hydrogen and electricity (also included in the CBAM scope) are not presented here, as there is no significant trade in these products between the EU and ASEAN.*Vietnam's 2024 export data were not available. The data used for Vietnam are from 2023.

Oil and gas state-owned companies' strategies: mitigating emissions by developing new business models?

Against this backdrop, major state-owned oil and gas enterprises (SOEs) are elaborating decarbonization strategies, prioritizing certain technologies. When considering Pertamina (Indonesia), Petronas (Malaysia), PTT

68. "Inside Commodities", London Stock Exchange Group Data & Analytics, November 11, 2024, available at: https://share.lseg.com.

(Thailand), and PetroVietnam (PVN, Vietnam), referred to here as the 4Ps, their strategies largely rely on maintaining operations in the oil and gas sector while seeking to mitigate emissions from those operations through various technological options.

Carbon Capture and Storage

Beyond energy efficiency and process electrification, decarbonization ambitions rely in particular on Carbon Capture and Storage (CCS). Pertamina is therefore developing a CCS hub project—the Sunda Asri Basin—in Java, with an expected total storage capacity of up to 2.9 gigatonnes (GT)CO_2e in deep saline aquifers. The project's FID was expected in 2026, but Pertamina is seeking a new partner after ExxonMobil withdrew from the project earlier this year.[69] Petronas has two main projects: the Southern CCS Terminal (5 megatonnes (MT)CO_2e/year by 2031, with a terminal in Kuantan, Peninsular Malaysia), which includes a partnership with TotalEnergies and Mitsui; and the Kasawari Project (3.3 MTCO_2e/year in Sarawak, Malaysian part of Borneo). The Kasawari project reached FID in 2022 and plans its first injection for early 2027, while the Southern CCS Terminal targets FID for late 2027. In Thailand, PTT is developing a major CCS hub centered on its offshore oil and gas operations in the Gulf of Thailand—the Arthit Field project, which received FID in 2025 (1 MTCO_2e/year, with commissioning scheduled for 2028). Finally, PVN's activities focus more on developing pilot projects until 2030.

Japan is paying particular attention to these projects, notably through the Japan Organization for Metals and Energy Security (JOGMEC). In particular, JOGMEC has entered into collaboration agreements with Petronas and PTT for feasibility studies and to facilitate links between CCS developers and Japanese industrial firms.[70] Several Japanese companies are interested in the potential of CCS projects in Southeast Asia for future storage of CO_2 captured at their own facilities. The 4Ps' objective thus goes beyond merely reducing their own emissions and includes integration into the development of new business models, such as CCS.

Biofuels and sustainable aviation fuels

This is also the case for the production of alternative fuels, a key focus of the industrial strategies of several Southeast Asian countries. Several countries in the region support the development of biofuels (produced from organic materials derived from biomass), which already have significant production

69. B. Loebs, "Pertamina Seeks New Partner for Sunda Asri CCS Project", Pertomindo, January 22, 2026, available at: www.petromindo.com.
70. "PETRONAS to Bolster Collaboration with Japan's METI, JOGMEC on Cross-Border CO_2 Transportation for CCS Projects", October 6, 2023, available at: www.petronas.com; "Carbon Capture and Storage", PTTEP, available at: www.pttep.com.

levels. ASEAN currently plays only a minor role in bioethanol (produced from sugar beet, sugar cane, wheat or maize), with Thailand being the main contributor in 2024 (1.1% of global production). By contrast, in the biodiesel sector (produced from vegetable oils, notably soya, rapeseed and palm), ASEAN accounted for a quarter of global production in 2024, especially through Indonesia (18%).

Figure 20. World bioethanol production, 2016-2024

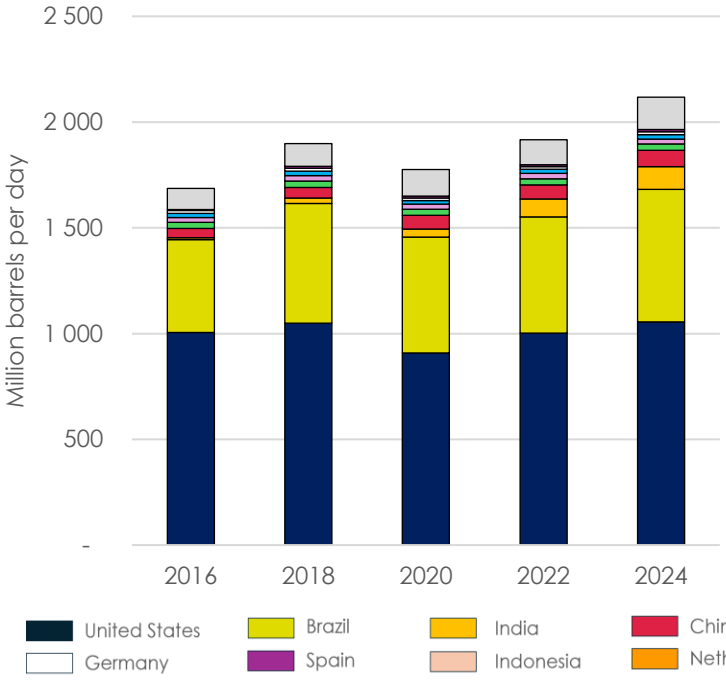
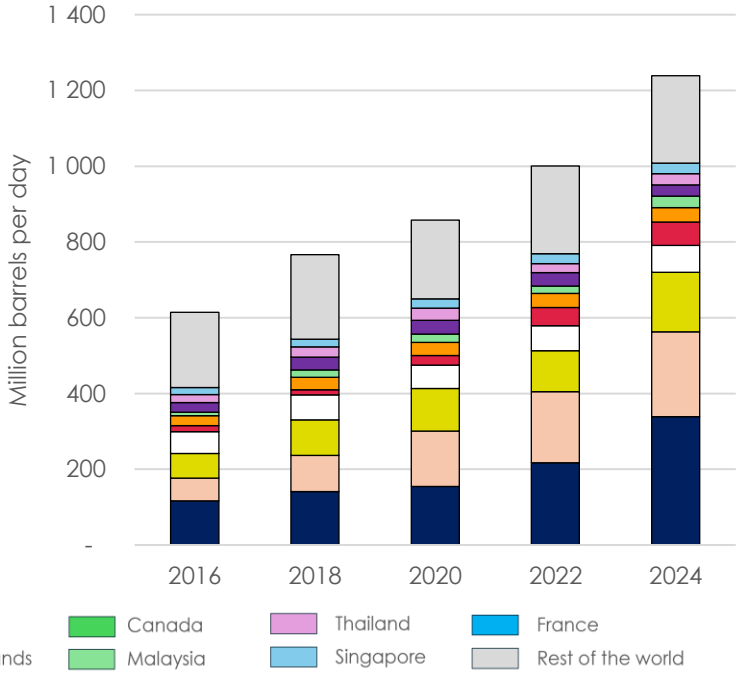


Figure 21. World biodiesel production, 2016-2024



Source: Ifri, based on data from the US Energy Information Administration, available at: www.eia.gov.

The current energy crisis and the quest for energy security have reignited the commitment of several countries to increase domestic biofuel production and consumption: Indonesia announced in March its plan to transition from B40 to B50 (50% biodiesel/50% conventional diesel) and is implementing the transition; Malaysia announced in April its plan to transition from B10 to B15; and Thailand shifted from B5 to B7 in March 2026, and announced a plan to move to E20 (20% bioethanol; 80% conventional gasoline). Vietnam deployed E10 in June 2026. However, blending biofuels at high levels poses technical and economic challenges, particularly in Indonesia, which is aiming for parity. Technically, vehicle engines (especially older ones) are not designed for high biofuel content, which can lead to premature wear and tear. Economically, the Indonesian government covers the additional costs of biofuel production (which is traditionally more expensive than conventional diesel) by taxing exports of certain palm oil products to compensate for losses incurred by biodiesel

producers.[71] The current increase in oil prices is partially altering this situation, but the economic mismatch between biodiesel and conventional diesel remains a structural problem.

In the biofuel sector, the 4P's industrial strategies notably include producing Sustainable Aviation Fuel (SAF). Pertamina produced its first batches of SAF from used cooking oil (UCO) in 2025, at its existing refinery in Cilacap (Central Java).[72] The fuel produced is used on flights operated by its subsidiary Pelita Air between Jakarta and Bali. The second phase of its strategy involves developing a dedicated refinery (a USD1.1 billion investment, with operations slated to begin in 2029), with a feedstock input capacity of 310 kilotonnes (kT)/year of feedstock.[73] The project has not yet reached the FID stage. Petronas, for its part, is developing a biorefinery in Pengerang (southern Malaysia), in collaboration with Enilive and Euglena, with an input capacity of 650 kT, to produce SAF and other biofuels (including naphtha). Groundbreaking took place in November 2025, and operations are scheduled to begin in 2028.[74] Another company, EcoCeres, also began production in October 2025 and is currently ramping up to reach a final biofuel production capacity of 420 kT/year. In Thailand, PTT produced its first batches of SAF in August 2025, using UCO, through the existing Map Ta Phut refinery. Another Thai producer, Bangchak, also began production in April, as did PVN in Vietnam through its subsidiary BSR. PTT and PVN aim to expand their production and diversify their product offerings, but have not announced any plans for dedicated biorefineries at the time.

Countries in the region are developing SAF blending mandates or targets for airlines, but their ambitions and levels of progress vary. Singapore has implemented an effective mandate (1% SAF starting in 2027; 3–5% starting in 2030) for flights departing from its airport.[75] A government-owned entity, SAFCo, aggregates SAF demand and funds it through a levy on passenger tickets. The SAF levy for 2027 has started to be collected on air traveler tickets starting on October 1, 2026. Indonesia is planning a blending mandate for international flights departing from Jakarta and Bali (1% starting in 2027; 5% in 2029), and implementation is underway, though it remains the main challenge. Plans are less advanced in the rest of the region. Malaysia has set a long-term target to progressively increase SAF blending to 47% by 2050 under its National Energy Transition Roadmap, while a 1%

71. "Indonesia Raises Palm Exports Levy", United States Department of Agriculture, May 21, 2025, available at: https://apps.fas.usda.gov.
72. "Indonesia's Pertamina Delivers First Used Cooking Oil Aviation Fuel", Reuters, August 12, 2025, available at: www.reuters.com.
73. J. Isaac, "Pertamina Targets 2029 Launch for US$1.1B Cilacap Bio-Refinery Project", *Indonesia Business Post*, September 11, 2026, available at: https://indonesiabusinesspost.com.
74. "Groundbreaking Ceremony of the New Biorefinery by PETRONAS, Enilive and Euglena in Pengerang, Johor, Malaysia", Petronas, November 10, 2025, available at: www.petronas.com.
75. D. Yow, "Singapore Defers Sustainable Aviation Fuel Levy for Air Cargo; Levy on Travelers to Proceed as Planned", CNA, September 3, 2026, available at: www.channelnewsasia.com.

mandate for international flights departing Kuala Lumpur from 2027 is still being developed and has not yet been adopted. Thailand is pursuing a voluntary 1% SAF uptake on designated international routes from 2026, with 1-2% envisaged from 2027, and Vietnam has announced a target of 10% by 2035 for some short-haul flights.

One of the main challenges for SAFs—and biofuels in general—remains certification, which is linked to emission levels and, therefore, to the nature and life cycle of their feedstock. Requirements vary by jurisdiction. The Singaporean and Indonesian mandates are based on the international ISCC-CORSIA certification, recognized by the International Civil Aviation Organization (ICAO). However, the European REFuelEU regulation goes beyond this single certification in its requirements:

- The list of accepted feedstocks is more restrictive: palm oil products, such as crude palm oil (CPO) and palm fatty acid distillate (PFAD), are not eligible[76]—only palm oil mill effluent (POME) is eligible, under certain conditions. POME, PFAD, and CPO (under certain conditions) are accepted by ISCC-CORSIA.[77]
- The emissions threshold for biofuels is stricter: ISCC-CORSIA requires emissions to be no more than 90% of those from conventional jet fuel for eligibility. REFuelEU requires emissions to be no more than 65%.
- The calculation of emissions differs: ISCC-CORSIA uses a different methodology than the EU for calculating SAF emissions.

The issue of feedstocks is central. Currently, most biofuels produced in ASEAN are based on UCO, which offers numerous advantages, particularly in terms of carbon footprint. However, UCO collection must be improved, and supply sources secured (Petronas and PTT, for example, are developing strategies to this end). This feedstock is increasingly in demand, with rising prices. Indonesia has therefore imposed restrictions on crude UCO—and crude POME—exports since January 2025 (which have since been converted into a ban).[78] The national free meal program could also help increase UCO production. China canceled its tax rebate for UCO exports in 2024. According to S&P Global, China, Malaysia, Vietnam, Thailand, and Indonesia are the world's top five UCO exporters.[79] Malaysia accounts for the majority of UCO exports from ASEAN, especially as Indonesia's exports have declined.

76. "List of Materials Eligible for ISCC EU Certification", ISCC EU, May 2026, available at: https://iscc-system.org.
77. "SAF Feedstocks", ICAO, available at: www.icao.int.
78. R. Ng, "Indonesia Restricts Crude Palm Oil Exports Waste", Fastmarkets, February 23, 2026, available at: www.fastmarkets.com.
79. S. Pandey, C. Boey, "Global UCO Supplies Tighten as Emission Mandates Boost SAF Output", S&P Global, December 16, 2025, available at: www.spglobal.com.

Low-carbon hydrogen

To a lesser extent, the 4Ps' decarbonization strategies also focus on low-carbon hydrogen. Pertamina is developing a green hydrogen demonstrator in Ulubelu (Sumatra) using geothermal electricity and AEM (Anion Exchange Membrane) electrolyzers. The project is scheduled to begin operations in late 2026. Petronas is developing a green hydrogen project in Sarawak, which was formally launched in July 2025. Among these four SOEs, PTT appears to be the most active player in this area. In late 2022, the Thai company signed a memorandum of understanding (MoU) with ACWA Power to develop a renewable-powered green hydrogen production facility in Thailand, targeting 225kT/year of hydrogen and 1.2 MT of ammonia. However, it has made no significant announcements since then. Through its subsidiary PTTEP, PTT is also involved in the Hy Duqm green hydrogen production project in Oman (targeting 220kT of hydrogen and 1.2 MT of ammonia). Around 40 low-emission hydrogen projects have been announced across Southeast Asia (for a capacity of 5.5 MT), of which 75% are concentrated in Indonesia and Malaysia. Yet, only 1 MT of this capacity is associated with projects scheduled to start up by 2030, and only 50 kT is currently under construction.[80]

The bankability of the decarbonization projects led by these SOEs remains a major challenge, particularly for green hydrogen: few projects have reached FID, and business models remain difficult to develop. The 4Ps operate fossil hydrogen production, with associated costs that are significantly lower than those envisaged for low-carbon hydrogen projects. For CCS, interest from Japan or South Korea may facilitate future offtake, but it also makes that offtake contingent on demand policies shaped outside the region. CCS projects are also hindered by incomplete regulatory frameworks regarding issues such as storage certification, long-term liability, and cross-border CO_2 transport. Actual investment in low-emissions fuels (fossil fuels with CCS, hydrogen, and bioenergy) has not taken off in Southeast Asia and is actually lower than in the early 2020s.[81] Developing sufficient domestic demand appears difficult without comprehensive carbon pricing schemes.

80. "ASEAN Energy Security Review", IEA, October 2026, p.53, available at: www.iea.org.
81. "Southeast Asia Energy Outlook 2026", IEA, June 2026, p. 34, available at: www.iea.org.



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