



Accelerating Clean Energy Investment in ASEAN: Policy Options

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Key Messages:

- **Significant investments needed for clean energy transition**

ASEAN's growing energy demand, driven by rapid economic growth, will require substantial investments in the power sector, with a projected USD 6 trillion needed to follow the carbon neutrality pathway.

- **Foreign Direct Investment flow is closely linked to incentives and regulatory support for renewable energy**

The analysis using RISE Score indicators and World Bank's Private Participation in Infrastructure (PPI) Project Database shows that foreign direct investment is highly correlated with renewable energy (RE) incentives, regulatory support for RE and current legal frameworks for RE.

- **Stable and transparent regulatory frameworks are essential for attracting investment**

Long-term Power Purchase Agreements, clear permitting guidance, and fiscal incentives play a key role in reducing risks and attracting both foreign and domestic investments in renewable energy projects across ASEAN.

- **Blended finance as a catalyst for private investment**

Blended finance, combining concessional funds with commercial investment, is key to de-risking high-impact clean energy projects and filling the investment gap in lower-income ASEAN countries.

1. Introduction

Rapid economic growth and falling renewable energy costs drive ASEAN's energy transition

ASEAN has consistently been one of the world's fastest-growing economic regions, with an average annual GDP growth of 5% before the COVID-19 pandemic. While the pandemic caused a significant drop in GDP, the region quickly rebounded, achieving a growth rate of 4.1% in 2023, with projections of 4.6% and 4.7% for 2024 and 2025 [1]. The rapid GDP growth drives the energy demand in the region. ASEAN's total final energy consumption is projected to increase by 73% by 2050 compared to 2023, following the national policies, driven largely by manufacturing, transportation, and improved living standards. To meet this rising demand, ASEAN's installed power capacity, which was 315 GW in 2022, is projected to grow significantly, reaching 1,115 GW by 2050 [2]. This expansion will be fuelled by investments in renewable energy (RE), particularly solar and wind, as ASEAN strives to balance energy security with sustainability goals. ASEAN aims to increase the share of RE in total primary energy supply (TPES) to 23% and in installed

capacity to 35% by 2025, as outlined in the ASEAN Plan of Action on Energy Cooperation (APAEC) 2021-2025 [3]. With the implementation of national policies, ASEAN is projected to meet the APAEC target of a 23% RE share in TPES by 2030, falling five years behind [2]. As the region moves into the next cycle of APAEC, it is crucial to build a strong foundation for the adoption of RE sources, reduce reliance on fossil fuels, and uphold robust policies to ensure a clean energy supply in the long term.

The power generation mix will also shift, with over 50% of total electricity expected to come from renewables by 2050, marking a key transition toward cleaner energy sources. By 2050, over half of ASEAN's electricity will come from renewable sources, with solar, wind, and hydro contributing 1,742 TWh, or 63% of the energy mix, surpassing fossil fuels [2]. The growth in solar and wind power is driven by falling technology costs and supportive government policies. Vietnam and Thailand are leading solar development, whilst Vietnam is also becoming a key player in wind energy, particularly in offshore and coastal areas.

The cost of RE is steadily decreasing, making it increasingly competitive with fossil fuels. Technological advancements and the growing demand for cleaner energy sources have driven down the costs of RE technologies such as utility-scale solar, onshore wind, and geothermal. The global average cost of solar power, for instance, dropped by 89% to USD 0.049/kWh in 2022, while the cost of onshore wind fell by 69% since 2010 [4]. This trend makes RE not only environmentally beneficial but also financially attractive. As fossil fuel prices rise, the reduced operating costs of renewables enhance their competitiveness. This cost reduction is expected to accelerate RE adoption across the region, contributing significantly to the energy transition.

Substantial investments needed for the ASEAN energy transition target

ASEAN will require substantial investments to meet its growing power capacity and energy demands due to the rapid GDP growth. Based on the 8th ASEAN Energy Outlook, the total investment requirement under the AMS Targets Scenario (ATS) is projected to reach USD 32 billion annually by 2050, which is 16% higher than the USD 27 billion required under the Baseline Scenario (BAS). However, the Carbon Neutrality Scenario (CNS), which incorporates more aggressive net-zero measures, necessitates an even higher investment, with the annual power investment in 2050 reaching USD 516 billion. Over the entire period from 2023 to 2050, achieving carbon neutrality through clean energy will require a total investment of USD 6 trillion [2].

The current investment flows in ASEAN show a dynamic mix of domestic and foreign capital fuelling the region's energy projects. Most energy investments between 2021 and 2023 came from local private investors, especially in countries like the Philippines, Malaysia, and Cambodia, where more than 50% of the funding came from domestic sources [5]. On the other hand, Japan and China are the largest foreign investors, contributing primarily to RE and conventional power projects in Vietnam, Lao PDR, and Thailand. In terms of financing instruments, commercial debt dominates at 57.9%, followed by equity investments at 24%. Multilateral and bilateral debt play smaller roles, at 7% and 10.7%, respectively, with concessional funding and grants making up less than 1% [5]. Blended finance—combining concessional and commercial funding—is becoming increasingly important for bankability in clean energy projects, particularly in lower-middle-income countries where concessional financing remains high.

Governments can accelerate the energy transition by offering incentives like tax breaks and subsidies. These measures help reduce the capital costs of renewable projects, making them more attractive to investors despite high borrowing costs. ASEAN countries have adopted this approach, with Thailand offering corporate tax exemptions and Malaysia providing tax incentives through programs like Green Investment Tax Allowance (GITA) and Green Income Tax Exemption (GITE) [6]. Vietnam has also adjusted its feed-in tariffs (FIT) for solar energy based on regional solar radiation [7]. However, while these incentives boost short-term progress, substantial government spending can increase debt and financial risks, making it crucial to balance public funding with private sector contributions and maintain healthy fiscal space.

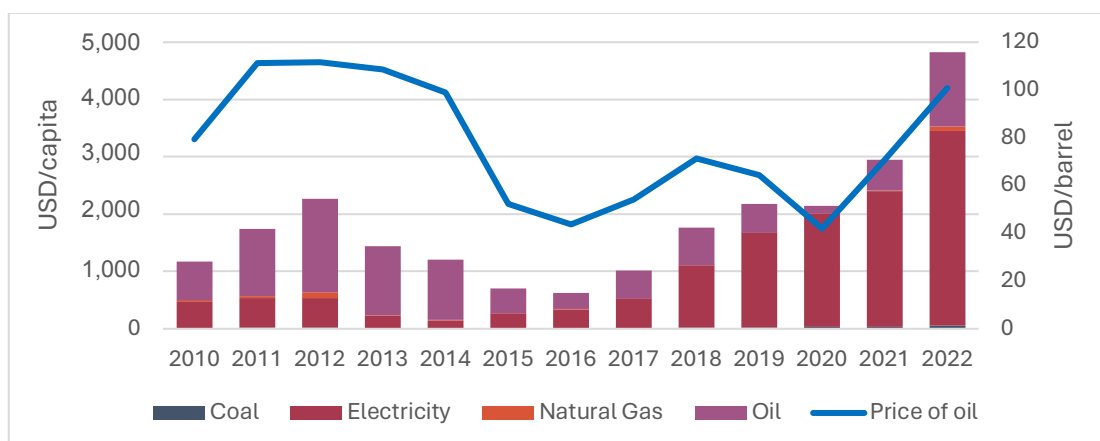
2. Challenges in Mobilising Investment for the Energy Sector in ASEAN

Complex regulatory frameworks and inconsistent policies hinder investment in renewables in ASEAN

The ASEAN energy market is fragmented, with inconsistent levels of market integration and cross-border trade, creating regulatory complexities that discourage investment in regional energy projects and slow the development of interconnected infrastructure. Initiatives like the ASEAN Power Grid and Trans-ASEAN Gas Pipeline aim to improve regional integration, but progress has been hindered by a lack of coordination, leading to duplicated efforts and missed investment opportunities. Political instability in some ASEAN countries further contributes to market uncertainty, as policy changes can deter investors in the energy sector.

Despite advancements in regulatory policies aimed at protecting and promoting foreign investments, ASEAN's investment governance structure remains underdeveloped, limiting transparency and hindering the growth of the cleantech industry. Additionally, fossil fuel subsidies across the region distort clean energy market prices and discourage investment in RE and energy efficiency. In 2022, electricity subsidies peaked at USD 3,400 per capita, while coal subsidies remained low, and oil subsidies followed an upward trajectory of crude oil prices, as shown in Figure 1 below:

Figure 1. ASEAN Energy Subsidies and the Price of Crude Oil



Source: Authors' calculations based on Fossil Fuel Subsidy Tracker [8] and Statista [9]

Long-term power purchase agreements, clear permitting guidance, and fiscal incentives significantly impact investment flows

In evaluating key policy aspects that affect RE investment, a study conducted by the ASEAN Centre for Energy (ACE) employs two World Bank's data sets, i.e. (i) World Bank's Private Participation in Infrastructure (PPI) Project Database to assess energy projects details and investment analysis; and (ii) Regulatory Indicators for Sustainable Energy (RISE) is used to assess the regulatory frameworks within the ASEAN Member States (AMS), except for Brunei Darussalam [10].

RISE assesses four indicators of sustainable energy, i.e., RE, electricity access, clean cooking, and energy efficiency. This study, however, focuses on RISE's RE indicators.

Based on detailed information for each sub-indicator of the RISE score, most of the AMS have addressed fundamental issues in their institutional and regulatory frameworks across three key areas: legal framework, planning, and counterparty risk (Figure 2). Except for Myanmar's counterparty risk and Cambodia's planning policy, the AMS generally achieved medium to high scores in these areas, indicating that most have established appropriate regulations for RE investments.

Figure 2. ASEAN Energy Subsidies and the Price of Crude Oil

Country	Sub-Indicator							Weighted Total Score
	Legal framework for RE	Planning for RE expansion	Incentives and regulatory support for RE	Attributes of financial and regulatory incentives	Network connection and use	Counterparty risk	Carbon Pricing and Monitoring	
Cambodia	80.0	29.2	17.5	0.0	30.0	64.6	50.0	39
Indonesia	80.0	54.2	35.4	33.3	30.0	90.6	50.0	53
Lao PDR	80.0	54.2	39.2	8.3	6.7	33.3	0.0	32
Malaysia	80.0	66.7	45.4	63.3	32.2	58.3	0.0	49
Myanmar	60.0	41.7	27.5	20.0	5.6	16.7	0.0	24
Philippines	60.0	54.2	60.0	80.0	70.0	53.7	0.0	54
Singapore	60.0	62.5	29.2	73.3	76.7	52.3	100.0	65
Thailand	40.0	95.8	12.5	73.3	20.0	74.0	0.0	45
Vietnam	80.0	100.0	73.3	83.3	60.0	90.9	100.0	84

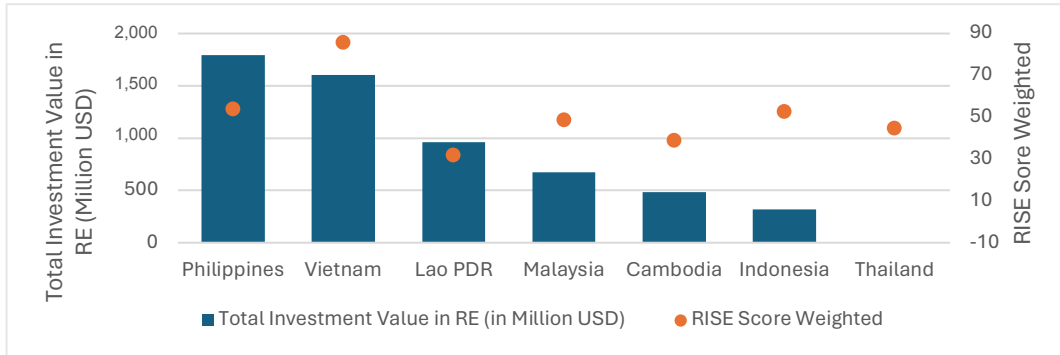
Note:
 Green : 67-100
 Yellow : 34-66
 Red : 0-33

Source: Authors compilation based on data from the RISE Website [11]

As given in the World Bank data, the RISE score is not the only indicator of progress toward investment in sustainable energy space [12]. Nevertheless, it provides a comprehensive indicator to track the progress of participating countries. In the analysis, investment value is

plotted against the overall weighted score of RE, as seen in Figure 3. It indicates that there is a very weak correlation between total investment value and RISE Scores for RE. For example, Lao PDR has the third largest RE investment, but the lowest RISE score for RE amongst the countries listed.

Figure 3. Total Investment Value and RISE Scores

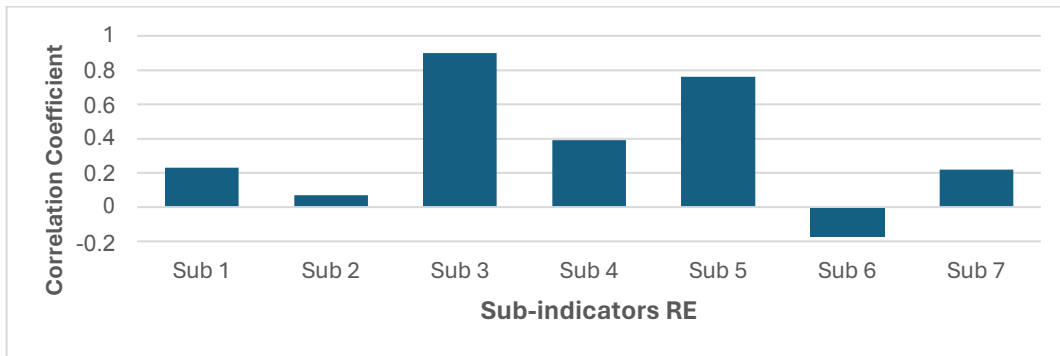


Source: Authors' calculations based on the World Bank's RISE [12]

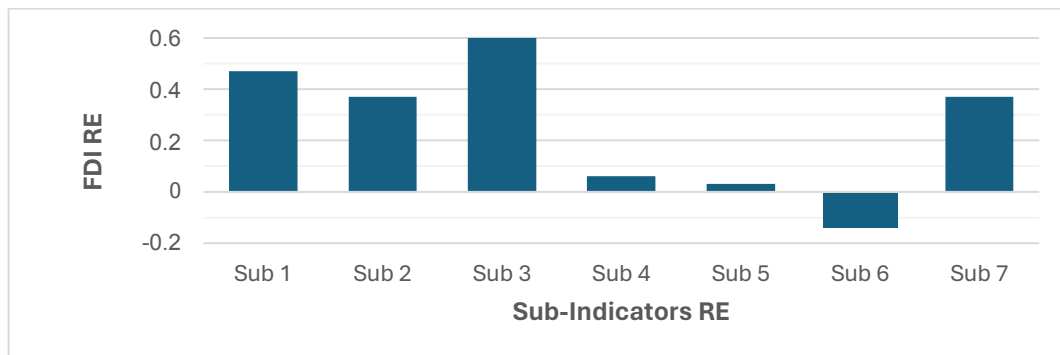
Hence, there is a need for further investigation into the sub-indicators to identify which ones are relatively more impactful by using the Pearson correlation formula between the sub-indicator scores and investment in the participating

countries. Correlations nearing a value of 1 mean a positive correlation in which the data sets move linearly. The result is shown in Figure 4.

Figure 4. The Correlation Coefficient Between RISE RE Sub-indicators and Investment Value



(a) Correlation between the sub-indicators and overall investment (local and FDI)



(b) Correlation between the sub-indicators and FDI

Legend:

- Sub 1.** Legal framework for RE
- Sub 2.** Planning for RE expansion
- Sub 3.** Incentives and regulatory support for RE

- Sub 4.** Attributes of financial and regulatory incentives
- Sub 5.** Network connection and use
- Sub 6.** Counterparty risk
- Sub 7.** Carbon pricing and monitoring

Source: Authors' calculations based on the World Bank's RISE [12]

In evaluating overall domestic and foreign investment, the strongest correlations are with Sub-indicators 3 (Incentives and regulatory support for RE) and 5 (Network connection and use). For foreign direct investment specifically, the highest correlations are with Sub-indicators 3 (Incentives and regulatory support for RE) and 1 (Legal framework for RE). Other sub-indicators show weak correlations to investment. These findings align with other studies, suggesting that policies alone, without additional international climate finance and stronger institutional capacity, are unlikely to advance decarbonisation efforts significantly [13], [14].

The incentives and regulatory support evaluated in sub-indicator 3 of the RISE Scores include concerns over long-term power purchase agreements (PPAs), clear guidance on permitting processes, and direct fiscal incentives. For investors, a bankable long-term PPA is key to obtaining competitive financing and lowering the perceived risk premiums. As described [15], “A bankable PPA is essentially a long-term offtake agreement executed with a creditworthy off-taker and having a sufficient tenor to enable repayment of a debt by providing an adequate and predictable revenue stream” [16]. A bankable PPA, which is key to securing financing, follows the principle that risks should optimally be allocated to the party best able to manage such risks.

The direct fiscal incentive is a public derisking instrument for RE investment, which was found to be effective in derisking the project by reducing the total project cost and playing an important role in low carbon transition [17], [18], [19]. The country’s capability to provide direct fiscal incentives for energy investment is determined by its fiscal space, which is measured by: (i) government debt sustainability; (ii) balance

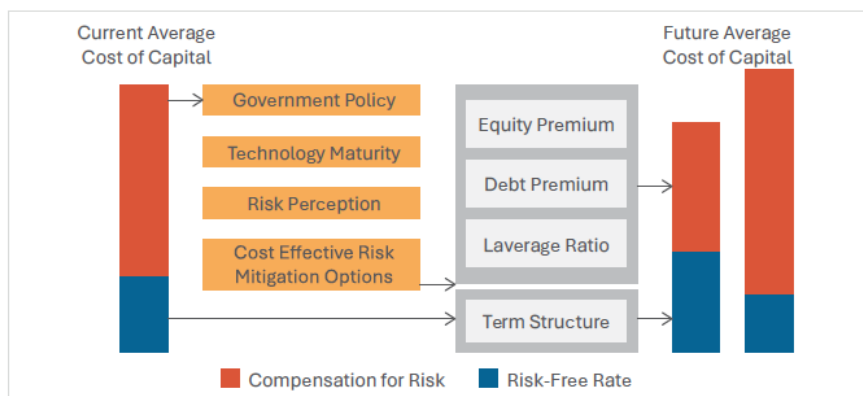
sheet composition; (iii) external debt; and (iv) market perception [20]. However, the COVID-19 pandemic adversely impacted the fiscal conditions in the AMS due to the disruption in government revenue collections and massive additional fiscal budgets to recover from the pandemic, which limits the AMS’ capabilities to continuously provide fiscal incentives for the energy sector.

Private investor is needed to fill in the investment gap, but the cost of capital remains a barrier

Public funding alone is insufficient to meet ASEAN's rising energy demand and support the green energy transition, making foreign and private investment critical. Growing demand in ASEAN's developing economies is expected to attract foreign investment in both renewable and conventional energy infrastructure.

In the private sector, clean energy investment decisions are strongly influenced by the cost of capital, which reflects the expected return on funding a project. The cost of capital is defined as the expected rate of return that investors require from funding a project. It is linked to the capital structure of a project, specifically the proportion of debt and equity used in the project’s financing. Figure 5 illustrates the drivers of the cost of capital, showing that it is influenced by a risk-free rate and compensation for risk. Both debt and equity financing include a base-rate portion (indicated in blue), which is unaffected by the project’s specific risks or policies but is influenced by macroeconomic conditions. The compensation for risk (indicated in red), or premium, is driven by actual and perceived risks related to project cash flow certainty [21]. Higher perceived risks result in a higher cost of capital, which can discourage investment, particularly in developing countries and emerging clean energy technologies.

Figure 5. Drivers of Cost of Capital



Source: Coleman, 2021 [21]

3. Key Recommendations for ASEAN Policymakers

The policy recommendations are formulated as follows:

a. Strengthen Regulatory Stability

One of the crucial policy options is the need to strengthen regulatory stability across AMS. Consistent and transparent regulations are essential to reduce perceived country risks and attract foreign direct investment into RE projects. Regulatory uncertainty can deter foreign investors, making stable and long-term policies vital for sustaining investment flows.

b. Increase International Climate Finance

Increasing international climate finance is highlighted as a necessary policy option. International climate finance can act as a catalyst to mobilise private capital and close the significant investment gap in RE. Programs like the Just Energy Transition Partnership and ASEAN Catalytic Green Finance demonstrate how international collaboration can support large-scale investments in RE infrastructure and reduce carbon emissions. Therefore, global partnerships and climate finance are critical to ensuring a successful energy transition in ASEAN.

c. Expand Blended Finance Mechanisms Solution to De-risk the Private Investment

Blended finance is a key strategy for attracting private investment in high-risk, high-impact projects, often used as international climate finance. It combines concessional funds from donors or philanthropists with commercial funds from private investors and development finance institutions. Development banks play a crucial role in providing blended finance products, which include [23], [24]:

- **Concessional Senior Loans:** Loans with top repayment priority, offered at below-market interest rates or other non-commercial terms (e.g., maturity, grace period, security, repayment profile).
- **Concessional Subordinated Loans:** Loans with lower repayment priority (or with deferred interest or principal payments in certain pre-agreed situations), provided at below-market interest rates or other non-commercial terms.
- **Guarantees or Risk-Sharing Facilities:** These transfer all or part of the financial risk of a loan or group of loans to the guarantor up to a maximum agreed amount, with fees charged below market rates. This

could include first-loss protection, where the donor guarantees a portfolio of investments for a financial intermediary and pays out before the senior guarantor in case of a payment default.

- **Concessional Equity:** An ownership stake in a company or participation in a fund, with return expectations below what market investors would expect, or subordinated equity with cash waterfall.
- **Grants:** These can be Performance-Based Incentives to achieve certain expected milestones, or Viability Gap Fund (VGF), which provide a certain portion of the capital investment. VGF is aimed at projects which are not yet commercially viable.
- **Local Currency Support:** Provision of fully or partially subsidised currency hedge through concessional funds.

When structuring projects with blended finance, financial instruments are chosen based on macroeconomic, sectoral, and project-specific risks. The aim is to use the least amount of concessional funds while maximising private investment leverage. While these instruments can address common challenges in emerging markets, such as political and currency risks, each project will require a unique blended finance structure. Projects in lower-income countries typically require a higher percentage of concessional funds compared to those in upper-middle-income countries [25].

d. Enhance Regional Coordination


A significant challenge facing the ASEAN energy sector is the lack of coordination among regional energy initiatives. This lack of coordination can lead to duplicated efforts, inconsistent policies, and missed opportunities for collaborative investment and development. Enhancing coordination among regional initiatives can help address shared challenges, streamline efforts, and create a more cohesive energy strategy for the ASEAN region to manage its energy resources better and meet its growing demand. Such measures will also ease foreign investors to scale up in investing through multiple assets in different ASEAN countries.

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