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A Special ASEAN Investment Report 2023

International investment trends: Key issues and policy options

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A Special ASEAN Investment Report 2023

International investment trends: Key issues and policy options

The ASEAN Secretariat

United Nations Conference on Trade and Development

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967.
The Member States are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.

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The map in this publication is only indicative and is not drawn to scale.

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The ASEAN Investment Report is produced to facilitate a better understanding of FDI developments in ASEAN. The findings, interpretations, and analysis in the Report should be treated with care, as work on harmonising and improving FDI quality across the region is on-going.

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FOREWORD

The global economy has gradually recovered from the pandemic and continued to shows its progress from year to year. The health crisis caused by the COVID-19 pandemic has ended and economic disruption has returned to pre-pandemic levels. In early 2023, the global economy proved resilient, as shown by stable energy and food prices as well as a strong labor market, amidst the Ukrainian war crisis and financial instability in some developed countries. Nevertheless, there are still many challenges that await in the near future.

According to IMF's projection, global economic growth will slow down from 3.5 percent in 2022 to 3.0 percent in 2023. Global inflation is also projected to decline from 8.7 percent last year to only 6.8 percent in 2023. While global FDI flows in first half of 2023 rebounded from the second half of 2022, global FDI flows in second quarter of 2023 dropped 44% compared to the previous quarter, according to OECD. Therefore, it is necessary foster inflow of investment to spur economic growth.

This report aims particularly to support ASEAN Economic Ministers, ASEAN Investment Area (AIA) Council, and policymakers in making decisions regarding emerging issues that may affect foreign direct investment inflows. Several emerging issues discussed in this report, such as international tax reform, the reshaping of global supply chains, energy transition trends, and the electric vehicle supply chain, are factors that can influence the inflow of foreign investment into the ASEAN region.

In the ASEAN region, foreign direct investment flows in 2022 increased to US$ 224 billion, breaking an all-time record. The main drivers are robust growth in manufacturing investment as well as increased investor interest in sectors related to the energy transition such as renewable energy and electric vehicles, wholesale and retail trade, the digital economy, and financial sector. ASEAN member countries need to strengthen cooperation to maintain the growth of foreign investment inflows to the ASEAN region and promote equal distribution of foreign investment across ASEAN member countries.

Finally, I really appreciate and thank the ASEAN Secretariat and UNCTAD's Investment and Enterprise Division, as well as the ASEAN Coordinating Committee on Investment (CCI), who have contributed to the preparation of the ASEAN Investment Report 2023. I hope this report can be useful for policymakers and stakeholders in further encouraging investment in ASEAN.

Bahlil Lahadalia
Minister of Investment/Chairman of Investment Coordinating Board, Republic of Indonesia
Chair of The AEM - 26th AIA Council Meeting

FOREWORD

Foreign Direct Investment (FDI) inflows into ASEAN reached an all-time high at $224 billion in 2022. This was an important achievement for ASEAN, despite a 12 percent decline in global FDI flows to $1.3 trillion due to the multitude of international crises and challenges, including geopolitical conflicts, inflated prices of food and energy, the risk of recession and mounting debt pressures in many countries around the world, resulting from the consequences of COVID-19 pandemic. It is noteworthy that ASEAN continues to remain resilient and positioned itself as a top FDI recipient. The robust growth in manufacturing investment, and the increased interest in sectors related to energy transition, digital economy, wholesale and retail trade, are among the key drivers of these strong investment trends.

Intra-ASEAN FDI also continued to expand further to $28 billion in 2022, marking its position as the second largest source of investment after the United States. The share of ASEAN FDI to the global FDI has also increased to 17 percent from the 15 percent level in 2021. Closer collaboration and proactive investment promotion and facilitation initiatives by the ASEAN Member States are imperative to further bolster the intra-ASEAN FDI.

This Special ASEAN Investment Report (AIR) identifies and discusses several key emerging issues that will affect the region's efforts to attract FDI. These emerging issues include: (i) the reshaping of international supply chains; (ii) international tax reform and global minimum tax; and (iii) investment in the energy transition and electric vehicle supply chain. The report also looks at the need to further push intra-ASEAN investment and to reform International Investment Agreements (IIAs).

The global and regional economic challenges continue to evolve dynamically. In bolstering further economic integration, it is imperative that ASEAN remains open and responsive to the rapidly changing global needs and trends. I hope that the data, insights and recommendations provided in this publication will be of great benefits to policymakers and business stakeholders alike in realising a conducive and sustainable investment landscape in ASEAN.

Dr. Kao Kim Hourn
Secretary-General of ASEAN

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ABBREVIATIONS

AEC	ASEAN Economic Community
AIFF	ASEAN Investment Facilitation Framework
AIR	ASEAN Investment Report
ASEAN	Association of Southeast Asian Nations
ASSIST	ASEAN Solutions for Investments, Services and Trade
BEPS	Base Erosion and Profit Shifting (project)
BITs	bilateral investment treaty
CAGR	compound annual growth rate
CLMV	Cambodia, the Lao People's Democratic Republic, Myanmar, Viet Nam
EU	European Union
EV	electric vehicle
FDI	foreign direct investment
FIT	feed-in tariff
FTA	free trade agreement
GDP	gross domestic product
HEV	hybrid electric vehicle
IEA	International Energy Agency
IIA	international investment agreement
IRENA	International Renewable Energy Agency
Lao PDR	Lao People's Democratic Republic
LCOE	levelized cost of electricity
LDCs	least developed countries
M&As	mergers and acquisitions
MDB	multilateral development bank
MNE	multinational enterprise
MSMEs	micro, small and medium-sized enterprises
MW	megawatts
NDCs	nationally determined contributions
OECD	Organisation for Economic Co-operation and Development
OEM	original equipment manufacturer
PCB	printed circuit board
PPP	public-private partnership
R&D	research and development
RCEP	Regional Comprehensive Economic Partnership

SDGs	Sustainable Development Goals
SEZ	special economic zone
SMEs	small and medium-sized enterprises
SUV	sports utility vehicle
TIP	treaty with investment provisions
UNCTAD	United Nations Conference on Trade and Development
WASH	water, sanitation and hygiene
WIR	World Investment Report

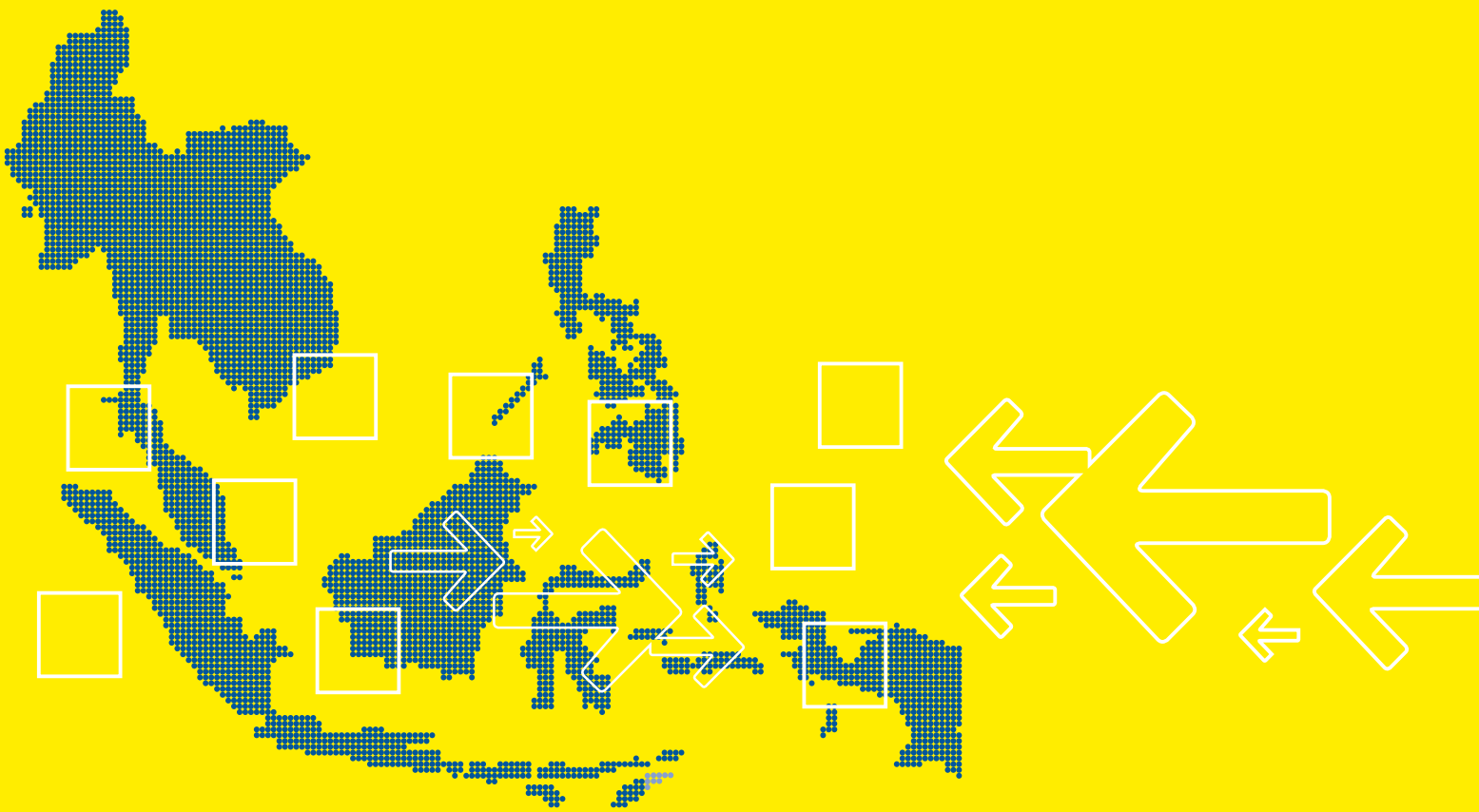
PREFACE

This special report was prepared at the request of the Chairman of the ASEAN Economic Ministers–26th ASEAN Investment Area Council Meeting. It served as a background document to facilitate discussion at the ministerial meeting in Semarang, Indonesia on 19 August 2023.

In 2022, the global economy was affected by multiple crises, which weighed on global flows of foreign direct investment (FDI). However, ASEAN and a few developing regions bucked the trend. FDI in ASEAN reached the highest level ever recorded, albeit with growing concentration. Rapid economic and industrial growth and opportunities linked with regional integration were key factors. Improving investment environments and efforts by Member States to attract FDI for sustainable recovery, to facilitate economic growth and to strengthen the industrial ecosystem, also played a role. Firms in the region, including many start-ups, small and medium-sized enterprises (SMEs), large firms and foreign multinational enterprises (MNEs) are expanding across ASEAN, upgrading factories, scaling up operations, participating in regional value chains and strengthening supply chain networks.

The purpose of this report is to analyse FDI trends and developments in ASEAN and to identify key emerging issues that will affect the region's efforts to attract FDI. These emerging issues include international supply chain restructuring, investment in the energy transition, international tax reforms, FDI in sectors relevant to the Sustainable Development Goals (SDGs) and investment in electric vehicle (EV) value chains. The report also looks at intra-ASEAN investment which, while remaining a major source of FDI, has grown more slowly in recent years, highlighting the need to examine its development in the context of the ASEAN Economic Community (AEC).

KEY MESSAGES



KEY MESSAGES

FDI TRENDS

Global FDI was down in 2022, but remained strong in ASEAN

Global foreign direct investment flows fell by 12 per cent, reaching $1.3 trillion. The decline was concentrated in developed countries. The multitude of crises and challenges on the international stage, including the conflict in Ukraine, elevated prices of food and energy, the risk of recession and mounting debt pressures in many countries exerted downward pressure. Several developing regions defied this trend, among them the Association of Southeast Asian Nations (ASEAN).

In ASEAN, FDI flows increased to $224 billion, marking an all-time peak. The increase followed a vigorous recovery during 2021. ASEAN solidified its position as a top recipient of investment within the developing world, with inflows surpassing those directed towards China for the second consecutive year. The region's share of global FDI expanded further, growing from less than 15 per cent in 2021 to exceed 17 per cent.

Multinational enterprises in the region are proactively expanding across ASEAN, building regional value chains and fortifying supply chain networks. This is manifested by an 8 per cent increase in equity investment, to $127 billion, or 56 per cent of FDI in 2022. Reinvestment increased by 5 per cent, totalling $86 billion, or 38 per cent of the total.

Investment project numbers increased across all three main modes of international investment: announced greenfield projects, international project finance and cross-border mergers and acquisitions (M&As).

Among the Member States, six registered higher inflows, with three marking record highs (Malaysia, Singapore, Viet Nam). Cambodia and Myanmar emerged as prominent recipients within the group of the least developed countries (LDCs). Investment directed towards Indonesia also increased by 5 per cent, reaching $22 billion.

The main propellers of these trends included robust growth in manufacturing investment, heightened investor interest in sectors associated with the energy transition (such as renewables and activities related to electric vehicles (EVs)), wholesale and retail trade, the digital economy and the consistent high volume of FDI in the finance sector.

International investment in sectors relevant to the SDGs in ASEAN rose for the second consecutive year. In 2022, the number of such projects rose by 26 per cent to 349. Investment in the SDGs remained uneven, with some sectors (e.g. infrastructure and renewables) attracting strong investor interest, while others (e.g. water, sanitation and hygiene (WASH)) receive less attention.

Despite the fragility of global FDI in 2023, the outlook for heightened inflows into ASEAN remains promising. This outlook is underpinned by ongoing investment in international supply chain restructuring that favours the region, robust macroeconomic projections, continuously improving policy environments, persistent efforts towards regional integration and strong confidence among investors. Nevertheless, important challenges lie ahead that could temper this growth: global economic uncertainties; crises in food, fuel and finance; and weaknesses among financial institutions.

Intraregional investment in ASEAN increased but needs a growth push

For the third consecutive year, intraregional investment in ASEAN grew, to $28 billion, solidifying the region's position as the second-largest source of investment following the United States. However, the expansion of intraregional investment trails the overall growth in FDI in the region. The share of intraregional investment in total FDI inflows in ASEAN has consistently remained below 20 per cent since 2017. By contrast, intraregional investment within the European Union constitutes approximately 60 per cent of FDI in that region, reflecting the differing developmental stages of the two regions. More importantly, the average growth rate of FDI inflows from outside ASEAN between 2015 and 2022 was more than 2.5 times higher than that of intra-ASEAN investment.

Intraregional investment is a pivotal conduit to facilitate ASEAN's economic integration. The relatively gradual expansion of intraregional investment makes it necessary to explore mechanisms to bolster it, including strategies to encourage the regionalization of SMEs and start-ups. Addressing this challenge should not happen at the cost of the continuous growth of FDI of non-ASEAN origin. Possible measures to enhanced intra-ASEAN investment include the following:

- Strengthening institutional connectivity through collaboration between inward and outward FDI agencies, particularly within subregional growth zones.
- Enhancing cooperation for the regionalization of SMEs, encompassing investment facilitation for SME regionalization and the expansion of startups across borders.
- Forming a task force composed of alliances of stakeholders to identify challenges and provide recommendations to the AIA Council, focusing on policies and measures that bolster enterprise regionalization.
- Enlisting ASEAN statistical bodies to compile detailed statistics on intraregional investment.

INVESTMENT POLICY TRENDS

ASEAN's investment policy environment continues to improve

The investment policy landscape in ASEAN continues to improve and is marked by a growing tendency to adopt investment policies and measures favourable to FDI. ASEAN Member States have enacted numerous investment facilitation measures and introduced supplementary

policy actions, largely geared towards bolstering FDI. At the regional level, a series of declarations and agreements in recent years aim to stimulate investment across diverse sectors, including the electric vehicle industry, the digital economy and the transformation ushered in by Industry 4.0.

Over the period spanning 2013 to 2022, Member States collectively implemented a total of 149 policy measures with implications for investment, with more than 90 per cent of them either favourable or neutral for investors. This percentage surpasses the global average of 68 per cent and the Asian average of 86 per cent. A temporary dip occurred in 2021, coinciding with the peak of the COVID-19 pandemic, when the proportion of investment-favourable policy measures declined to 70 per cent, mirroring global trends. The shift predominantly revolved around the tightening of investment regulations, particularly in sectors of strategic importance, public health and national security concerns.

The process of reforming IIAs should continue

As of June 2023, ASEAN Member States had concluded 342 bilateral investment treaties and 83 treaties with investment provisions, constituting 13 per cent of the global universe of international investment agreements (IIAs). Following global trends, over 85 per cent of ASEAN's IIAs are older-generation ones, predating 2012. All 36 known investor–State dispute settlement cases against Member States are rooted in these older treaties, with 3 cases initiated from 2021 to 2022.

Older treaties lack sustainable development provisions, hindering their adaptation to evolving economic and regulatory changes because of vague terms, broad treatment standards and limited safeguards for regulatory measures. ASEAN's IIAs can benefit from modernization and consolidation, adopting newer-generation policies that address global challenges such as pandemics and climate change, while promoting sustainable investment. UNCTAD's toolkits offer guidance for this reform process.

KEY AND EMERGING ISSUES

International tax reforms will affect investment in ASEAN

International tax reforms have been proposed by the Base Erosion and Profit Shifting (BEPS) project carried out by the Group of 20 (G20) and the Organisation for Economic Co-operation and Development (OECD). The implementation of these reforms, notably the global minimum tax of 15 per cent on the profits of the largest MNEs, will have significant implications for investment policies, FDI promotion and the development of special economic zones (SEZs), which are often tied to profit-based incentives such as tax holidays and reductions.

It is important that ASEAN prepare for these global tax reforms. Possible actions include the following:

- Assess the potential impact of the global minimum tax on the region's attractiveness for international investors.
- Explore further avenues beyond tax measures to encourage investment.
- Review FDI promotion policies and SEZ programs tied to tax-based incentives.
- Carry out a review of IIAs to assess the risk of disputes arising from the implementation of the global minimum tax.

The reshaping of international supply chains will bring further opportunities for ASEAN

Geopolitical tensions and pandemic-driven disruptions have triggered a wave of supply chain restructuring, favouring ASEAN as a relocation hub. This environment motivates investors, including those already in ASEAN, to expand capacities, establish stronger regional footholds and reinforce supply chains.

To sustain momentum, active FDI promotion and continuous outreach are crucial. Effective communication of regional development, integration, synergies and emerging prospects can attract potential investors. Specific actions include the following:

- Accelerating implementation of the ASEAN Investment Facilitation Framework.
- Facilitating streamlined sourcing and movement of inputs.
- Engaging in proactive ASEAN investment forums and events such as the 2023 World Investment Forum.
- Maximizing benefits from the ASEAN Economic Community (AEC) and the Regional Comprehensive Economic Partnership (RCEP).

Progress towards the AEC and the RCEP is significant. These platforms lay the foundation for a competitive supporting industry, streamlined sourcing and resilient regional supply chains. Timely achievement of AEC and RCEP milestones is vital.

Further gains are possible in promoting FDI in support of the energy transition

To attain a 23 per cent share of renewable energy in primary energy supply and a 35 per cent share in installed capacity by 2025, ASEAN would need to invest a total of $180 billion annually. However, international investment projects in renewable energy in the region only reached an estimated value of $43 billion in 2022. Domestic investment in renewable energy is estimated to be much lower. This leaves a substantial investment gap that demands attention.

Addressing this investment challenge goes beyond the capabilities of the public sector alone. The private sector, both domestic and international investors, and multilateral development banks (MDBs) and other stakeholders such as commercial banks and green funds, play crucial roles in navigating ASEAN's energy transition. The private sector provided over 40 per cent of financing for large-scale renewable energy projects in ASEAN between 2014 and 2018, with the rest coming from the public sector and MDBs. Yet, potential remains for increased international private investment.

Significant challenges necessitate attention. Enhancing the investment environment should centre on FDI policies spanning the entire renewable energy supply chain. In addition, strategies that encourage investment in renewable technologies and their integration into manufacturing sites can address the renewable energy demand of industry while attracting equipment manufacturers. Encouraging private engagement, including international investment, in the development of eco-industrial parks, eco-SEZs and environmentally friendly data centres across the region can support ASEAN's energy transition goals. The generation and supply of renewable electricity to these facilities should align with national transition plans. Strengthening the regional power pool and fostering cross-border cooperation for renewable electricity trade offers an opportunity, fostering the energy transition and enhancing regional industrial interconnections, and thus facilitating regional integration.

Promoting FDI in the EV supply chain is a major industrial policy opportunity

In ASEAN, international investment in EV-related sectors surged 570 per cent to $18 billion in 2022. Investment has been concentrated upstream (mining and smelting), while midstream investment (manufacturing) has gained traction in several Member States, particularly in regional automotive hubs. Most Member States have initiated programs to boost their underinvested EV infrastructure.

The EV transition landscape features a proliferation of firms from diverse industries: traditional automotive producers (original equipment manufacturers, or OEMs) with a regional presence, EV OEMs, battery manufacturers, MNEs, technology firms, energy companies and start-ups.

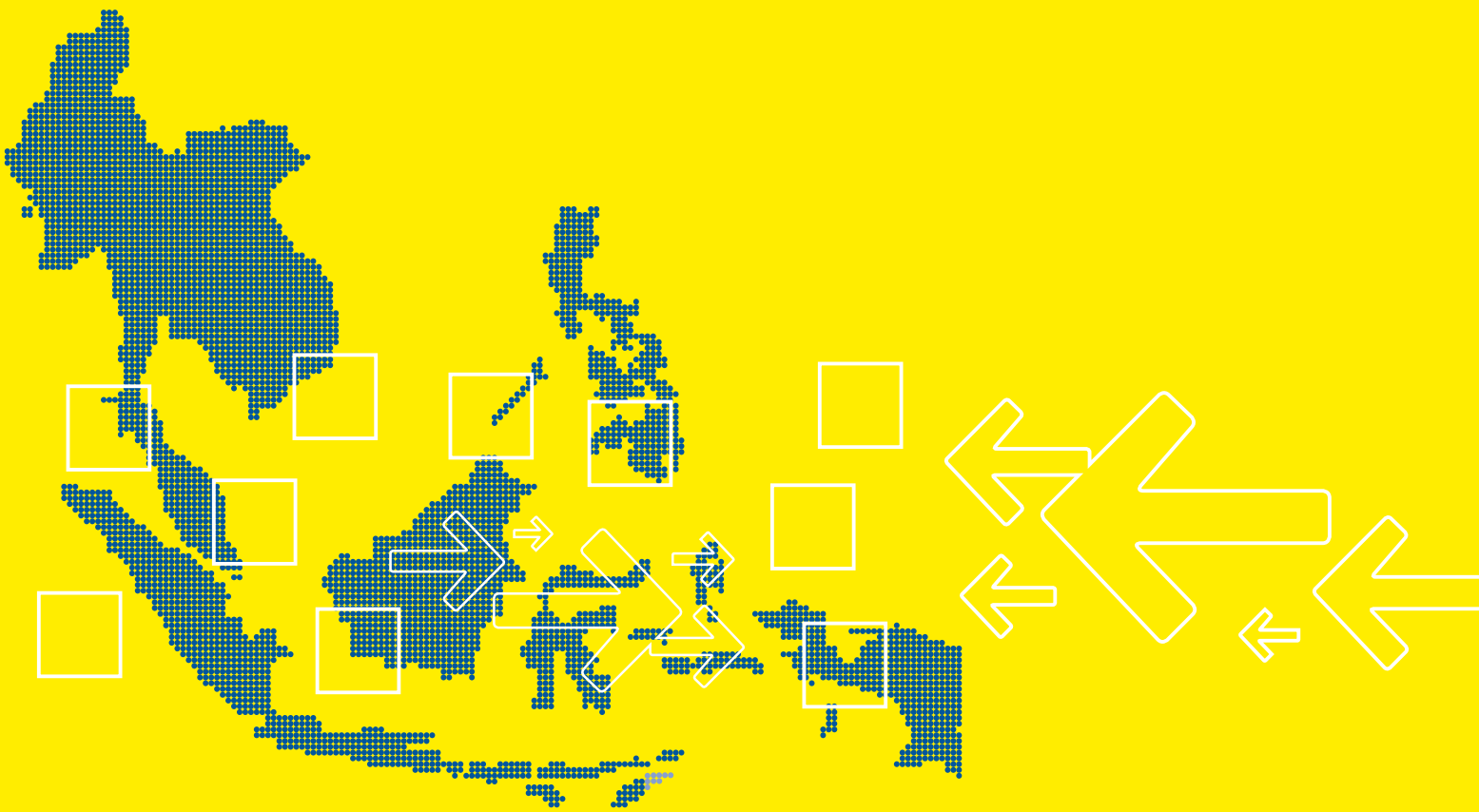
Notably, all top 10 global EV manufacturers are in ASEAN, with ongoing expansions. Nine of the top 10 battery manufacturers actively invest in the region, attesting to ASEAN's appeal for EV-related investment. FDI drivers encompass growing demand, emerging markets, favourable policies, incentives and supply chain strategies. Global MNEs' presence in EV production and battery manufacturing draws other suppliers to ASEAN, to capitalize on market proximity.

Prospects for accelerated FDI growth in the EV supply chain are promising. International investment will nurture a competitive EV supply chain, bridging countries, companies and processes and reinforcing regional integration.

Policymakers should customize investment promotion to encompass diverse actors in the EV supply chain, aligned with energy transition goals. Timely execution and assessment of the 2023 ASEAN Declaration on Developing a Regional Electric Vehicle Ecosystem are crucial. Potential avenues include cultivating strategic alliances among stakeholders, strengthening MNE-SME connections. Additional policy options might focus on these activities:

- Further boosting EV adoption.
- Promoting and facilitating EV infrastructure and downstream investment.
- Cultivating an efficient EV-supporting industry, enabling free component flow, intraregional sourcing and production networks.
- Attracting battery recycling investment, aligning with green economy development and energy transition objectives.

INTERNATIONAL INVESTMENT TRENDS: KEY ISSUES AND POLICY OPTIONS



CHAPTER 1

GLOBAL AND REGIONAL FDI TRENDS

1.1. GLOBAL TRENDS

Global FDI flows in 2022 declined by 12 per cent to $1.3 trillion, after nosediving in 2020 and rebounding in 2021. The multitude of crises and challenges on the global stage – the war in Ukraine, high food and energy prices, risks of recession and debt pressures in many countries – negatively affected global FDI. International project finance values and cross-border mergers and acquisitions (M&As) were down, depressed by stiffer financing conditions, rising interest rates and uncertainty in financial markets. The value of international project finance deals fell by 25 per cent in 2022, while cross-border M&A sales were 4 per cent lower.

The global environment for international business and cross-border investment remains challenging in 2023. Although the economic headwinds shaping investment trends in 2022 have somewhat subsided, they have not disappeared. Commodity prices that rose sharply following the war in Ukraine have tempered, but the war continues and geopolitical tensions are still high. Recent financial sector turmoil in some developed countries adds to investor uncertainty. In developing countries, continuing high debt levels limit fiscal space. UNCTAD expects downward pressure on global FDI to continue in 2023.

Early indicators confirm this expectation: FDI project activity in the first quarter of 2023 shows that investors are uncertain and risk averse. The number of international project finance deals in the first quarter of 2023 was down significantly; greenfield project announcements and cross-border M&A activity also slowed.

1.2. REGIONAL TRENDS

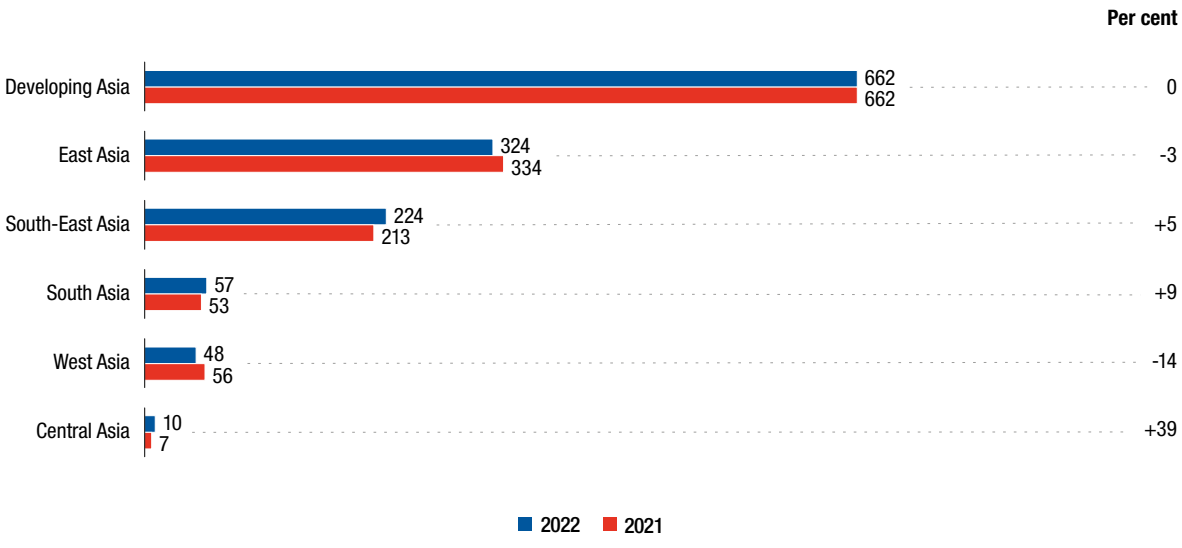
FDI flows to *developed countries* fell by 37 per cent, to $378 billion, largely in Europe and North America. The 2022 decline in developed economies reflected the uncertainty in financial markets and the winding-up of stimulus packages, but the volatile nature of FDI flows in developed markets (with large volumes of financial flows and one-off transactions) played a major role. In Europe, FDI totals were affected by fluctuations in the major conduit economies and by M&As. In the United States, inflows fell by 26 per cent to $285 billion, mainly caused by the halving of the value of cross-border M&As, which generally account for a large share of United States inflows. The decrease in M&As had a direct impact on the equity component of FDI, which fell by 35 per cent.

Inflows to *developing economies* rose by 4 per cent, to $916 billion – the highest level ever recorded. The increase was mainly the result of strong growth performance in Latin America and the Caribbean, where inflows rose by 51 per cent to a record $208 billion, sustained by high demand for commodities and critical minerals. In South America all major recipients saw a rise in FDI flows, driven by investment in mining and hydrocarbons. Brazil – the largest recipient in the region – saw FDI rise by two thirds, reaching $86 billion, the second highest value ever recorded there. In Central America, FDI reached $44 billion, up 5 per cent from 2021. Flows to Mexico, the second largest recipient in Latin America, increased by 12 per cent to $35 billion, with a rise in new equity investment and reinvested earnings.

FDI to Africa fell by 43 per cent to $45 billion, from the anomalous peak in 2021 caused by a large corporate reconfiguration in South Africa. Excluding that deal, FDI flows to Africa in 2022 would have increased by 7 per cent.

FDI flows to developing Asia remained flat at $662 billion (figure 1). This region remained the largest recipient of FDI, accounting for half of global inflows. In East Asia, FDI decreased by 3 per cent to $324 billion in 2022. Flows to China rose by 5 per cent, to a record $189 billion. The increase was concentrated in manufacturing and high-tech industries (mainly electronics and communication equipment) and came mostly from European MNEs. Some MNEs have been restructuring their global supply chains, with implications for FDI in China. Flows to South-East Asia increased by 5.5 per cent to $224 billion – also the highest level ever recorded. In South Asia, FDI flows rose by 9 per cent to $57 billion.

Figure 1. Developing Asia: FDI inflows by subregion, 2021–2022 (Billions of dollars and per cent)



Source: UNCTAD, FDI/MNE database.

CHAPTER 2

FDI TRENDS AND DEVELOPMENTS IN ASEAN

Following the strong post-pandemic rebound of FDI in 2021, inflows in ASEAN rose further in 2022 to an all-time high. A combination of external and internal factors continues to drive the high level of investment. International supply chain restructuring led to new investment and motivated firms to expand their presence in the region. Manufacturing, sectors involved in the energy transition, the digital economy and finance are attracting keen international investment interest.

This chapter provides an analysis of FDI and intraregional investment and various modes of international investment (announced greenfield investment, international project finance and cross-border M&As) in ASEAN in 2022. It examines key factors driving the surge in FDI. While prospects for higher inflows are encouraging, there are headwinds that could dampen the growth momentum.

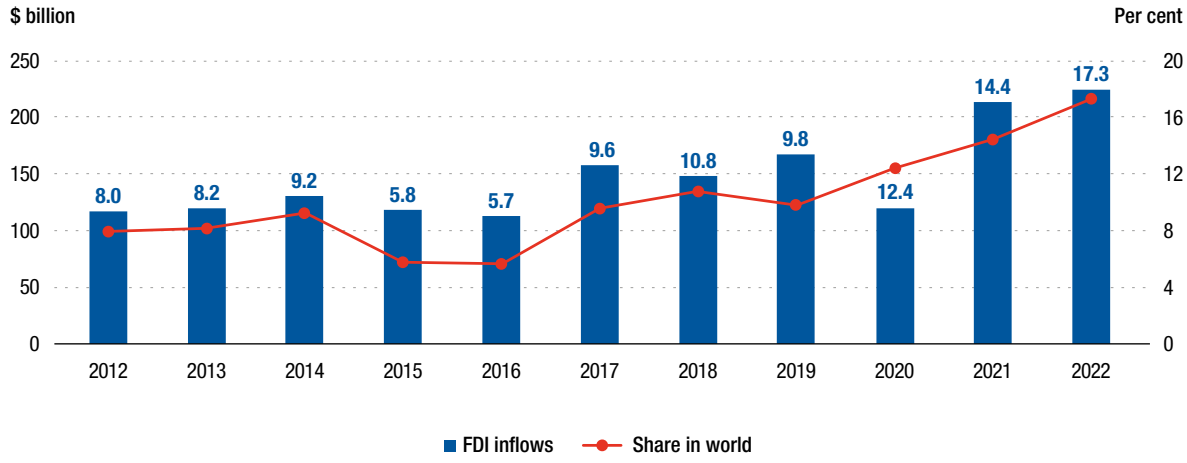
2.1. FDI TRENDS IN ASEAN

FDI in ASEAN rose by 5.5 per cent in 2022, to a record $224 billion (figure 2). The region's share of global FDI inflows rose further, from less than 15 per cent to more than 17 per cent. The region registered higher numbers of greenfield project announcements, international project finance deals and cross-border M&As. ASEAN FDI inflows in 2022 exceeded flows to China for the second consecutive year.

Six Member States recorded higher inflows in 2022 than in 2021 (figure 3). Singapore witnessed the highest absolute increase in value, accounting for more than 60 per cent of FDI in the region, while Malaysia and Myanmar recorded the highest percentage growth. FDI hit record levels in three Member States (Malaysia, Singapore and Viet Nam), while in Cambodia and Indonesia growth was flat but levels of investment remained high. With strong inflows, Cambodia and Myanmar emerged among the top five FDI recipients of the LDCs.

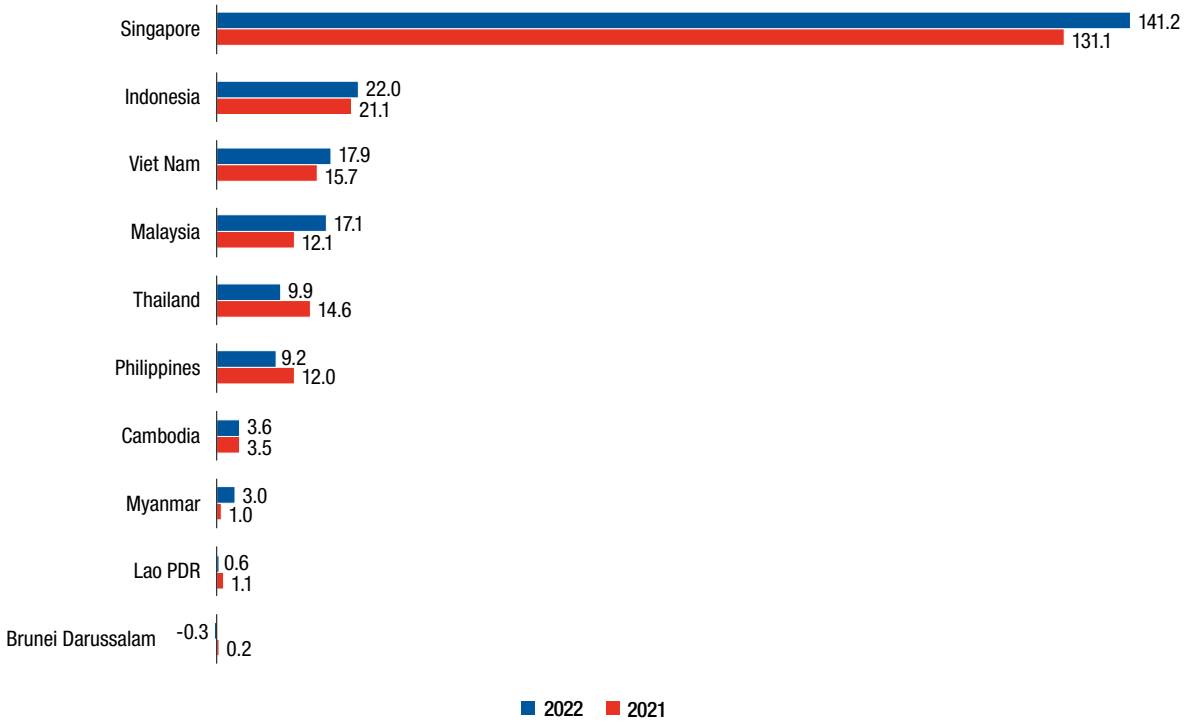
ASEAN continues to be an engine of growth. Significant inflows over the years have pushed FDI stock in the region to $3.6 trillion, double the level of 2015 (figure 4). In 2022, the region held 24 per cent of global inward FDI stock in developing economies, up from 19 per cent in 2010. The inward stock in 2022 was 5.5 per cent below the level in China and about 40 per cent more than in Latin America and Caribbean.

Figure 2. ASEAN: FDI inflows and share in world inflows, 2012–2022 (Billions of dollars and per cent)



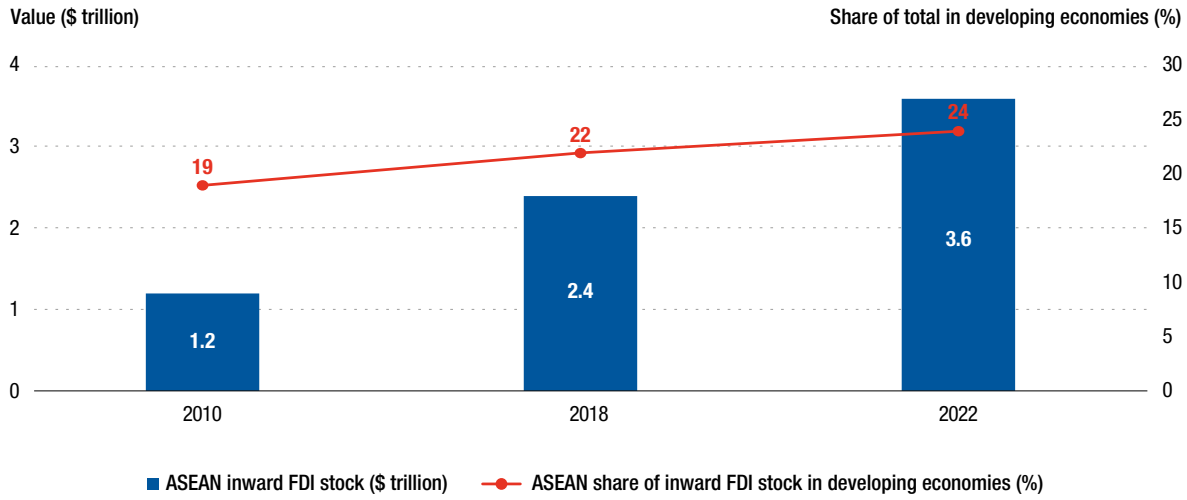
Source: UNCTAD, FDI/MNE database (https://unctad.org/fdistatistics).
Note: Data exclude financial centres in the Caribbean and special purpose entities in reporting countries.

Figure 3. ASEAN Member States: FDI inflows, 2021 and 2022 (Billions of dollars)



Source: ASEAN Secretariat.

Figure 4. ASEAN: inward FDI stock, 2010, 2018 and 2022 (Trillions of dollars and per cent)



Source: UNCTAD, FDI/MNE database.

Several interrelated and overlapping factors led to the record inflows:

(i) Rising investment across different modalities (project types), showing increasingly favourable investor sentiment for the region.

(ii) Record FDI in manufacturing, attesting to the region's strong rebound from the pandemic and its industrial vibrance.

(iii) Corporate investment strategies focusing on capacity expansion to build supply chain facilities, to bolster supply chain networks and to establish a stronger regional foothold.

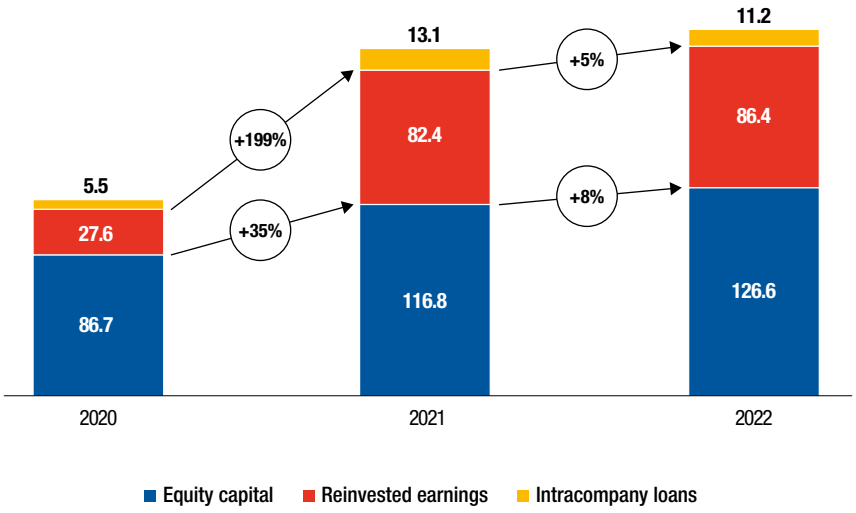
(iv) Increased investment in the energy transition, infrastructure and the digital economy.

(v) Significant investor interest from several source countries.

The implementation of previously announced large projects played a role in sustaining high levels of investment in the region. Several megaprojects announced in 2021 advanced in 2022. Industries that received significant investment in 2021 (e.g. EVs, electronics, data centres, the digital economy) continued to receive new, expanded and upgraded investment in 2022. Geopolitical tensions and supply chain challenges remained an important influencing factor for diversification and relocation activities, with ASEAN a major beneficiary.

Equity capital and reinvested earnings rose significantly. Equity investment rose 8 per cent to $127 billion, accounting for 56 per cent of FDI in 2022 (figure 5). Increasing equity capital investment was widespread across the region. New investors and investors already in ASEAN are injecting fresh capital to expand business operations or to upgrade production facilities. Reinvested earnings or reinvestment rose by 5 per cent to $86 billion, accounting for 38 per cent of total FDI inflows.

Figure 5. ASEAN: FDI by component, 2020–2022 (Billions of dollars and per cent)



Source: ASEAN Secretariat.

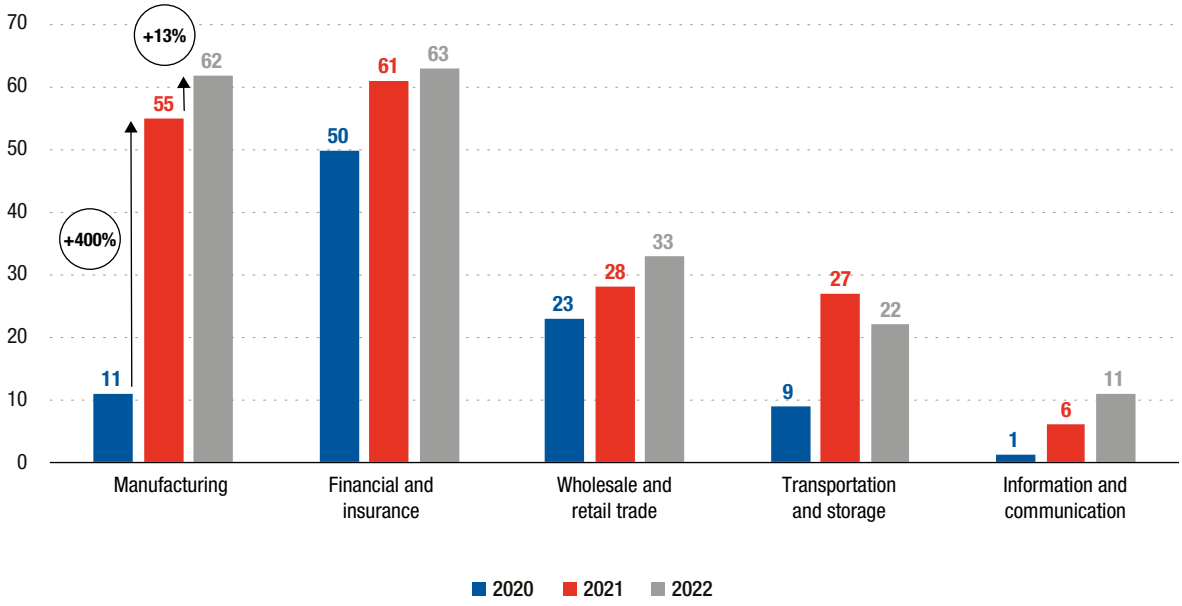
2.1.1. FDI by industry

Key industry drivers of FDI growth were strong investment in manufacturing, finance, wholesale and retail trade, and some services industries associated with the rapidly growing digital economy (figure 6). Five major industry recipients accounted for 86 per cent of total FDI inflows. Except for transportation and storage, FDI in the other four major industries rose. FDI in the region has become more concentrated, with the share of these five industries in total inflows growing from 78 per cent in 2020 to 83 per cent in 2021 and increasing by another 3 per cent in 2022.

Manufacturing remained a significant recipient with investment climbing to an all-time high of $62 billion, following the robust rebound in manufacturing FDI (+400 per cent growth) in 2021 – underscoring the steady recovery from the pandemic and the resilience of the industry. The share of manufacturing in total FDI in ASEAN rose from just 9 per cent in 2020 to 26 per cent in 2021 and 28 per cent in 2022. Manufacturing is now about on par with finance and insurance, traditionally the largest industry recipient. Electronics and EV value chain segments (particularly batteries and storage) continued to attract robust investment interest.

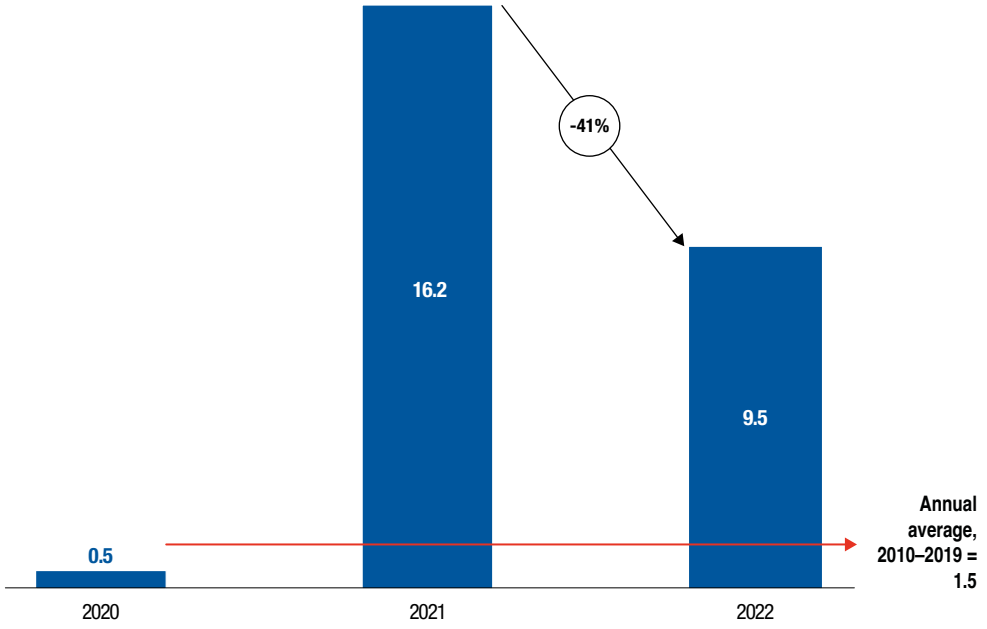
The electronics and electrical industry remained the major recipient of investment in manufacturing in ASEAN in 2022. These industries accounted for more than 70 per cent of announced greenfield manufacturing investment, at $37 billion. In the electronics industry, production of semiconductors and electronic components received the most attention from investors, accounting for 27 per cent of announced greenfield investment in manufacturing. While such investment in electronics declined to $9.5 billion in 2022, it was still six times the annual average for 2010–2019 (i.e. before the pandemic) (figure 7).

Figure 6. ASEAN: FDI by industry, 2020–2022 (Billions of dollars and per cent)



Source: ASEAN Secretariat.

Figure 7. ASEAN: announced greenfield investment in electronics, 2020–2022 (Billions of dollars)



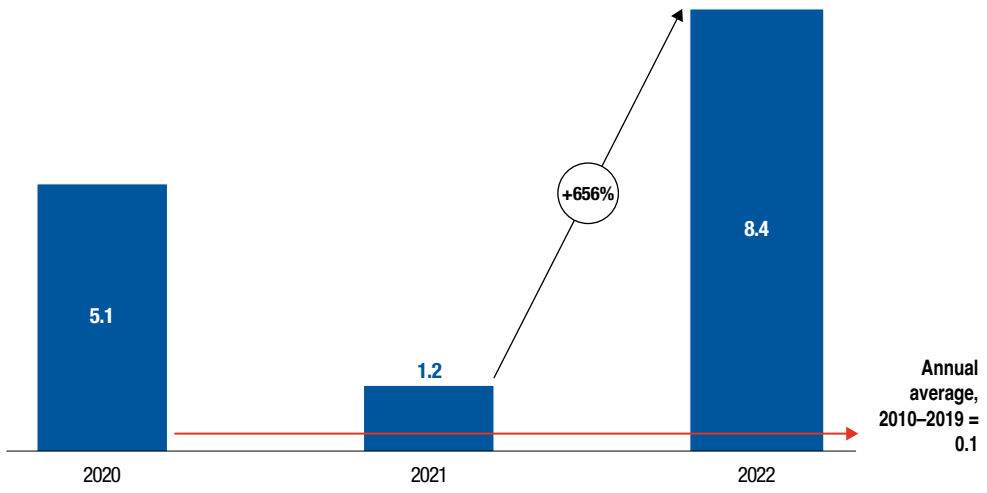
Source: UNCTAD.

The region also continued to attract strong investment interest in battery production linked to the emerging EV industry. Some MNEs are investing in battery production in ASEAN as part of their upstream-downstream integration of the EV value chain. In some cases, these companies are investing to produce batteries both to supply the growing EV industry in the region and to export. Announced greenfield investment in batteries rose by 656 per cent in 2022, to $8.4 billion, accounting for 23 per cent of all such investment in manufacturing (figure 8). Semiconductors, electronic components and battery production together received half of all greenfield investment in manufacturing in 2022.

FDI in finance and insurance rose by only $2 billion, while investment in wholesale and retail trade rose by 18 per cent to $33 billion and investment in information and communication rose by 67 per cent to $10 billion. Growing interest by investors in e-commerce, the rise of middle-income consumers and the rapid growth of technology start-ups continued to encourage investment in wholesale and retail trade.

The robust digital economy, the rapid growth of data centres, the use of cloud computing applications and upgrading of the digital infrastructure helped attract FDI, especially in information and communication activities. Many MNEs also continued to expand in the region by opening or building more data centres, driven by rapid growth in demand (annex table 1). Amazon (United States), which already has a significant presence in other ASEAN Member States, is building a second data centre in Viet Nam, Google (United States) is establishing a third data centre in Singapore and Equinix (United States) completed its fifth data centre in Singapore. NTT (Japan) is building or has completed data centres in Malaysia, Indonesia (its second one there) and Viet Nam. GDS (China) has a new data centre campus and two new data centre buildings in Indonesia and is also building data centres in Johor Bahru, Malaysia.

Figure 8. ASEAN: announced greenfield investment in battery production, 2020–2022 (Billions of dollars)



Source: UNCTAD.

MNEs and other companies in ASEAN continued to expand to multiple locations or invest in additional production facilities to strengthen their regional presence and to increase supply chain capacity and connectivity. In some cases, they expanded or relocated certain operations to lower-cost locations within the region. Some invested to upgrade factories with Industry 4.0 technologies to improve efficiency, which in turn helped improve the investment environment.

Regional expansion by semiconductor-related MNEs is notable. For instance, the top 10 largest semiconductor MNEs by revenue are expanding by adding production facilities or upgrading plants (annex table 2). Other industry MNEs that are already in ASEAN further expanded across the region, including in the automotive, electronics and energy transition sectors (annex table 3).

More investors are investing in ASEAN for the first time in a wide range of industries and for a combination of reasons (e.g. geopolitical tensions and supply chain disruptions) (annex table 4). Emerging investment opportunities in ASEAN and regional market development are also important factors for these firms. In many cases, they are motivated to establish a presence in ASEAN to be close to markets and to major customers who have already moved to the region. The region's vibrant electronics and automotive industry is also helping to attract many first-time investors. Arevo (United States) is establishing a 3D printing manufacturing facility in Viet Nam, and automaker BYD (China) is establishing its first ASEAN-based EV manufacturing facility in Thailand. Many Chinese EV manufacturers (e.g. Changan and SAIC) have also recently invested in the region. They join the many automotive MNEs that have a significant presence in ASEAN (e.g. Mercedes Benz (Germany), Hyundai (Republic of Korea) and Toyota (Japan)), further strengthening the automotive-EV ecosystem.

2.1.2. FDI by source

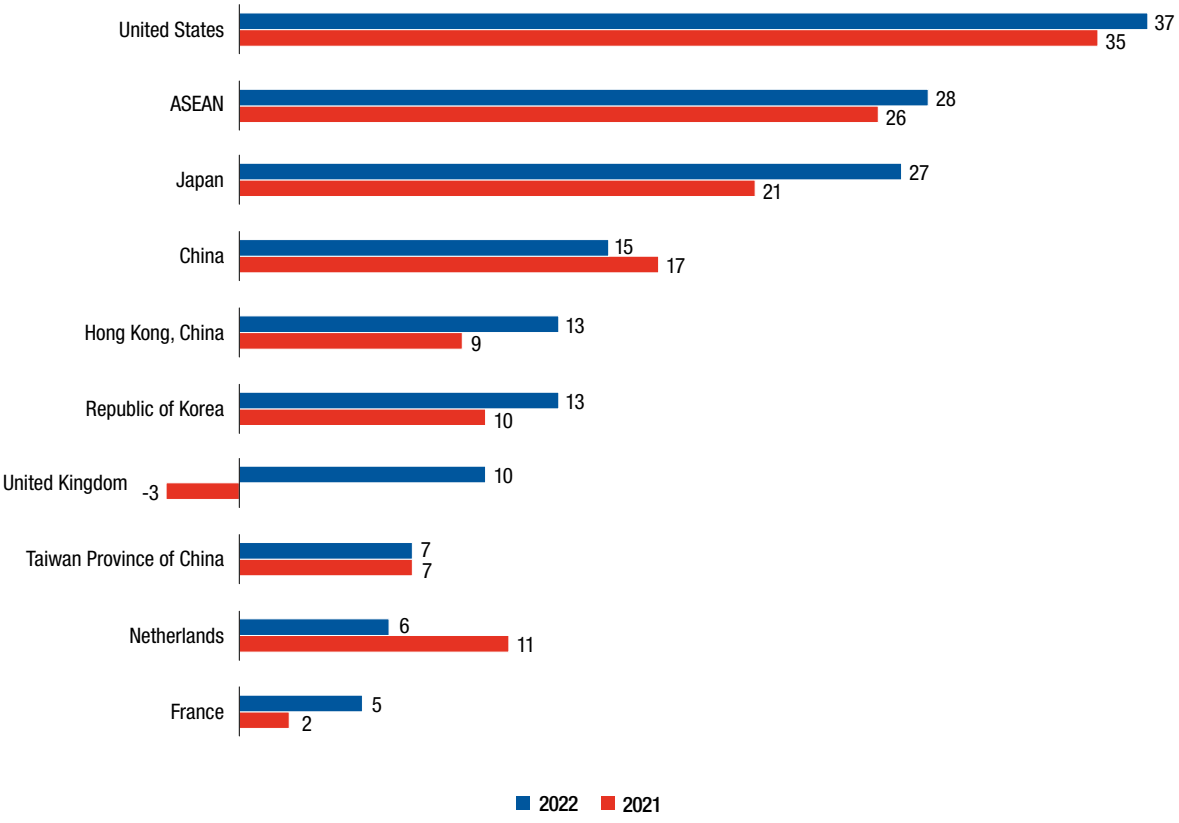
FDI from the top 10 sources accounted for 71 per cent of investment in ASEAN, up from 63 per cent in 2021. Seven of the top 10 saw a rise in investment (figure 9). In the total for the top 10, some 65 per cent of investment came from Asian economies.

FDI from the United States was the largest source, rising by 6 per cent to $37 billion. Manufacturing and finance, both at about $20 billion, received the bulk of FDI from the United States. Firms from the United States were by far the largest investors in these industries.

Japan was the third largest source, after intra-ASEAN investment. Inflows from Japan rose from $21 billion in 2021 to $26 billion, concentrated in the transportation and storage industry. Japan is the largest investor in this industry, responsible for more than 88 per cent of investment. This underscores the growing interest by firms from Japan in investing in and expanding operations in the automotive industry, including in automotive parts and components and in EV-related activities.

After successive years of increasing inflows, FDI from China to ASEAN fell by $1 billion to $16 billion but unevenly across the region. About half of this FDI was in manufacturing and real estate. Chinese companies remained active in infrastructure projects, EV-related activities and the digital economy, and were the largest investors in Cambodia, the Lao People's Democratic Republic (PDR) and Myanmar.

Figure 9. ASEAN: top 10 investors, 2021–2022 (Billions of dollars)



Source: ASEAN Secretariat.

FDI from the United Kingdom rose the most, from –$3 billion in 2021 to $10 billion, with a significant increase in Singapore in wholesale and retail, finance and professional and scientific services. United Kingdom MNEs in finance and manufacturing expanded to a few Member States (mostly in Singapore). For instance, Dyson opened a global headquarters in Singapore in 2022 to be close to its fastest-growing markets in the region and announced a further $1.1 billion investment over the next few years.[1] It is expanding in Singapore by building a battery factory and in the Philippines in research and development and to enhance its manufacturing capabilities.[2] HSBC opened a headquarters in Singapore in 2022 and plans to invest $3 billion in the next few years in South and South-East Asia.[3] It also acquired AXA's business in Singapore.

The European Union remained a major source of FDI for ASEAN, third after the United States and intra-ASEAN investment. FDI from the group grew 3.5 times to $24 billion between 2021 and 2022, mostly in wholesale and retail trade, manufacturing, and professional and scientific activities.

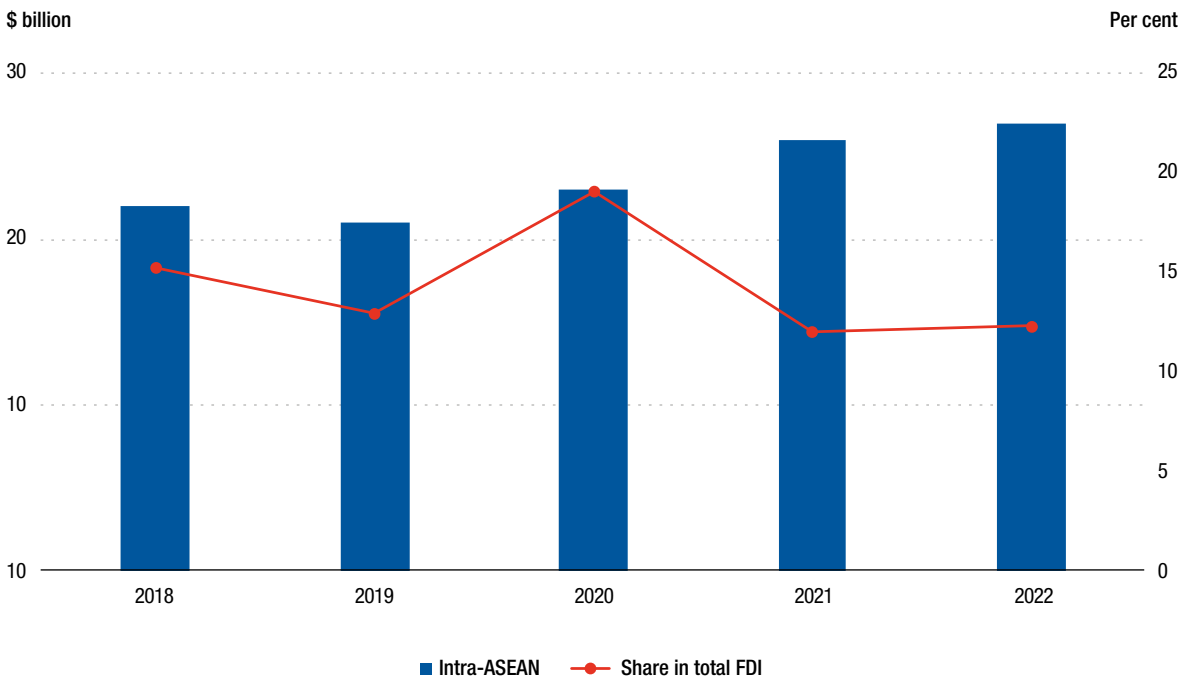
2.2. INTRA-ASEAN INVESTMENT

Intraregional investment rose for the third consecutive year to $28 billion – the highest level on record (figure 10). It was the second largest source of investment in 2022, after the United States. Finance and manufacturing, in that order, attracted the largest amounts (figure 11). The top five industries accounted for 87 per cent of intra-ASEAN investment. Complementary locational advantages, relocation of investment from high- to lower-cost destinations and emerging business opportunities within the region were important drivers.

Three ASEAN Member States received two thirds of intraregional investment (Indonesia, Singapore and Viet Nam) (figure 12). Singapore remained the largest source at $18 billion, 10 per cent higher than in 2021. In addition, a rise in investment from Indonesia and Thailand helped push intraregional investment up by $1 billion.

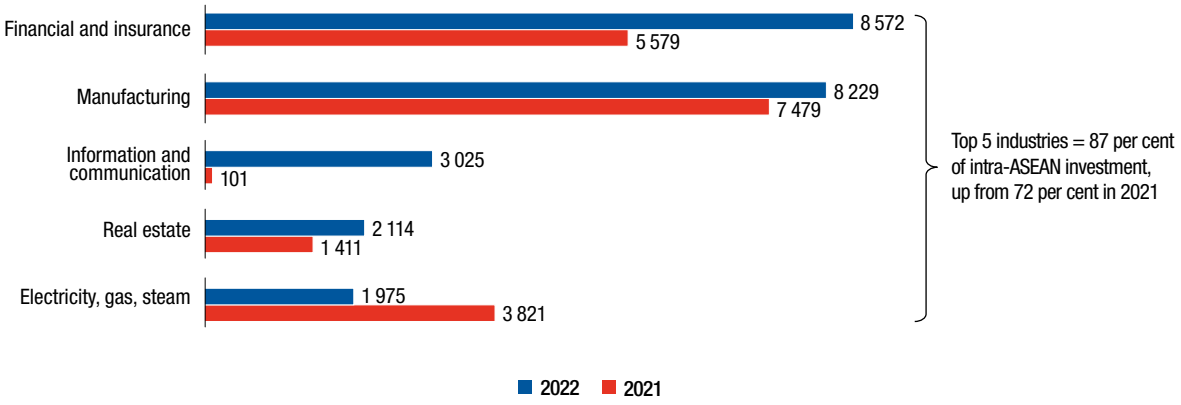
Despite the rise, the growth of intraregional investment lags that of overall FDI in the region. The share of intraregional investment in total FDI inflows in ASEAN has remained below 20 per cent since 2017. By comparison, intraregional investment accounts for about 60 per cent of FDI in in the European Union (which reflects the different stages of development of the two regions). The compound annual growth rate of non-ASEAN FDI inflows between 2015 and 2022 was 9.2 per cent, 2.5 times the growth rate of intra-ASEAN FDI (figure 13).

Figure 10. Intra-ASEAN investment flows, 2018–2022 (Billions of dollars and per cent)



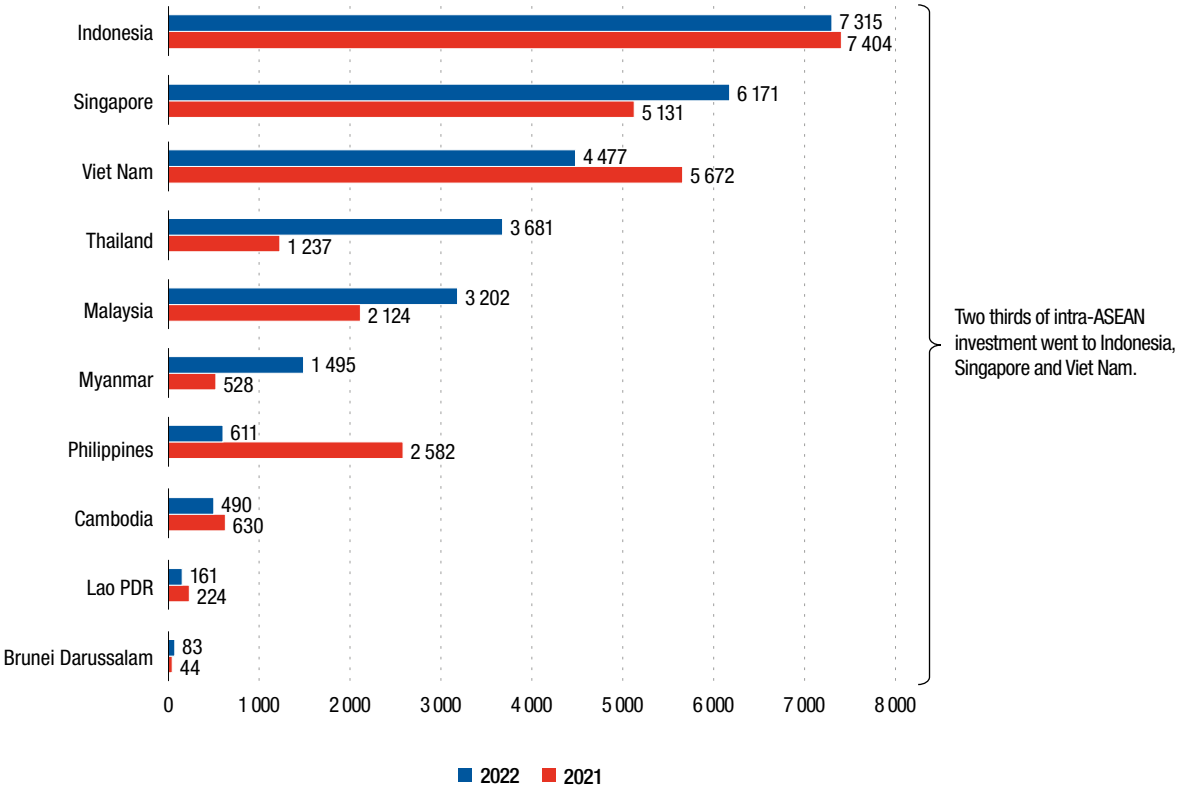
Source: ASEAN Secretariat.

Figure 11. Intra-ASEAN investment: top five industries, 2021–2022 (Millions of dollars)



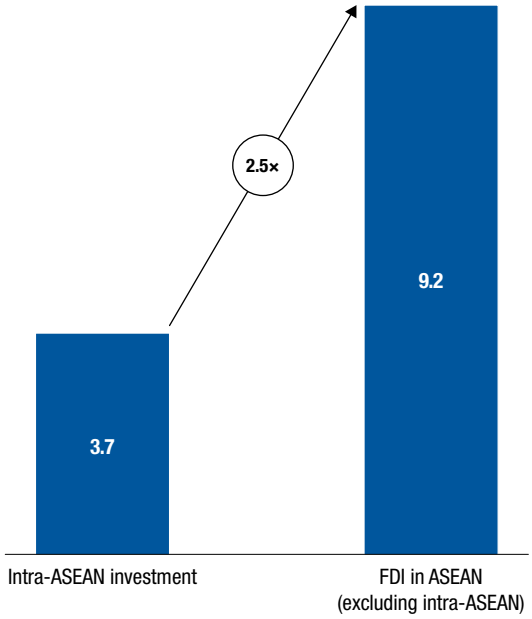
Source: ASEAN Secretariat.

Figure 12. Intra-ASEAN investment, by host country, 2021–2022 (Millions of dollars)



Source: ASEAN Secretariat.

Figure 13. Intra-ASEAN investment and FDI in ASEAN: compound average growth rate, 2015–2022
(Per cent)



Source: UNCTAD.

Action is needed, but it is important that efforts to promote intraregional investment do not negatively affect FDI from non-ASEAN sources. Several key aspects of intra-ASEAN investment should be considered:

(i) The three major destinations for intra-ASEAN investment (Indonesia, Singapore and Viet Nam, in that order) accounted for more than 66 per cent of intraregional investment in 2022. Singapore, Thailand and Malaysia were the three largest regional investors; together they accounted for more than 90 per cent of intraregional flows. This indicates a high concentration in the source of intraregional investment and the limited capacity of firms from other Member States to regionalize. Key challenges to internationalization include limited access to finance; knowledge, information and know-how gaps; and difficulties in identifying investment opportunities.

(ii) Measuring intra-ASEAN investment by value can be misleading. SMEs can provide a potential source of intraregional investment as these enterprises tend to internationalize to neighbouring countries to grow, rather than venture further afield.

(iii) It is important to distinguish intraregional investment by ASEAN companies from investment by MNE subsidiaries based in ASEAN. Investment conducted by MNEs in the region often flows through holding companies or special-purpose vehicles, which in turn invest across the region. This channel has implications for regional policies aimed at promoting intra-ASEAN investment.

Policy options for increasing intraregional investment

Intraregional investment can be an important channel for facilitating ASEAN's economic integration. The relatively slow growth of intraregional investment highlights the need to examine policy tools to support it, including by promoting the regionalization of SMEs and start-ups.

While there is a need to address the slow growth of intraregional investment, it is also important to support the continuous increase of FDI from non-ASEAN sources. Several measures could be considered to increase the pace of intra-ASEAN investment.

Strengthen institutional connectivity.

Establish a regular forum for cooperation between inward-outward FDI agencies, including between investment promotion agencies involved with the respective growth areas or growth triangles in ASEAN (e.g. Indonesia, Malaysia, Thailand; Indonesia, Malaysia, Singapore; Brunei Darussalam, Indonesia, Malaysia and the Philippines). Forum outcomes should be reported to the AIA Council on an annual basis.

Promote regional cooperation on regionalization of SMEs.

Include investment facilitation measures for SME regionalization and for start-ups to scale across borders. Issues to address could include measures and mechanisms to facilitate access to finance and access to information, establish dedicated institutional support (e.g. dedicated ASEAN SME regionalization desks), facilitate investment, establish SME regionalization alliances (e.g. investment promotion agencies, banks, SME agencies, regional industry clubs and private sector champions of SME regionalization), and establish a public-private partnership forum that promotes success stories and regional opportunities for SMEs. Consider a regional programme to encourage corporate or MNE mentorship for SMEs.

Establish a task force of alliances of stakeholders.

Its purpose would be to map out challenges and recommend to the AIA Council policy options and measures that support enterprise regionalization. The task force should include CCI members, other relevant ASEAN bodies, financiers (banks and EXIM banks), practitioners (legal and investment consultancy firms), business councils, chambers of commerce and representatives of relevant industry clubs). The task force should also examine regional policies that have or have not worked to encourage intraregional investment and determine why ASEAN firms are not regionalizing at a faster pace.

Leverage the ASEAN Working Group on Statistics.

Task the group with compiling and reporting detailed statistics on intraregional investment (including detailed industry breakdowns by number of projects and on the basis of the ultimate investor's home country) and determine the proportion of intraregional investment made by ASEAN firms. Estimate the proportions of different categories of ASEAN enterprises (e.g. large, SMEs, start-ups, certain industries) that have an active drive to regionalize.

2.3. FDI IN ASEAN MEMBER STATES

In most ASEAN Member States, strong investment in manufacturing, finance, wholesale and retail trade, and information and communication drove up inflows.

Brunei Darussalam

FDI declined to –$292 million, primarily a result of foreign firms divesting through intracompany loan repayments. Nonetheless, the country attracted $60 million in finance and insurance investment, making it the largest recipient in 2022. The main sources were from Singapore and Malaysia.

Cambodia

FDI inflows rose 3 per cent in 2022, to $3.6 billion, maintaining a peak similar to that of 2020. Cambodia stood out among the LDCs as a target of growing investor interest. Significant investments continued in finance, manufacturing and construction, making up 70 per cent of inflows. The country's improved investment climate and rapid economic growth influenced FDI decisions. Notably, construction and real estate attracted one fifth of investments, reflecting industrial growth and demand. Traditional manufacturing sectors such as garments and footwear still attracted substantial FDI, while emerging industries such as solar equipment saw rapid growth (up $100 million in 2022), albeit from a low base.

Investment from Asia was the largest source and accounted for more than 80 per cent of inflows, with China leading, followed by ASEAN, the Republic of Korea, Japan and Hong Kong (China). FDI from ASEAN came mostly from Singapore and Malaysia.

Indonesia

FDI reached $22 billion in 2022, second only to the peak of $24 billion in 2019. Manufacturing drew over half of these inflows. Strong investment interest in transportation, storage, communication and finance contributed to the sustained high inflows. Industries elated to EVs, data centres, and the digital economy and payment systems continued to gain investor attention.

Asian MNEs remained the largest investor group (accounting for more than four fifths of inflows). Manufacturing received the bulk of Asian investment ($10 billion) and accounted for nearly half of Asian FDI. ASEAN was the largest investor in transportation, storage and communication.

Investment from Singapore – the largest investor – grew by 22 per cent to $6.6 billion, which represented 30 per cent of inflows. Other major Asian investors included China, Hong Kong (China), the Republic of Korea and Japan, in that order. FDI from the United States grew 15 per cent to $1.9 billion, that from the United Kingdom increased by 68 per cent to $1.2 billion and investment from the European Union rose 63 per cent to $1.6 billion.

Lao PDR

FDI dropped by 51 per cent to $0.5 billion, owing to a slowdown in hydropower investment.

Malaysia

Inflows increased by 39 per cent to a record $17 billion, driven by strong manufacturing investment, which accounted for 66 per cent of FDI. Investment in manufacturing grew by 44 per cent to $11 billion, with significant investment in the electronics and electrical industry. Services sector investments doubled, to $5.4 billion; the finance and insurance industries saw a twofold increase to $2.8 billion.

The United States emerged as the largest investor ($8.6 billion), contributing over half of the inflows. Singapore remained a significant source, as inflows rose by 20 per cent to $2.6 billion. Investment from Japan ($2.2 billion) was four times the 2021 level, and that from Hong Kong (China) ($1.4 billion) more than 2.5 times the 2021 level. These four economies accounted for over 85 per cent of investment in 2022.

Myanmar

FDI surged by 197 per cent to $3 billion, making Myanmar a top LDC recipient. Active investment in a wide range of industries, particularly manufacturing and finance, drove this growth. Asia remained the largest source by region, led by investors from ASEAN, China and the Republic of Korea.

Philippines

After a record 2021, FDI in the Philippines decreased by 23 per cent to $9.2 billion owing to notable acquisitions of foreign affiliates by local investors. For instance, the Union Bank of the Philippines acquired the Philippine consumer banking business of Citigroup (United States) for $1.4 billion and the Udenna Group acquired the exploration operation of Shell (United Kingdom) for $460 million. These reverse M&A deals contributed to reducing the equity capital component of FDI, from $4.5 billion in 2021 to $2.9 billion.

Singapore

FDI grew by 10 per cent to a record $141 billion, mainly attributable to increased investment in manufacturing (e.g. electronics, semiconductors) and wholesale and retail trade. Although FDI in finance and insurance declines, those industries remained the largest recipients ($49 billion). Together, manufacturing, wholesale and retail trade, and finance and insurance accounted for 75 per cent of the inflows. Singapore continued to attract significant investment in the rapidly growing digital economy. MNEs also continued to establish regional headquarters and financial holding entities, which in turn invest in other ASEAN Member States.

The United States, Japan, the United Kingdom, Hong Kong (China) and China, in that order, were the five largest sources of FDI. They accounted for 45 per cent of inflows. FDI from the United Kingdom jumped from -$5.5 billion in 2021 to $8.7 billion, the largest rise among all sources. United Kingdom companies injected significant equity capital in 2022 ($8.3 billion), from -$5.1 billion in 2021. Investment from Hong Kong (China) rose 190 per cent, to $7.2 billion and that from Japan increased by 37 per cent, to $17 billion.

Thailand

Investment fell to $10 billion, from $15 billion in 2021. Inflows to manufacturing dropped by 73 per cent to $4 billion, but it remained the largest industry recipient. FDI in finance and insurance, the second largest recipient, also fell (to $2.2 billion). Investment in real estate bucked the trend and grew by 42 per cent to $1.7 billion. These three industry groups (i.e. manufacturing, finance and real estate) received nearly 80 per cent of inflows.

Investment from ASEAN grew by nearly 200 per cent to $3.6 billion, but not enough to cushion the decline in investment from other major sources such as China, Japan, the United States and the European Union. Firms from Singapore made up the single largest investor group ($3.4 billion), accounting for a 30 per cent share.

Viet Nam

FDI increased to $18 billion, with manufacturing, especially the electrical and electronics industries, drawing the most investment. Investors from Asia, including ASEAN, as well as China, Japan and the Republic of Korea, were prominent. Greenfield investment announcements rose 120 per cent to $26 billion, reflecting strong investor interest.

2.4. MODES OF INTERNATIONAL INVESTMENT

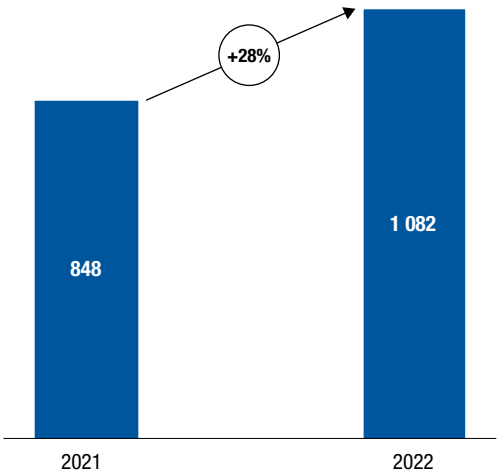
Aside from FDI inflows, all other modes of international investment – cross-border M&As, international project finance deals and announced greenfield investment) rose. The increasing numbers of the last two modes suggest a promising prospect of high FDI levels when these projects are either realized or significantly invested in 2023.

2.4.1. Greenfield investment

Announced greenfield investment in terms of number of projects rose by 28 per cent to 1,082 (figure 14) and in terms of value increased by 35 per cent to $86 billion. Greenfield investment in a few Member States rose significantly or remained high: in Indonesia by 82 per cent to $15 billion, in Singapore by 23 per cent to $16 billion, in Thailand by 111 per cent to $8.2 billion and in Viet Nam by 120 per cent to $26 billion.

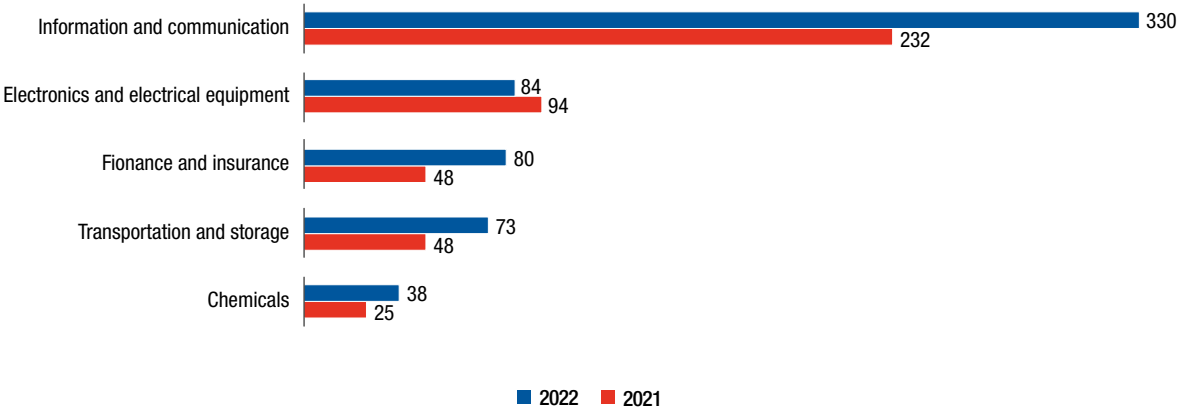
Most announced greenfield investment was in services and manufacturing. Five industries accounted for 56 per cent of the number of projects, with information and communication leading with 330 projects (figure 15). In value terms, the electronics and electrical industry and the energy industry were the two major recipients, accounting for more than half of the total project value in 2022.

Figure 14. ASEAN: announced greenfield investment projects, 2021–2022 (Number)



Source: UNCTAD, based on information from the Financial Times Ltd, fDi Markets (www.fDimarkets.com).
Note: Data exclude financial centres in the Caribbean.

Figure 15. ASEAN: announced greenfield projects, top five industries, 2021–2022 (Number)



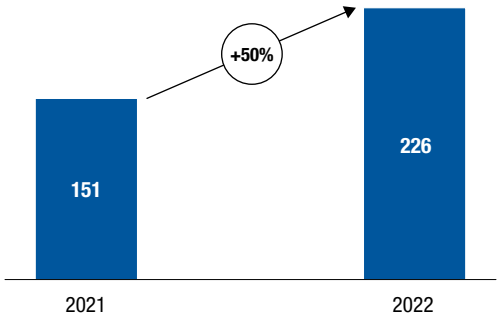
Source: UNCTAD, based on information from the Financial Times Ltd, fDi Markets (www.fDimarkets.com).
Note: Data exclude financial centres in the Caribbean.

2.4.2. International project finance

Announced international project finance deals in ASEAN rose in number by 50 per cent, from 151 in 2020 to 226 (figure 16). All Member States saw an increase in the number of such deals, with the most projects in Indonesia, Viet Nam and Malaysia, in that order. These three countries together accounted for more than 62 per cent of the number of these deals in 2022.

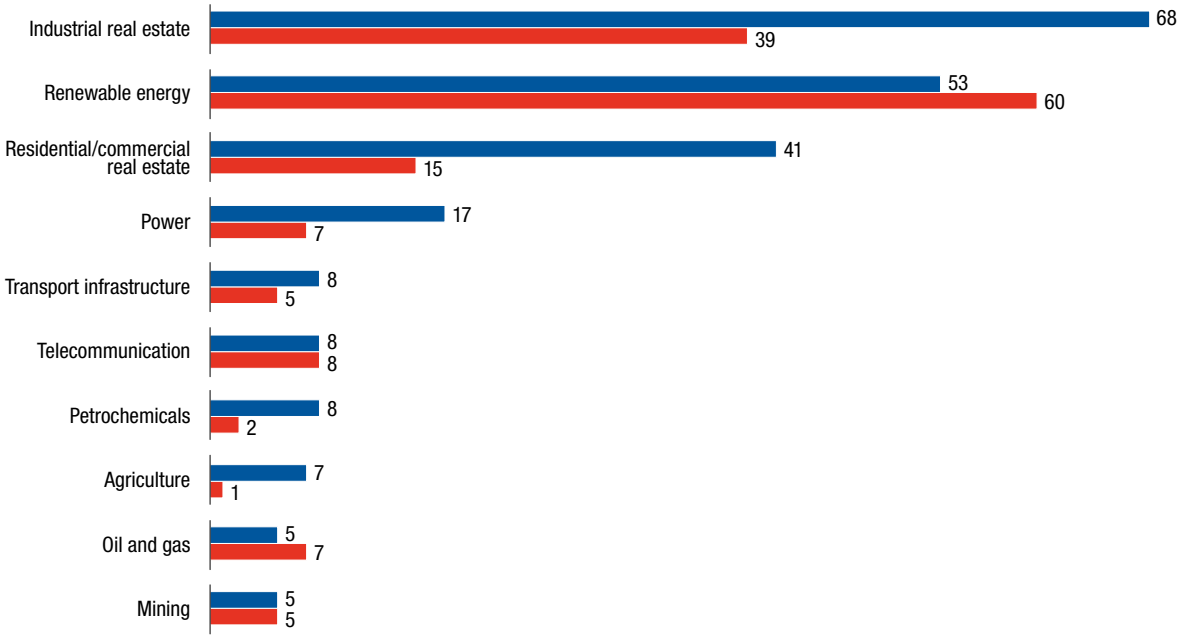
The bulk of international project finance deals were in infrastructure-related industries, including in renewable energy and telecommunication (figure 17). Investment rose in industrial real estate, power and transport infrastructure. The top 10 industries received about 95 per cent of the deals by number, with most concentrated in the top five industries.

Figure 16. ASEAN: international project finance, 2021–2022 (Number)



Source: UNCTAD, based on information from Refinitiv.
Note: Data exclude financial centres in the Caribbean.

Figure 17. ASEAN: International project finance deals, top 10 industries, 2021–2022 (Number)



Source: UNCTAD, based on information from Refinitiv.
Note: Data exclude financial centres in the Caribbean.

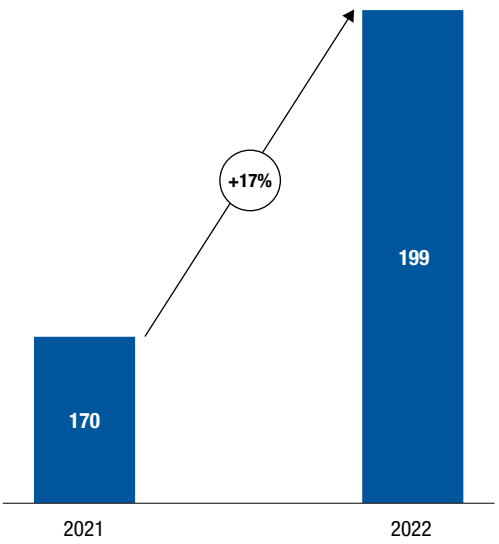
The number of megaprojects that exceeded $1 billion in value was 17, compared with 20 in 2021. With a total value of $58 billion, these megaprojects accounted for 62 per cent of the value of international project finance deals in 2022 – 41 per cent less than the value in 2021. The top three projects announced in 2021 were the $21 billion Thai Beverage (Thailand) consortium solar project in Malaysia, the $12 billion offshore wind power project in Viet Nam by T&T Group (Viet Nam) and Orsted (Denmark), and the $10 billion pharmaceutical park involving local companies and investors from India). This was equivalent to nearly three quarters of the value in 2022. Most of the megaprojects were in energy and industry (primarily in EV-related activities).

2.4.3. Cross-border M&As

Cross-border M&A sales by number rose from 170 in 2021 to 199 (figure 18), with nearly all of the increase and an overwhelming level of the activities concentrated in services, where the number jumped to 173, from 133. Most of the increase was in information and communication, finance and insurance, and transportation and storage (figure 19), in that order. The top five industries received nearly 60 per cent of the transactions.

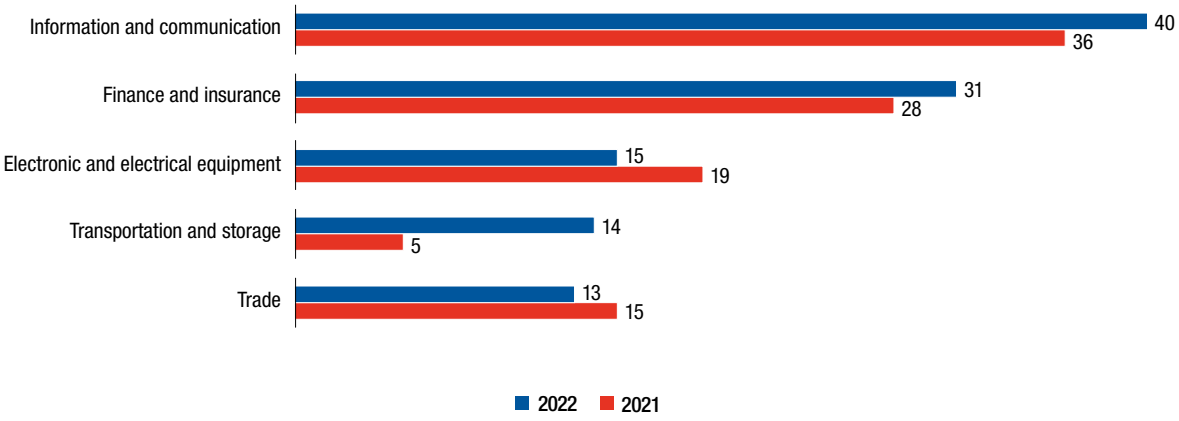
The number of megadeals exceeding $300 million rose to 30, from 27 in 2021 (annex table 5), mostly in services. The deal size by value was relatively small, compared with 2021. One super deal in 2021 of $34 billion by Altimeter (United States), a merger with Grab Holdings (Singapore), was worth $2 billion more than the combined value of all 30 megadeals recorded in 2022. This underlines the need to exercise caution in interpreting the M&A data.

Figure 18. ASEAN: cross-border M&A sales, 2021–2022 (Number)



Source: UNCTAD, cross-border M&A database.

Figure 19. ASEAN: cross-border M&A sales, top five industries, 2021–2022 (Number)



Source: UNCTAD, cross-border M&A database.

2.5. MAJOR DEVELOPMENTS SHAPING THE FDI LANDSCAPE

Global and regional developments will continue to bring opportunities and challenges to ASEAN's efforts to attract FDI.

Challenges

(i) Global FDI flows in 2023 are expected to fall further (*World Investment Report 2023*). This declining trend could affect the investment momentum to the region.

(ii) Rising interest rates could lead to higher costs of finance. This could slow down investment and international project finance activities. Financial uncertainties, fear of recession and concern about the profitability and financial health of firms could hold back FDI, including in cross-border M&A transactions.

(iii) The forthcoming international tax reform will have significant implications for FDI policies, including SEZ development. It will affect the use of tax incentives to promote FDI (section 5.1).

Opportunities

(i) The RCEP agreement, signed in 2020, was ratified in 2022. Given the significance of ASEAN as a major market and production hub, and as a significant source of technology and investment, the RCEP can strengthen the region's attractiveness for FDI. ASEAN should maximize the benefits that the RCEP offers.

(ii) Robust investment interests will continue in key industries, such as manufacturing (e.g. electronics, semiconductors, EV-related segments) (section 5.4), the energy transition sectors, the digital economy (e.g. e-commerce and fintech) and digital infrastructure. This upward trend augurs well for the region.

(iii) International supply chain restructuring and growing corporate interest in strengthening supply chain capacity will continue to encourage more investment expansion and diversification projects in favour of the region (section 5.2). This supply chain investment push is expected to grow further, as corroborated by major business councils and chamber of commerce surveys on business outlook in the region.

(iv) The commitment of the region to energy transition and the untapped vast renewable energy potential for electricity generation will have an important impact on the region's attraction of FDI (see *World Investment Report 2023* and section 5.3). This includes not just investment in infrastructure to generate renewable power but also investment in transmission and distribution and investment related to renewable technology solutions as well as in manufacturing of renewable equipment. Cambodia saw a sixfold increase in investment in manufacturing of solar equipment in 2022, to about $100 million. With the right policy support, building on experiences from the electronics and automotive industries, the region could become a major hub for production of renewable equipment, parts and components.

(v) While intra-ASEAN investment remains a major source of investment for the region, the growth of intraregional investment is not as high as desirable (section 2.2). This is an important area to examine. In line with the AEC objectives, there is a need to encourage greater regionalization of firms, including by SMEs and start-ups, to help strengthen regional connectivity and regional integration.

***

ASEAN will continue to attract high levels of FDI flows; however, strong headwinds could dampen the growth momentum. These headwinds include concern about the global economic situation, the war in Ukraine, food-fuel-finance crises and the financial health of companies.

The factors that have been helping the region attract robust levels of FDI in recent years will remain instrumental. They include the region's strong macroeconomic fundamentals. Regional integration, a significant determinant, will continue to strengthen investor sentiments favouring the region. Key underlying "pull" factors rapidly growing markets, opportunities for firms to scale, opportunities to exploit complementary locational advantages, opportunities to build or strengthen regional value chains and access to natural resources, including manufacturing inputs. The improving investment environment and the vibrant manufacturing industry will remain major attraction forces for FDI related to international supply chain restructuring. The energy transition sectors and the digital economy will offer further potential for investment in these areas. The adoption of policy measures favourable to FDI by Member States will remain an important factor.

The corporate regional expansion – through injection of equity capital and retained earnings witnessed in 2022 – will continue to be a major feature. MNEs and ASEAN firms will continue to expand regionally, involving upgrading production facilities, adopting Industry 4.0 technologies and strengthening supply chain capacities.

Surveys by foreign chambers of commerce and business councils in ASEAN corroborated the improving investment sentiments indicated by firms. Many are generating profits by operating in the region, and many are planning to further invest regionally over the next few years because of emerging market and investment opportunities.

Although countries in ASEAN are better positioned to attract FDI and benefit from international supply chain restructuring than countries outside the region, absorptive capacity limitations could hamper efforts in the region. The region needs to improve its absorptive capacity, strengthen the role of SME-MNE linkages, develop competitive supporting industry for parts and components, invest in skills development and infrastructure, and attract FDI in key industries such as those involved in the energy transition, as well as in EVs and the digital economy.

NOTES

[1] Reuters, "Dyson to invest $1.1 billion in Singapore as part of global plan", 25 March 2022.

[2] *Fortune*, "Dyson doubles down on Singapore with a battery factory the size of 53 basketball courts", 3 May 2023; *Forbes*, "Dyson expanding in Singapore, Philippines and U.K. under firm's $3.4 billion global investment plan", 3 May 2023.

[3] HSBC, News and Media, "HSBC deepened commitment in Singapore with the opening of its new headquarters", 14 November 2022.

CHAPTER 3

SDG INVESTMENT TRENDS

ASEAN Member States are taking actions to achieve the SDGs of ending poverty, ensuring access to education, providing sustainable water and sanitation and energy for all, promoting inclusive economic growth and employment opportunities, building resilient infrastructure and developing inclusive industrialization. To achieve all the SDG targets will require significant levels of investment from all stakeholders (e.g. the public and private sectors, international sources, MDBs and regional development banks).

After slow or negative growth following the adoption of the SDGs in 2015, international investment in SDG sectors in ASEAN rose but remained uneven, with some sectors (e.g. infrastructure) receiving strong investor interest, while other sectors (e.g. water, sanitation and hygiene (WASH)) continued to receive less attention. Between 2015 and 2022, renewable energy and other infrastructure sectors witnessed a significant increase in investment, by 52 per cent and 19 per cent respectively. The sectors with the lowest growth were WASH and food and agriculture, which retracted, at –25 per cent and –58 per cent, respectively (table 1).

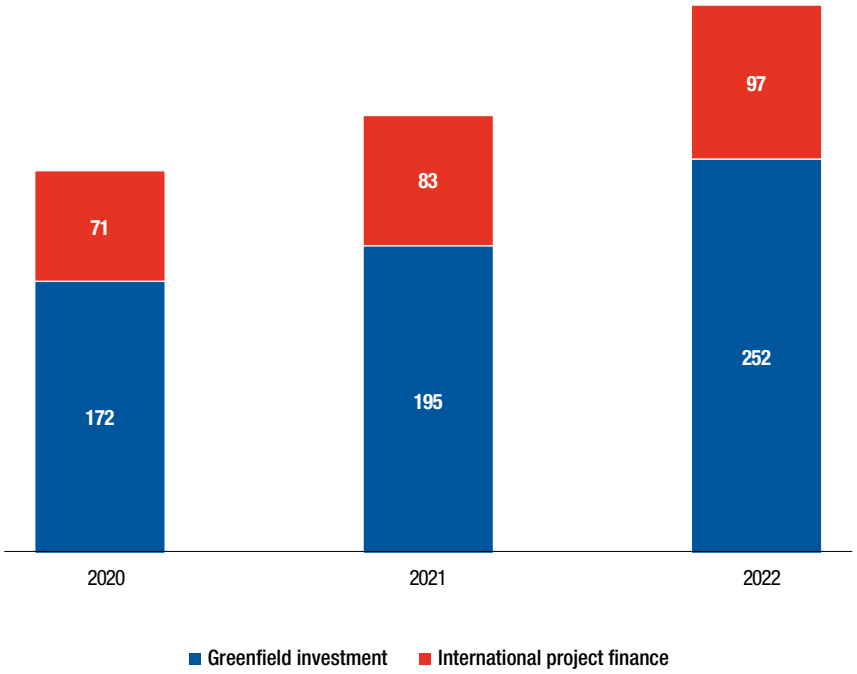
Table 1. International investment in ASEAN and developing economies: announced greenfield projects and international project finance deals, change in number of projects, 2021–2022 and 2015–2022 (Per cent)

		2021–2022		2015–2022	
		ASEAN economies	All developing economies	ASEAN economies	All developing economies
Infrastructure Transport infrastructure, power generation and distribution (except renewables), telecommunication		44%	26%	19%	16%
Renewable energy Installations for renewable energy generation, all sources		9%	8%	52%	21%
WASH Provision of water and sanitation to industry and households		0%	20%	-25%	13%
Agrifood systems Agricultural production and processes; fertilizers, pesticides and other chemicals; R&D; technology		-19%	6%	-58%	-19%
Health and education Hospital facilities, school buildings and other infrastructure for service delivery		32%	8%	9%	11%

Source: WIR 2023.
Note: Includes greenfield investment and international project finance deals.

International investment in SDG sectors in ASEAN (proxied by announced greenfield investment projects and international project finance deals) rose in the last two years, to about $78 billion. In 2022, the number of such projects rose by 26 per cent, to 349, with a significant share from announced greenfield investment (figure 20). Yet, the value of such investment fell by $5 billion, to $78 billion – suggesting that many projects were of low value.

Figure 20. International investment in SDG sectors in ASEAN, 2020–2022 (Number)



Source: UNCTAD.

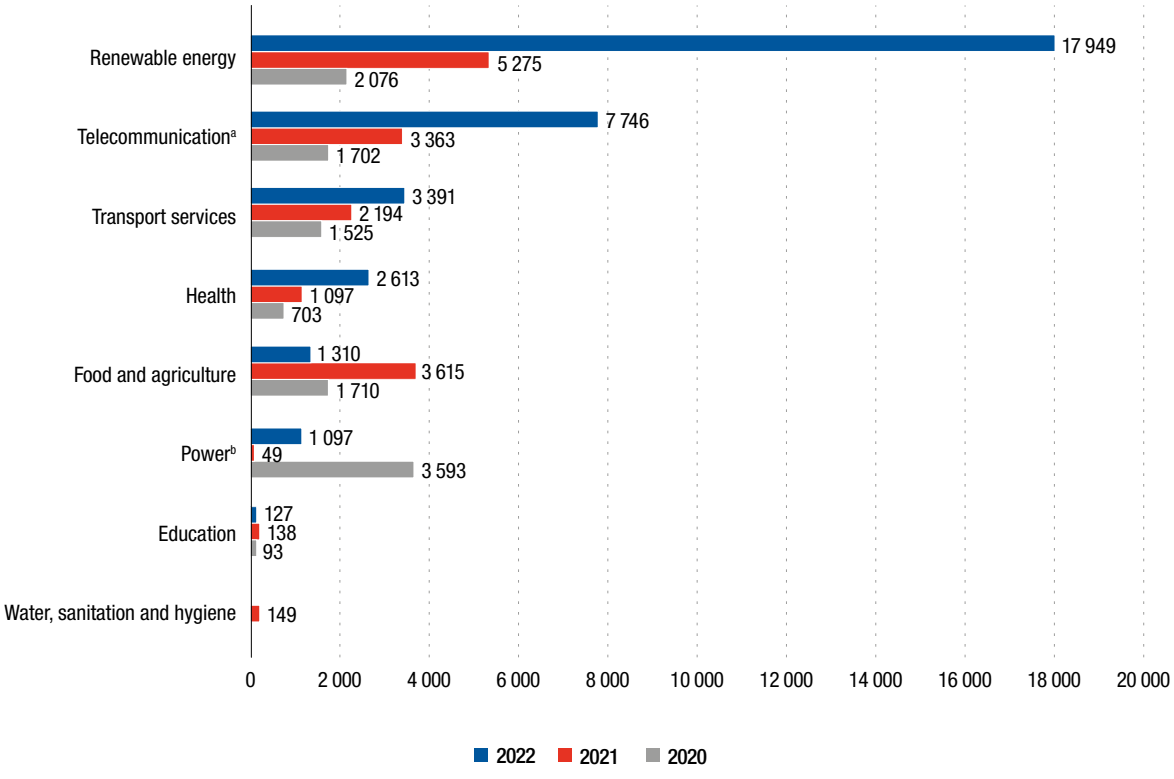
Sectoral trends

Despite the mixed picture in international investment in SDGs, in 2021–2022 the region experienced stronger growth in the number of investment projects in infrastructure (44 per cent) than the average in developing economies (26 per cent) as well as in health and education (32 per cent compared with 8 per cent). Investment in food and agriculture and in WASH in ASEAN lags that in the rest of the developing economies. The number of investment projects in renewable energy, however, is comparable to that in the rest of the developing economies. In 2022, renewable energy remained the largest recipient of international investment, among SDG sectors (figures 21 and 22). It accounted for more than half of the value of greenfield investment and international project finance deals in SDG sectors.

International investment in the power sector grew by over $1 billion in announced greenfield projects and by $8 billion in international project finance deals. In telecommunication, greenfield investment rose 130 per cent, to $7.7 billion, but international project finance fell by 70 per cent, from $7.7 billion in 2021 to $2.3 billion. In transport infrastructure, both kinds of investment in ASEAN rose, in contrast to the declining investment trend in developing countries as a whole. Greenfield investment in transport services grew by 54 per cent in value and 50 per cent in project numbers, while international project finance rose by 43 per cent in value and 60 per cent in numbers, respectively.

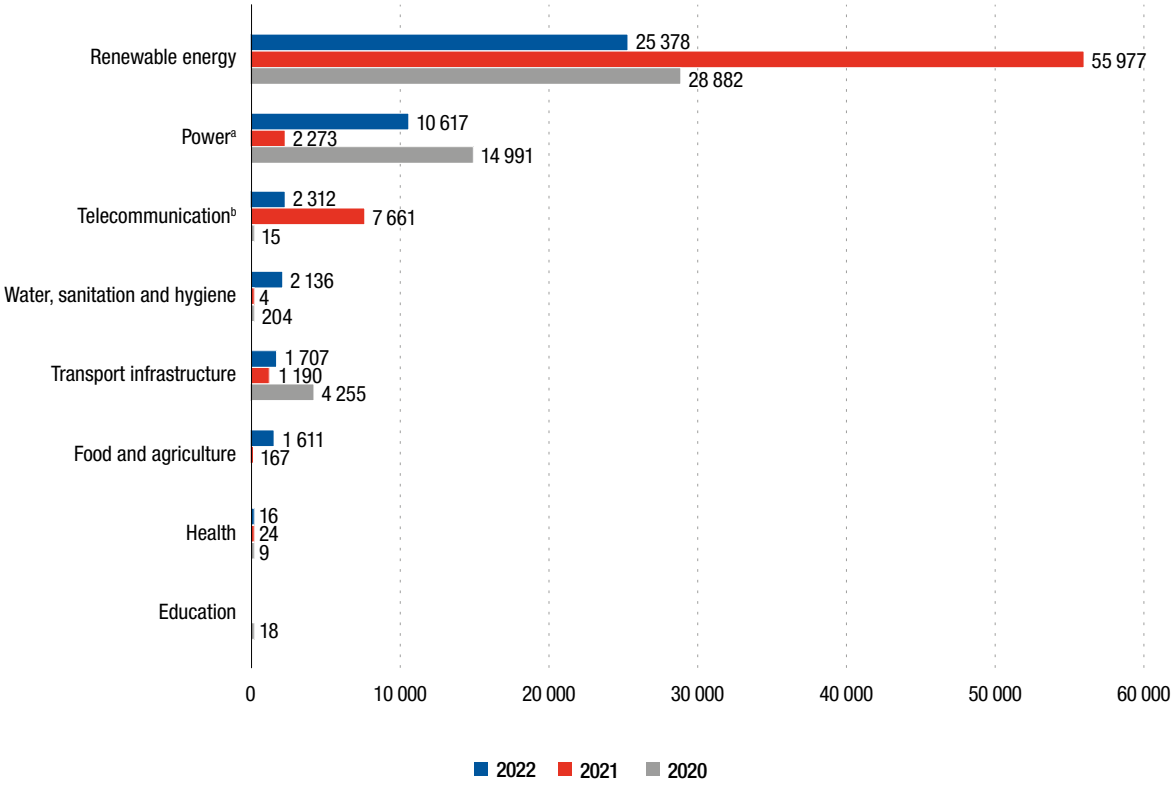
In the WASH sector, which embraces SDG 6 (universal access to safe drinking water, sanitation and hygiene), public sources of finance provided most investment in 2022. International project finance rebounded after a drop in 2021 to surpass the 2020 value. Yet investment in WASH, as well as in health and education, continued to receive relatively less attention from international investors. International investment in *food and agriculture* remained small, but international project finance values rose, from just $167 million in 2021 to $1.6 billion.

Figure 21. ASEAN: announced greenfield projects in SDG sectors, 2020–2022 (Millions of dollars)



Source: UNCTAD, based on Financial Times Ltd, fDi Markets (www.fdimarkets.com).
Note: Based on the industry classifications of host-economy investors, which are partially or fully owned by foreign public or private entities.
[a] Includes information services activities.
[b] Excludes renewable energy.

Figure 22. ASEAN: announced international project finance deals in SDG sectors, 2020–2022 (Millions of dollars)



Source: UNCTAD, based on data from Refinitiv SA.
Note: Based on the industry classifications of host-economy investors, which are partially or fully owned by foreign public or private entities.
[a] Excludes renewable energy.
[b] Includes information services activities.

CHAPTER 4

INVESTMENT POLICY TRENDS

A favourable investment policy environment is crucial for attracting FDI. In ASEAN, the trend has been towards adopting favourable investment policies and measures.

4.1. NATIONAL INVESTMENT POLICY DEVELOPMENTS

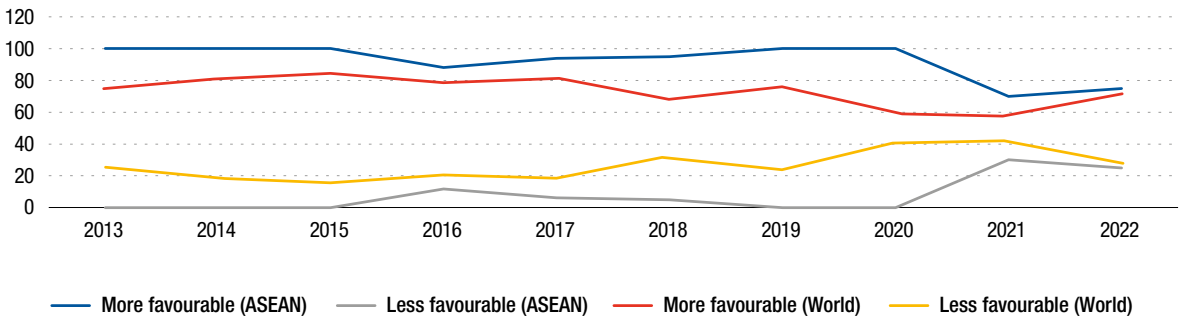
In 2021–2022, ASEAN Member States adopted 24 investment policy measures. Of these, 16 were favourable to FDI, 3 neutral and the rest restrictive. Six of the favourable measures emphasized investment facilitation. Some Member States liberalized their policies, allowing fully owned foreign equity ownership in such sectors as insurance, renewable energy and telecommunication.

From 2013 to 2022, Member States implemented 149 investment-related measures:

- 111 were favourable to investment.
- 27 were neutral.
- 11 were restrictive.

In total, these measures represented 11 per cent of global investment policy measures and 33 per cent of those in Asian economies. More than 90 per cent of these ASEAN measures were either favourable or neutral towards investment, surpassing the global average of 68 per cent and the Asia average of 86 per cent. However, in 2021, at the peak of the pandemic, the proportion of favourable policy measures decreased to 70 per cent (figure 23). This reduction reflected the global trend post-pandemic, during which countries imposed stricter FDI regulations, especially in strategic sectors and public health, owing to national security concerns.

Figure 23. Changes in national investment policies in ASEAN and the world, 2013–2022 (Per cent)



Source: UNCTAD, Investment Policy Monitor.

4.1.1. FDI liberalization

From 2013 to 2022, more than one third of the FDI-favourable measures related to opening new sectors or activities to foreign investment. In 2021–2022, for instance:

- *Viet Nam* allowed complete foreign investment in insurance and set implementation guidelines for the 2020 Law on Investment, which includes a restrictive list for market access for foreign investors.
- The *Philippines* permitted full foreign investment in renewables and revised its negative list by removing manufacture, repair, storage and distribution of products requiring clearance from the Department of National Defence. Foreign ownership restrictions in SMEs and trading enterprises were also relaxed. Wholly foreign ownership of public services, such as telecommunication, airlines, shipping and railways was allowed.

4.1.2. Investment incentives

From 2013 to 2022, more than one fifth of the favourable measures that were adopted provided investment incentives. In 2021–2022, for example:

- *Cambodia* enacted a Law on Investment that provides incentives for investment in 19 sectors, including high-tech industries and projects targeting innovation, research and development, digital infrastructure and high value added manufacturing.
- *Thailand* reduced import tariffs for four major investment projects and introduced a personal income tax waiver for specific foreign taxpayers, including high-income earners, retirees and foreigners working remotely from Thailand.

4.1.3. Other legal and institutional reforms to promote and facilitate investment

Over two fifths of the measures aimed to enhance investment promotion or facilitation. In 2021–2022:

- *Cambodia* updated its Law on Investment to streamline administrative processes and introduced the "Cambodia My 2nd Home" visa programme targeting foreign investors with investment capital of at least $100,000 who own real estate in the country.
- *Indonesia* established a Ministry of Investment to facilitate the ease of doing business in the country. Through Presidential Regulation No. 49 of 2021, the government also reduced the number of business sectors that are subject to certain investment requirements.
- *Myanmar* offered currency conversion exemptions for some FDI projects.
- *Thailand* set criteria for high-income earners: those who invest at least $500,000 in government bonds or assets in the form of FDI are considered investors eligible for long-term residence visas.

4.1.4. Restrictive policy measures

A few measures from 2013 to 2022 were restrictive. These mainly targeted FDI project monitoring and shielding strategic industries and national security. In 2021–2022:

- *Myanmar* established a committee to monitor foreign currency transactions.
- *The Philippines* created an FDI review mechanism for strategic industries such as those related to the military, cyberinfrastructure and pipeline transportation, and for activities that might jeopardize national security or public safety.

4.2. REGIONAL AGREEMENTS

In 2021–2023, ASEAN continued to adopt regional agreements and announce declarations that have significant implications for FDI. These covered development of the digital economy, Industry 4.0 transformation, investment facilitation and establishment of a regional EV ecosystem (table 2).

Table 2. Selected ASEAN agreements and declarations with implications for FDI, 2021–2023

Title of agreement/declaration	Year	Description
ASEAN Leaders' Declaration on Developing Regional Electric Vehicle Ecosystem	2023	Covers the development of a regional EV ecosystem to support EV adoption and a global production hub for EVs. Includes these elements: • Create an environment to attract investment in EVs. • Promote investment opportunities. • Develop EV infrastructure, including charging stations. • Encourage public-private partnership. • Enhance participation of MSMEs. • Collaborate on R&D activities and human capital development.
Declaration on Advancing Regional Payment Connectivity and Promoting Local Currency Transaction	2023	Promotes deepening regional financial integration and developing currency markets in local currency to strengthen financial stability in the region. Covers the following efforts: • Advances regional payment connectivity. • Promotes the use of local currencies for cross-border transactions in the region. • Establishes a task force for developing an ASEAN Local Currency Transaction Framework.
Development of ASEAN Smart City Investment Toolkit (ongoing)	2023	Provides guidelines and options for developing the ASEAN Smart City Network. Expected to offer information on financing options for various types of smart city development in the region.
Cooperation on Regional Payment Connectivity among Indonesia, Malaysia, the Philippines, Singapore and Thailand	2022	Supports connected cross-border payment systems between the Member States.
ASEAN Investment Facilitation Framework	2021	Promotes investment facilitation through measures in 10 areas: transparency and provision of information, streamlining and speeding up of administrative procedures and requirements, use of digital and internet technologies, a single digital platform, assistance and advisory services to investors, independence of competent authorities, temporary entry and stay for businesspeople, facilitation of investment-supporting factors, consultative mechanisms for investment policies and cooperation. Significant implementation progress by most Member States.
ASEAN Digital Masterplan 2025	2021	Provides a guide for achieving a digital community and economic bloc, powered by secure and transformative digital services, technologies and ecosystems. Major activities include promoting investment in new technologies, removing regulatory barriers to digital market operations, supporting social measures for digital inclusion and digital skills, and ensuring the digital safety of end users.

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Table 2. Selected ASEAN agreements and declarations with implications for FDI, 2021–2023 (Concluded)

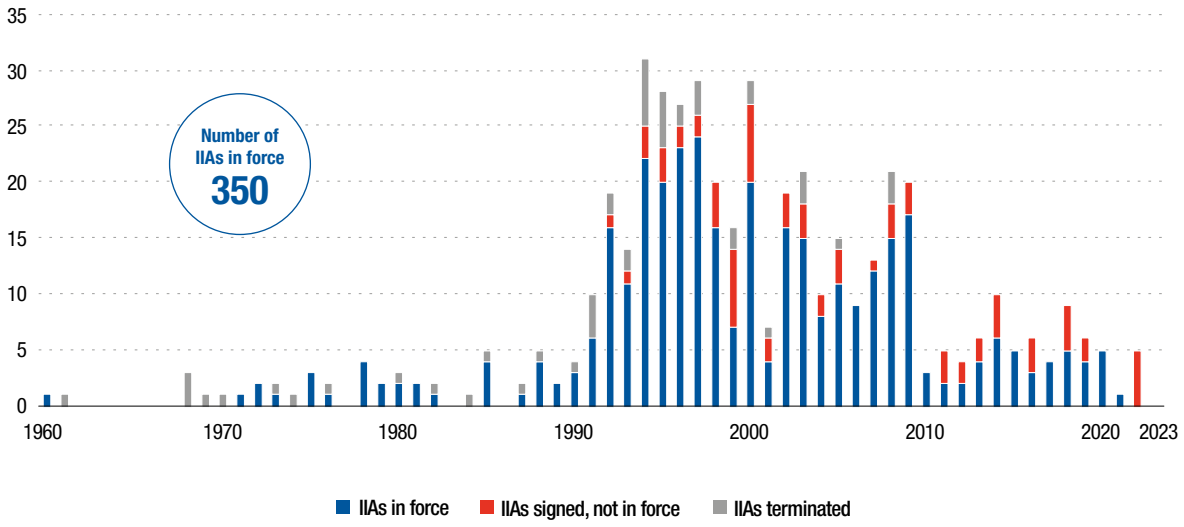
Title of agreement/declaration	Year	Description
Consolidated Strategy on the Fourth Industrial Revolution for ASEAN	2021	Provides policy guidance for building the ASEAN Digital Community on three key pillars: the ASEAN Political-Security Community, the ASEAN Economic Community and the ASEAN Socio-Cultural Community.
ASEAN Solutions for Investments, Services and Trade (ASSIST)	2021	Presents an internet-based business facilitation system that offers a non-binding consultative mechanism for addressing operational problems encountered by enterprises in cross-border issues related to implementing ASEAN economic agreements and within the framework of the ASEAN Economic Community.

Source: ASEAN Secretariat.
Note: EV = electric vehicle, MSMEs = micro, small and medium enterprises, R&D = research and development.

4.3. TRENDS IN IIAS CONCLUDED BY ASEAN MEMBER STATES

ASEAN Member States have actively engaged in concluding international investment agreements (IIAs), comprising both bilateral investment treaties (BITs) and treaties with investment provisions (TIPs).[1] As of June 2023, they had collectively concluded at least 342 BITs and 83 TIPs, representing 13 per cent of the IIA universe of 3,264 agreements. Some 350 IIAs involving ASEAN countries are currently in force; 75 have been signed but are not yet in force; and 52 have been terminated (figure 24). Only 23 BITs have been concluded between two ASEAN countries. In 2021–2022, ASEAN countries concluded 6 IIAs[2] and 9 IIAs entered into force.[3] On 1 January 2022, the Regional Comprehensive Economic Partnership (RCEP) Agreement came into force with 14 signatories ratifying the agreement.[4]

Figure 24. IIAs concluded by ASEAN Member States, 1960–2023



Source: UNCTAD, IIA Navigator.

Aligning IIAs with sustainable development imperatives

As is the case globally, many IIAs concluded by ASEAN Member States (over 85 per cent) belong to the so-called old generation of investment treaties, those signed before 2012. All 36 known IIA investor–State dispute settlement cases initiated against Member States are also based on old-generation IIAs; 3 of these cases were initiated in 2021–2022.[5] Old-generation treaties typically lack sustainable development-oriented provisions and can unduly limit countries' ability to adapt to changing economic realities and new regulatory imperatives. For example, most of the old-generation IIAs have a vague definition of "investment" and "investor", broadly worded standards for national treatment and most favoured nation treatment, and unqualified standards for fair and equitable treatment. They include few exceptions or safeguards for legitimate regulatory measures.

The urgency of addressing global challenges (e.g. health pandemics and climate change) further underlines the need to reform international investment governance. Existing IIAs generally do not include proactive investment provisions for promoting and facilitating sustainable investments. IIAs of ASEAN Member States could benefit from modernization and consolidation by adopting new-generation investment policies to address emerging global challenges. IIA reform processes should focus on (i) safeguarding the right to regulate for pursuing sustainable development objectives, while maintaining protection; (ii) reforming investment dispute settlement; (iii) promoting and facilitating investment; (iv) ensuring responsible investment; and (v) enhancing systemic consistency.

ASEAN Member States could reform and modernize their IIA regime by adopting the UNCTAD Investment Policy Framework for Sustainable Development (2015), as well as its consolidated Reform Package for the International Investment Regime (2018), IIA Reform Accelerator (2020) and its toolbox for promoting sustainable energy investments in IIAs (table 3). The toolbox aims to ensure that IIAs actively support and do not impede the energy transition, offering policy options in four action areas.

Table 3. IIA toolbox for promoting sustainable energy investment

Action area	Tools
Promoting and facilitating sustainable energy investment	Incorporate IIA provisions that aim to actively promote and facilitate sustainable energy investment. Provide preferential treatment for sustainable energy investment. Establish institutional mechanisms for cooperation on R&D of sustainable technologies, including charging stations. Commit to technical assistance on the adoption of investment facilitation measures for sustainable energy.
Technology transfer and diffusion	Encourage transfer of low-carbon and sustainable technologies, including related know-how. Make efforts to create an enabling environment for receiving technology. Allow certain kinds of performance requirements relevant to the energy transition. Ensure that the protection of intellectual property rights does not unduly impede the diffusion of technology.

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Table 3. IIA toolbox for promoting sustainable energy investment (Concluded)

Action area	Tools
Right to regulate for climate action and the energy transition	Refine the content of investment protection standards and reform investor–State dispute settlement with regard to energy investment. Acknowledge the need for regulatory flexibility. Include general exceptions related to climate change and the energy transition. Clarify provisions on compensation and damages (where applicable).
Corporate social responsibility	Include binding obligations related to corporate social responsibility. Specifically oblige energy investors to comply with requirements for sustainable investment.

Source: WIR 2023.

NOTES

[1] TIPs include free trade agreements, economic partnership agreements and other regional economic agreements with investment provisions.

[2] The Philippines–United Arab Emirates BIT (2022), the Israel–Philippines BIT (2022), the Indonesia–Switzerland BIT (2022), the Cambodia–Republic of Korea FTA (2021), the Indonesia–United Arab Emirates Comprehensive Economic Partnership Agreement (2022) and the Pacific Alliance (Chile, Colombia, Peru)–Singapore FTA (2022).

[3] The Indonesia–Singapore BIT (2018) entered into force on 9 March 2021; the Indonesia–United Arab Emirates BIT (2019) entered into force on 3 December 2021; the United Kingdom–Viet Nam FTA (2020) entered into force on 1 January 2021; the Armenia–Singapore Agreement on Trade in Services and Investment (2019) entered into force on 1 February 2021; the Singapore–United Kingdom FTA (2020) entered into force on 11 February 2021; the European FTA (EFTA) States–Indonesia Economic Partnership Agreement (2018) entered into force on 1 November 2021; the Cambodia–China FTA (2020) entered into force on 1 January 2022; the Regional Comprehensive Economic Partnership (RCEP) Agreement (2020) entered into force on 1 January 2022 among 10 of the signatories; and the Cambodia–Republic of Korea FTA (2021) entered into force on 1 December 2022.

[4] Australia, Brunei Darussalam, Cambodia, China, Indonesia (entry into force on 2 January 2023), Japan, the Republic of Korea (entry into force on 1 February 2022), the Lao PDR, Malaysia (entry into force on 18 March 2022), New Zealand, the Philippines (entry into force on 2 June 2023), Singapore, Thailand and Viet Nam.

[5] See the UNCTAD IDS Navigator: https://investmentpolicy.unctad.org/investment-dispute-settlement.

CHAPTER 5

EMERGING ISSUES AND POLICY IMPLICATIONS

Some emerging issues concerning FDI include the international minimum tax and its implications on FDI promotion and SEZ development, international supply chain restructuring and growing investor interest in the energy transition and in the EV supply chain.

5.1. INTERNATIONAL MINIMUM TAX

The implementation of the international tax reforms proposed by the G20-OECD BEPS projects, notably the global minimum tax of 15 per cent on the profits of the largest MNEs, has significant implications for investment policies, FDI promotion and development of SEZs, often tied to profit-based incentives such as tax holidays and reductions (box 1). The reform initiative is expected to be adopted in 2024, with more than 140 jurisdictions having signed on to it.

Box 1. The impact of a global minimum tax on FDI

The introduction of the international minimum tax is expected to discourage MNEs from shifting profits to low-tax countries and to reduce tax competition between countries. Further objectives are to stabilize international tax rules and reduce tax uncertainty, to create a more level playing field for companies and to prevent the proliferation of unilateral measures that could lead to a deterioration in the investment climate.

Pillar II of the BEPS project will increase the corporate income tax levied on MNEs' foreign profits, with two effects. First, MNEs will reduce their use of profit shifting, as they will have less to gain from it, and will pay host-country tax rates. Second, foreign affiliates that pay an effective tax rate below the minimum on profits reported in host countries will be subject to a top-up tax. The expected rise in the (FDI-level) effective tax rate faced by MNEs is conservatively estimated at 2 percentage points. This corresponds to an increase in tax revenues paid by MNEs to host countries of about 15 per cent, more for large MNEs that are directly affected by the reform.

No country can afford to ignore Pillar II. The implementation mechanism that has been devised is such that it is sufficient for a relatively small number of investor home countries (e.g. G20 and OECD members) to apply the top-up tax for the effects to become almost universal. Host countries, including many developing economies, then have the option to apply the top-up tax first – before home countries can do so – to protect tax revenues. But the effectiveness of competitive tax rates or traditional tax incentives to attract FDI will be diminished.

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Box 1. The impact of a global minimum tax on FDI (Concluded)

The strategic implications for investment policy are important to note. Reduced competition from low-tax locations could benefit developing economies. Nevertheless, as competition shifts from tax levers to alternative investment determinants and from fiscal incentives to financial incentives, countries that cannot afford the substantial upfront financial commitments associated with infrastructure provision or subsidies could still find themselves at a disadvantage.

The implementation of BEPS Pillar II by tax authorities will be highly complex, and so will the translation of the reforms into investment policies, incentives regimes and value propositions of investment promotion agencies and special economic zones (SEZs). The international community, in parallel with or as part of the Inclusive Framework discussions, should alleviate the constraints that are placing developing countries, and especially least developed countries (LDCs), at a disadvantage by (i) vastly scaling up technical assistance to developing countries to support BEPS implementation and investment policy adjustment, (ii) adopting a multilateral solution to remove implementation constraints posed by IIAs and mitigate investor–State dispute settlement risks and (iii) establishing a mechanism to return any top-up revenues raised by developed home countries that should have accrued to developing host countries, but that they were unable to collect because of capacity or treaty constraints.

Source: WIR 2022.

While certain economies (e.g. offshore financial centres) are likely to lose out more than others, many countries would be affected by promoting FDI using tax-related measures. Countries will need to understand the related implications and take appropriate actions. Investment policymakers in ASEAN urgently need to review their incentives packages for both new investors and firms already present in the region. Some fiscal policy options to promote investment may remain, such as shifting to incentives that are less affected by the tax reform and especially non-tax measures that have a bearing on investment decisions. Among those that they could consider are greater use of investment facilitation measures to improve efficiency, streamline investment processes, use of online technology and adopt facilities that would further improve the overall business and investment environment to facilitate FDI.

Most IIAs do not exclude taxation from their scope, and they cover a wide range of tax-related measures of general or specific application. The international minimum tax will have implications for IIAs, BITs and future investment treaty making. Countries will need to review existing and future treaties in relation to the international minimum tax. Existing old-generation IIAs, of the type predominantly in force in many developing countries, are likely to be particularly problematic (section 4.3).

5.1.1. Special economic zones

ASEAN has more than 1,600 zones of different categories and sizes from small ones to megazones encompassing a few contiguous provinces or states (*ASEAN Investment Report 2022*; *WIR 2019*). More industrial estates and SEZs are being developed and planned in

the region to facilitate investment. Most have been developed to attract FDI by granting tax incentives. The tax reform is expected to affect development programmes for SEZs and other industrial zones, which will thus need to be reviewed. SEZs could still be developed by using non-tax measures, including offering competitive electricity charges from renewable energy sources, promoting green SEZs and providing efficient and connected physical and digital infrastructure.

5.1.2. Policy options: global minimum tax

Two sets of actions, general and specific, could be considered. At the general level, some suggestions have been made in the *World Investment Report 2022*. These suggestions include actions to (i) assess the likely impact of the global minimum tax, (ii) develop an effective tax framework for investment promotion in the changed global environment and (iii) explore the potential for non-tax measures to promote investment.

Specific suggestions:

- Review all investment treaties and FDI promotion policies that rely on tax-based incentives to bring them in line with the international tax reform.
- Review SEZ programmes that offers tax incentives to attract FDI with a view to linking SEZ development to non-tax measures. This could include offering efficiency, better ecosystem connectivity, better digital and physical infrastructure facilities, and connections to universities and research and development (R&D) parks.

5.2. INTERNATIONAL SUPPLY CHAIN RESTRUCTURING

Geopolitical tensions and pandemic-induced supply chain disruptions are key drivers of the recent wave of international supply chain restructuring, as are rising costs. Investors are diversifying production locations to mitigate future risks, and the ASEAN region is a major beneficiary of this relocation trend.

Diversification of supply chain-related FDI in ASEAN can be categorized into two main channels:

- Existing investors are expanding capacities in the region (horizontally and vertically), either within the same host country or across ASEAN Member States.
- New investors are establishing a presence in the region.

MNEs are diversifying production facilities to ASEAN in industries such as electronics, semiconductors, and garments and footwear (box 2). In electronics, major MNEs are expanding operations to enhance production capacity and strengthen supply chain connections. Google (United States) is expanding its Pixel phone production to the region, Infineon Technologies (Germany) is expanding capacity in Batam, Indonesia to strengthen supply chain facilities and for exports, and HP (United States) has continued to expand in Thailand. Other electronics MNEs and their suppliers are turning to ASEAN to diversify production and bolster supply

chain networks. Samsung and LG Electronics (both Republic of Korea) and Intel, Microsoft and Qualcomm (all United States) are expanding in ASEAN. Several major semiconductor MNEs with established footprints in the region are extending their investments with big-ticket projects (*ASEAN Investment Report 2022*).

Box 2. Supply chain diversification

Apple (United States) in 2019 urged key suppliers such as Foxconn, Pegatron and Wistron (all Taiwan Province of China) to explore shifting some production to countries in ASEAN for reasons of supply chain diversification.[a] These suppliers, along with others such as Goertek (China), established facilities in ASEAN as part of their international supply chain restructuring. After moving some production to ASEAN, these suppliers expanded further in subsequent years. Pegatron increased its presence in Viet Nam since 2020 for computer, communication equipment and electronic component manufacturing. Foxconn expanded in the same host country and other countries in the region. It partially moved the IPAD production to Viet Nam and started construction of a factory in 2020.[b] Suppliers such as BYD and BOE Technology (both China), and Compal Electronics and Catcher Technology (both Taiwan Province of China) followed suit. BOE Technology is building two additional plants in Viet Nam. Apple, along with suppliers Luxshare Precision Industry (China) and Foxconn, started producing Apple watches in Viet Nam in 2021. Foxconn also set up an Apple MacBook production line[c] and Quanta Computer (Taiwan Province of China) is constructing a factory in northern Viet Nam for notebook components in 2022.

Apple is encouraging its suppliers to diversify production base to other Southeast Asia countries such as Malaysia and Thailand. Apple watches have been made in Thailand since 2022, and the company is working with suppliers in Thailand to produce Macbooks. Several apple suppliers such as Delta Electronics (Taiwan Province of China), Analog Devices (United States), Compal Electronics (Taiwan Province of China), Cosmosupplylab Limited (Hong Kong, China), Fujikura (Japan), Power Integrations (United States), Unimicron (Taiwan Province of China) are already producing apple components in that host country. Some of these suppliers, including Compeq (Taiwan Province of China) and Murata (Japan) are expanding in Thailand to strengthen supply chain capacities and linkages. Apple started manufacturing the M1 Mac Mini in Malaysia in 2021 through Foxconn, who partnered with Dagang NeXchange (Malaysia) in 2022 to set up a 12-inch chip plant in Malaysia.[d] Many major global semiconductor MNEs have plants in Southeast Asia from which they supply components to produce Apple's products (box table 2.1).

Samsung started relocating its manufacturing from China to Viet Nam in 2008. The relocation was driven by increasing costs in China and intense competition from local smartphone manufacturers. Since then, Samsung has been expanding its production facilities in ASEAN, in particular in Viet Nam, where it has six manufacturing plants and an R&D centre. According to the Ministry of Industry and Trade of Viet Nam, in 2020 at least 28 Samsung suppliers from China, Japan and the Republic of Korea had manufacturing plants in the country. In 2022, Samsung was building a $1.6 billion EV battery cell facility in Malaysia. Samsung and other major Korean companies such as LG Electronics are encouraging their suppliers to establish a presence and expand in the region.

Intel (United States) operates in Malaysia, manufacturing a broad range of products, including microprocessors, chipsets, network processors and microcontrollers. It has multiple facilities, two design centres and a shared services hub that also supports Intel worldwide. The company continued to expand

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Box 2. Supply chain diversification (Concluded)

Box table 2.1. Apple semiconductor suppliers in ASEAN, 2022

Semiconductor MNE	Headquarters	Countries in ASEAN where MNE produces Apple components
Amkor Technology	United States	Philippines (Laguna)
Infineon Technologies	Germany	Malaysia (Kedah, Malacca (Melaka), Perak) Philippines (Laguna) Singapore
Intel	United States	Malaysia (Kedah, Penang) Viet Nam (Ho Chi Minh)
Micron Technology	United States	Singapore
Murata	Japan	Malaysia (Perak) Singapore Thailand (Lamphun) Viet Nam (Da Nang, Tien Giang)
ON Semiconductor	United States	Malaysia (Negeri Sembilan, Penang, Selangor) Philippines (Cebu, Laguna, Tarlac) Singapore Thailand (Bangkok, Chachoengsao, Ayutthaya)
Renesas	Japan	Malaysia (Penang)

Source: Apple Supplier List FY22.
Note: Apple is a major client of these semiconductor companies.

its production and test capacities in the country by building an additional production facility in Penang in December 2021, part of the company's $7 billion expansion plan in Malaysia. Some of Intel's suppliers also have significant manufacturing facilities in the region. They include ASE Technologies (Taiwan Province of China), Applied Materials and Lam Research (both United States), and Murata (Japan). These suppliers have been constructing additional facilities in ASEAN between 2021 and 2023. Intel has also built business linkages with local suppliers that have evolved to be MNEs (e.g. Eng Teknologi, Globetronics Technology, LKT Engineering, Metfab Engineering). In 2021, Intel invested $475 million to build a chip assembly and test manufacturing facility in Saigon Hi-Tech Park in Viet Nam (part of its $1 billion investment plan in that country).[e]

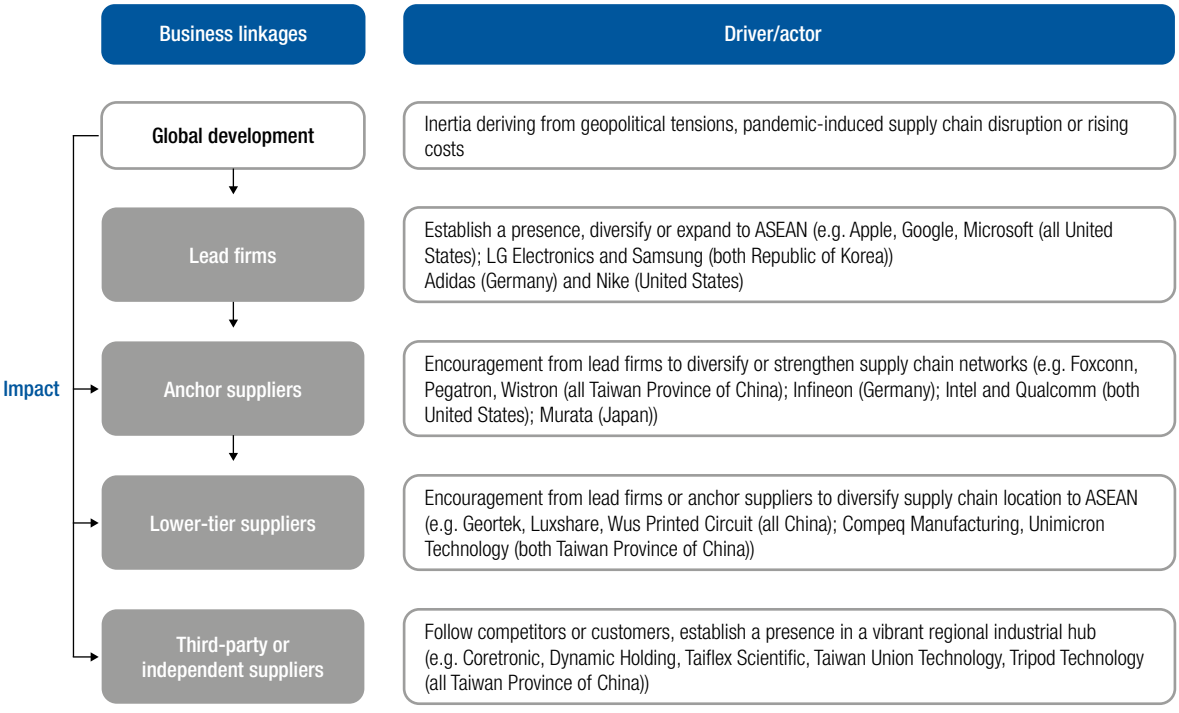
Source: ASEAN Investment Report 2023 research, company websites and press releases, media and industry journals.
[a] *The Verge*, "Apple plans to move some manufacturing out of China," 19 June 2019.
[b] Reuters, "Exclusive: Foxconn to shift some Apple production", 26 November 2020.
[c] *Nikkei Asia*, "Apple in talks with suppliers to make MacBooks in Thailand", 13 April 2023.
[d] *Pandaily*, "Foxconn to build joint venture chip factory in Malaysia", 18 May 2022.
[e] Intel. "Intel invests additional $475 million in Vietnam", press release, 26 January 2021.

In the automotive industry, firms already present in ASEAN and new regional investors are entering different segments of the supply chain from mining and processing of critical minerals to EV and battery production, including charging stations (section 5.4). In Indonesia, Ford (United States) is setting up a joint venture for nickel production to fortify its supply chain,[1] and Porsche (Germany) is investing in nickel production through a joint operation with partners.

Many MNEs have relocated to ASEAN or have further expanded in the region (e.g. Adidas (Germany) and Nike (United States)). Through a series of capital expenditures, more than half of Nike's shoes and Samsung's mobile handphones are now produced in ASEAN.

Firms in different industries are diversifying supply chain facilities to ASEAN. They include lead firms and their anchor suppliers (some of them also major MNEs), who in turn influence lower-tier suppliers to invest in the region (figure 25). The global supply chain disruptions in recent years have also encouraged independent suppliers to diversify. Many manufacturers of printed circuit boards (PCBs) from China and Taiwan Province of China have expanded to ASEAN to be part of the supply chain ecosystem of major electronics and semiconductor MNEs that are already in the region. PCB makers and raw material producers such as Compeq Manufacturing,

Figure 25. International supply chain restructuring and implications for ASEAN



Source: ASEAN Investment Report 2022 research.

Note: In some cases, it is not a straightforward task to draw a clear distinction between lead firms and anchor suppliers. Depending on the products, some anchor suppliers can also be lead firms (e.g. Intel).

Dynamic Electronics, Taiflex Scientific, Taiwan PCB Techvest, Taiwan Union Technology, Tripod Technology, Unimicron Technology and Wus Printed Circuit (all Taiwan Province of China), and Aoshikang Technology, Kingboard and Sihui Fuji Electronics (all China) have invested for the first time in the region. Some have in recent years expanded investment in ASEAN to develop a stronger regional foothold.

For some MNEs, relocation to ASEAN is taking place to strengthen intrafirm networks and interfirm linkages. This includes MNEs strengthening regional production networks by optimizing and better coordinating production facilities in the region. Supply chain development may involve strengthening or expansion of production networks and intrafirm transactions involving affiliates and subsidiaries of the group in ASEAN (e.g. Murata (Japan) and Infineon (Germany)). Interfirm transactions involve linkages between major MNEs and independent suppliers or third-party suppliers (e.g. many PCB manufacturers have moved to ASEAN to be close to markets and customers).

Protectionist policies and "chip nationalism" such as in the electronics and semiconductor industries are influencing MNEs' investment plans. Pull factors from ASEAN (e.g. regional integration, a major production hub, emerging investment opportunities and a competitive industrial ecosystem) are helping the region attract investment and encouraging investors to further strengthen regional production networks. Annex table 6 lists MNEs investing in or expanding production capacities in ASEAN in such a supply chain restructuring drive.

Increasing costs at home and in other locations have also encouraged firms to set up operations in ASEAN. The consequent diversification of lead firms and anchor suppliers in turn has encouraged other suppliers to follow suit. In many cases, these suppliers, which include anchor firms, have expanded their production capacity in the region, helping to strengthen intra- and interfirm connectivity and supply chain networks. The FDI drive related to restructuring international supply chains will continue beyond 2023 – and ASEAN is expected to remain a major destination.

5.2.1. Policy options: Facilitating international supply chain restructuring

The recent FDI wave of relocation to ASEAN suggests several important lessons for countries' FDI promotion strategies:

(i) The role of lead firms and their anchor suppliers complements ASEAN Member States efforts to attract FDI.

(ii) Lead firms and anchor firms play an active role in helping to build the region's supporting industries and in further improving the investment environment as they develop their supply chain ecosystems and strengthen regional production network systems.

(iii) Active FDI promotion is warranted for the next few years, with efforts to engage with investors and to promote targeted investment opportunities as more MNEs plan their restructuring of international supply chains.

(iv) The AEC and the RCEP platforms can be instrumental for building a competitive supporting industry and enabling easy sourcing of parts and components. They can significantly facilitate investment based on complementary locational advantages, regional integration benefits and regional production and investment networks. They will amplify opportunities for firms to scale, to source and to develop more resilient supply chain networks in the region. ASEAN Member States should move forward with timely achievement of AEC and RCEP milestones and programmes.

ASEAN is well positioned to attract FDI related to international supply chain restructuring. Active FDI promotion strategies and regular outreach activities are needed to keep up the momentum. Regional development, integration and emerging investment opportunities need to be better promoted to the investor community. Some specific activities that could be considered are indicated in the following subsections.

5.2.2. AIFF and other measures

- Step up efforts to implement the ASEAN Investment Facilitation Framework and other investment facilitation measures. Consider bringing forward some specific recommendations made in the *ASEAN Investment Report 2022* for advancing the AIFF, such as establishing a clear time frame and milestones and conducting regular assessments of the implementation. Review AIFF progress periodically to identify areas for cooperation, to share best practices and to incorporate new investment facilitation measures to further improve the overall regional investment environment.
- Adopt a holistic approach for facilitating investment and doing business. Investment facilitation should not be confined to administrative issues but should also cover the broader context of the business environment (e.g. support for setting up a business and obtaining business registration and licenses and other business-related administrative requirements). Seek synergies between investment facilitation efforts and the activities and tools of authorities other than investment promotion agencies.
- Increase the depth and sophistication of the investment facilitation measures covered in the AIFF.
- Broaden the context of the investment facilitation environment by coordinating with business and tax authorities to integrate business facilitation.
- Consider additional provisions beyond the 10 main categories in the AIFF as highlighted in the *ASEAN Investment Report 2022*.

5.2.3. Easier flow or sourcing of production and raw material inputs

Facilitate easy sourcing of raw material inputs intraregionally, including by establishing rapid regional customs clearance requirements, procedures and coordination. Promote the ASEAN Single Window initiative more broadly to the investor community. Eliminate non-tariff barriers and investment impediments that could hinder regional sourcing or impede supply chains, except in areas critical to protecting national security and consumer safety.

5.2.4. ASEAN Investment Forum and other outreach activities

In maintaining the momentum of FDI flows related to supply chain restructuring, organize regular ASEAN Investment Forums to disseminate information and engage frequently with the regional and international investor community to promote investment opportunities in the region. To optimize attention and impact, organize these events with regional and international industry clubs and other relevant stakeholders. Develop and promote bankable projects.

5.3. ENERGY TRANSITION AND THE ROLE OF FDI

Energy demand in ASEAN, particularly for renewables, is projected to grow rapidly over the next decade and beyond because of energy transition commitments by Member States and rapid population, economic and industrial growth, including rising demand from the transportation sector. More MNEs in ASEAN are demanding renewable energy supply, and more are installing solar power systems at manufacturing sites to meet their electricity needs. Demand for renewable energy in turn is encouraging FDI in technology solutions and manufacturing of renewable energy equipment (e.g. solar panels). Green industrial parks are emerging in the region, and the proliferation of data centres is adding to the growing demand for more renewably generated electricity.

The energy transition involves a wide spectrum of activities, ranging from renewable energy generation and electrification to building sustainable infrastructure and energy-efficient buildings and decarbonizing industry (*WIR 2023*). Investment requirements in the renewable energy supply chain include upstream activities (R&D, critical mineral extractions and processing), midstream (component manufacturing and assembly) and downstream (installation and operation of solar panels, wind turbines, batteries and power generation and distribution). The energy transition supply chain is long. In each segment, significant investment is needed and participation by the private sector, including by MNEs, is vital.

Funding all these activities would require participation by all stakeholders. All types of funds – private, public, domestic, international – are needed to meet the region's huge investment requirements for transition. The private sector, including international investors, can play an important role in the process through (i) investment; (ii) adaptation and adoption of renewable technologies; (iii) supplying renewable technology solutions; (iv) manufacturing renewable equipment, components and parts; and (v) through innovation and R&D.

Given the vast scope of activities related to the energy transition, this report focuses on the role of international investment, key actors and policy options for attracting FDI to advance the renewable energy supply chain in ASEAN.

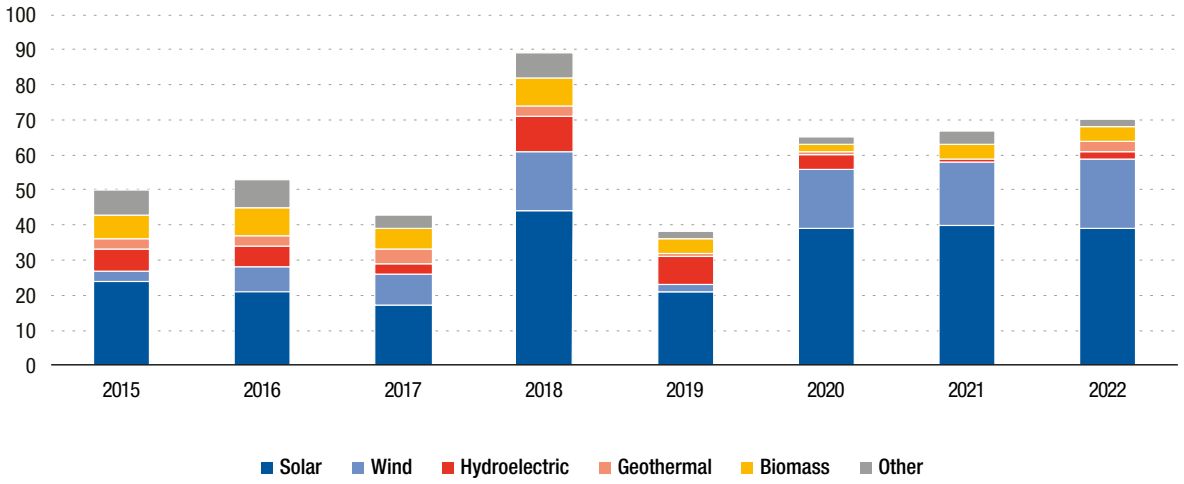
5.3.1. International investment trend

More than half of all international investment projects in renewables in the world in the last decade were in solar energy. In 2022, investment in solar and wind accounted for nearly 90 per cent of all international investment in renewables. A similar trend was also witnessed in ASEAN

with growing interest by investors and funders in renewable power generation. The bulk of renewable investments between 2011 and 2022 in ASEAN were in solar and wind power.

International investment in renewable sectors in ASEAN[2] is on an upward trend (figure 26), suggesting a growing appetite among investors for energy transition projects. The number of international investment projects in renewables rose 4 per cent to 70 in 2022, accounting for 15 per cent of all international investment in renewables in developing countries. In terms of value, investment in renewables fell by 29 per cent, to $43 billion. Renewables remained a major recipient of international project finance in 2022. In numbers of projects, about 23 per cent of all international project finance deals (226) were in renewables – mostly in solar and wind power (annex table 7).

Figure 26. ASEAN: international investment projects in renewables, by type, 2015–2022 (Number of projects)



Source: UNCTAD.

5.3.2. Investment need

For renewable energy to reach a 23 per cent share in the region's primary energy supply and a 35 per cent share in installed capacity by 2025 would require an estimated total of $180 billion in annual investment.[3] In 2021, an estimated $27 billion total investment was made in renewables (IEA, 2022), including in efficiency and end use. This left a huge investment gap to be filled, despite international investment projects estimated at $43 billion in 2022.

The public sector alone cannot meet the investment challenge. The private sector (domestic and international investors), multilateral development banks and other stakeholders (e.g. commercial banks and green funds) must play roles in the region's energy transition. FDI can be a catalyst. Worldwide almost half of project finance investment involves a foreign sponsor or equity investor. In value terms, international project finance accounts for

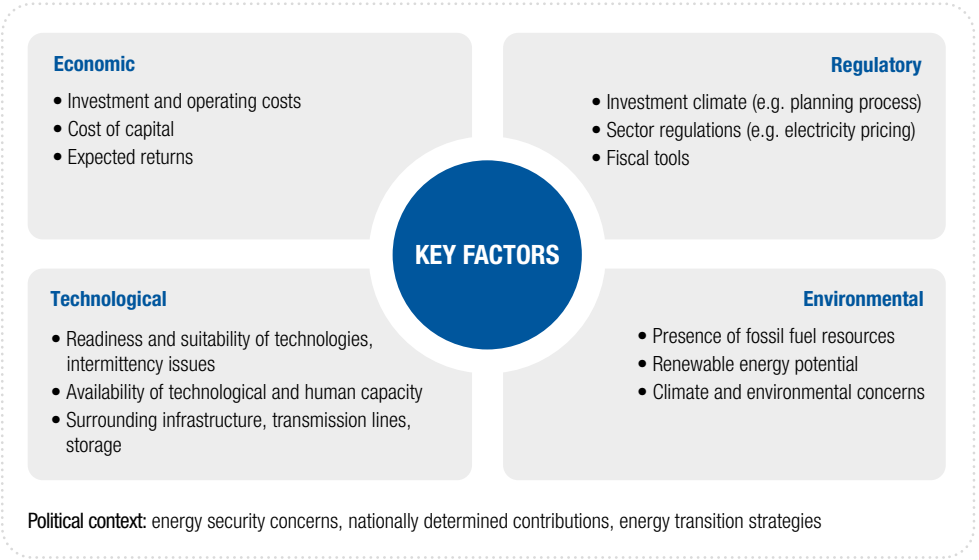
55 per cent of investment in renewables. Most of this investment is driven purely by the private sector; less than one fifth involves equity stakes by host-country governments, although such projects with government involvement are, on average, larger (*WIR 2023*).

In ASEAN, the private sector provided at least about 40 per cent of the financing of large-scale renewable energy projects between 2014 and 2018 (ADB, 2021). A study of power generation projects in Indonesia in 2016–2019 showed that the public sector provided 25 per cent of funds, the private sector 35 per cent and international development finance institutions 40 per cent (IRENA, 2022a). The role of private sector and international investment in renewable power generation is significant in ASEAN, as in the world. To attract international investment in the renewable energy supply chain, policymakers need to consider some major drivers and determinants of such investment (box 3).

Box 3. Attracting international investment in renewables: key aspects

Firms' decisions to invest in development of energy infrastructure are driven by economic, regulatory, technical and environmental factors. Some of these factors affect international investors differently from domestic investors, determining distinct roles and opportunities for FDI (box figure 3.1).

Box figure 3.1. Drivers and determinants of energy transition investment



Source: UNCTAD.

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Box 3. Attracting international investment in renewables: key aspects (Concluded)

Investment decisions on energy sources and technologies

Investor choices between fossil fuel assets and renewables are significantly affected by the cost of capital. Higher costs of capital penalize renewable energy projects with high upfront costs, representing a significant disincentive for investment in the energy transition. Investment decisions on new power plants depend on choices of technologies and sources of energy, including between fossil fuels and renewables. Such decisions are made on the basis of an analysis that compares the cost of the electricity generated over the lifetime of the installations on an equal footing. The key measure used is the levelized cost of electricity (LCOE). The LCOE is driven by numerous technical factors, such as capacity, operating costs, fuel prices, and maintenance and decommissioning costs, which are mostly the same for domestic and international investors.

Cost of capital or finance

International project finance is a key mechanism for foreign investors to fund energy infrastructure around the world. Financing costs in international project finance are driven by country risks, industry risks and project risks. Each of these will affect the choices made by investors and the potential for infrastructure projects to attract international capital.

Source: WIR 2023.

5.3.3. Energy transition plans

ASEAN Member States are signatories to the Paris Agreement and are committed to the energy transition targets of either carbon-neutral[4] or net-zero carbon emissions by 2050. They have put in place national energy policies that include targets for renewables in power generation by 2025–2040 (table 4).

Table 4. ASEAN: Renewable energy transition targets, various years

Country	Transition target (Per cent of renewables in energy mix)	Target year
Brunei Darussalam	30	2035
Cambodia	65	2030
Indonesia	23	2025
Lao PDR	30[a]	2025
Malaysia	31	2025
	40	2035
Myanmar	39	2030

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Table 4. ASEAN: Renewable energy transition targets, various years (Concluded)

Country	Transition target (Per cent of renewables in energy mix)	Target year
Philippines	35	2030
	50	2040
Singapore	30[b]	2035
Thailand	30	2037
Viet Nam	32	2030
	44	2050

Source: Country websites and media.
[a] On the basis of total energy consumption (excluding large hydropower).
[b] Of electricity supply from low-carbon electricity imports. About 95 per cent of electricity in Singapore is generated using natural gas. The Energy Market Authority aims to import up to 4 gigawatts of low-carbon electricity by 2035, which would make up about 30 per cent of the electricity supply (*Straits Times*, "Why Singapore needs to import electricity and other energy questions answered", 14 April 2022).

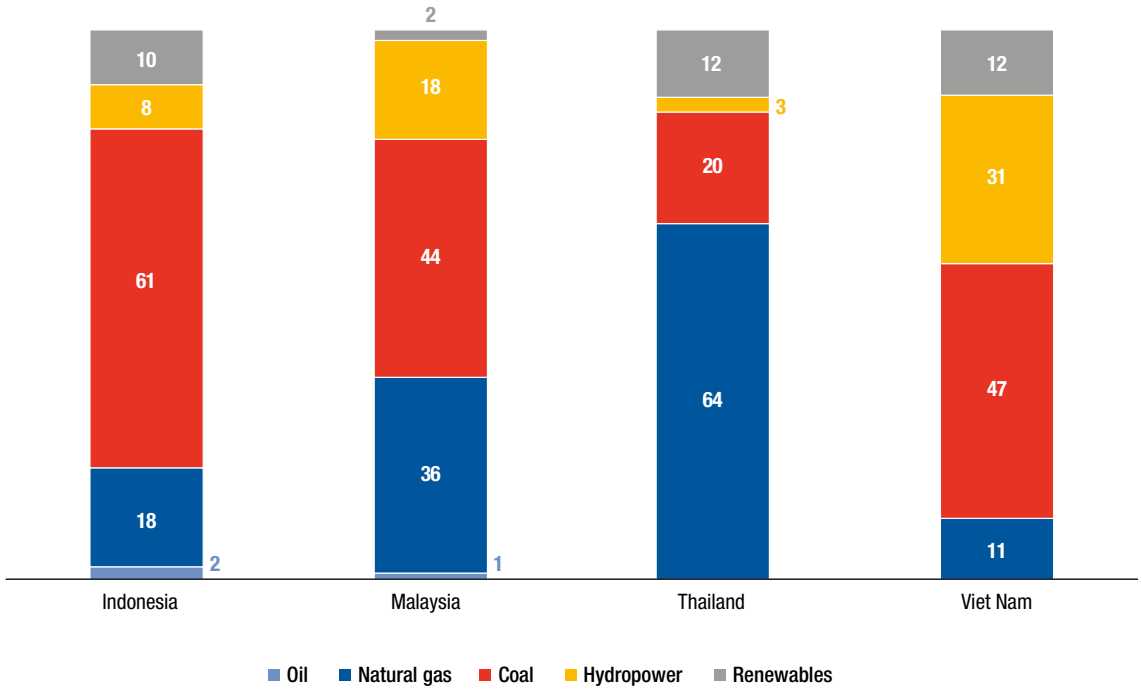
Providing universal access to electricity remains a key SDG target in ASEAN. Most Member States have achieved 100 per cent electrification through years of investment in generation and transmission infrastructure. Across the region, more than 95 per cent of the population has access to electricity, and achieving energy for all is within reach. The challenge is to provide sustainable (100 per cent renewable) and affordable energy for all.

5.3.4. Energy mix

Sources for electricity generation differ significantly between the Member States, depending on their resources. Some are significantly endowed with hydropower energy. Some with favourable topography have significant untapped potential for solar and wind power development. In 2021, hydropower accounted for 44 per cent of power generation in Cambodia and more than 80 per cent in the Lao PDR. In Indonesia, 61 per cent of the energy mix is from coal-powered plants (figure 27). About 47 per cent of power production in Viet Nam is from coal-fired power plants and 31 per cent from hydropower; the country is pursuing a transition towards a greater use of solar and wind energy. In Malaysia and Thailand, a high proportion of electricity generation is from gas- and coal-powered plants.

Solar power capacity in ASEAN has more than doubled between 2019 and 2020, increasing from 10.4 GW to 22.9 GW. It is projected to reach 35.8 GW by 2024.[5] Manufacturing alone will require 27 GW of new solar installations across the region over the next five years.[6] Viet Nam, Thailand, the Philippines and Malaysia, in that order, account for most of the solar capacity in the region. Viet Nam had a total capacity of 16 GW as of the end of 2020, with 9 GW of rooftop solar installed in that year.[7]

Figure 27. Energy mix of selected ASEAN Member States, by fuel source, 2021 (Per cent)



Source: BP *Statistical Review of World Energy 2022.*

5.3.5. Key actors

Traditional power companies, public utilities, oil and gas MNEs, and a wide range of new actors are shaping the renewable energy landscape in ASEAN (table 5). They are involved in renewable investment activities across the supply chain. Depending on the technology, new actors include renewable technology start-ups, battery and non-traditional EV manufacturers, renewable power producers (e.g. solar, wind and biomass) and related equipment manufacturers. They operate in different segments of the supply chain, from upstream to midstream and downstream.

Coal power plant owners

Foreign and locally owned coal-powered plants are slowly transitioning. Some major MNEs are reducing their use of coal-powered generation and increasing their use of renewable generation. Early retirement of coal plants and reinvestment in renewable energy is an important part of ASEAN Member States' carbon reduction plans. In November 2022, Sumitomo (Japan) announced that it will retire its 2,640 megawatt (MW) Tanjung Jati B coal plant in Indonesia and develop in its stead the Kayan hydropower plant. Tanjung Jati B is one of Indonesia's largest coal plants.

Table 5. ASEAN: Key actors in renewable energy transition supply chains

Types of actors	**Energy transition activities**	**Companies or MNEs** (Selected cases)
National electricity companies	Own resources and/or manage grid connections, and buy electricity generated from power plants, including renewable energy	PLN (Indonesia), EDL (Lao PDR), Tenaga (Malaysia), EGAT (Thailand), EVN (Viet Nam)
Coal power plant owners	Own coal mines and generate electricity using coal Manage early retirement of coal plants and reinvestment in renewable power plants	**Foreign:** China Huadian, China Energy Engineering, Datang Overseas Energy Investment and Sinohydro (all China); Engie Energy International) (France); Siemens (Germany); Sumitomo (Japan); and Samtan and Korea Midland Power (both Republic of Korea). **Regional**: Ratch Group and Banpu (both Thailand), Genting Group (Malaysia)
Oil and gas MNEs	Capture and store carbon, and reinvest in renewables and liquefied natural gas	**Foreign:** BP, Shell (both United Kingdom); Chevron, ExxonMobil (both United States); TotalEnergies (France) **Regional:** Pertamina (Indonesia), Petronas (Malaysia), PTT (Thailand)
Renewable energy project owners	Major players using technologies to generate electricity from renewable sources (e.g. wind, solar, hydropower)	**Foreign (hydro):** China Water and Energy, Power China Resources, China International Water & Electric (all China); Scatec (Norway); GE Renewable Energy (United States) **Foreign (solar/wind):** Xing Hai Group, Powerway Group (both China); ib vogt (Germany); Shapoorji Pallonji Infrastructure Capital (India); ACWA Power Renewable Energy Holding (Saudi Arabia) **Regional (hydro):** BCPG, EGCO Group, GSM, Southeast Asia Energy, and WHA (all Thailand); Viet Lao Power (Viet Nam) **Regional (solar/wind):** AC Energy (Philippines) (part of Ayala Group); B. Grimm and Super Energy (both Thailand); InfraCo Asia, Sembcorp, Sunseap and Quantum Power Asia (all Singapore) **New actors enabled by technologies** (e.g. manufacturing MNEs installing solar panels at factory sites)
Other actors		
Equipment manufacturers	Manufacture renewable (e.g. solar and wind) equipment and parts and components	JA Solar and Jinko Solar (both China), Hanhwa Q CELLS (Republic of Korea), Maxeon Solar and Sunpower (both United States)
Transmission grid project owners	Invest in transmission grids	China Southern Power Grid (China), Union Power (Singapore), B. Grimm (Thailand)
Technology companies and digital/green start-ups	Provide technology solutions to improve efficiency in energy consumption in buildings, transportation and industrial operation	Envision Digital (Singapore), Microsoft (United States) Grab (Singapore), GoTo and Sicepat (both Indonesia) (e.g. for development and use of EV motorbikes)
Mining, battery and EV companies	Produce EV batteries and EVs, extract and process critical minerals	Tsingshan (China), Hyundai and LG (both Republic of Korea)

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Table 5. ASEAN: Key actors in renewable energy transition supply chains (Concluded)

Others actors		
Project contractors and developers	Contract and develop power projects	Total Energies (France), SK Ecoplant (Republic of Korea), Athena Energy Holdings and Sunseap (both Singapore)
Funders	Provide international project finance and investment	Multilateral development banks, regional banks, export-import banks and other infrastructure and green funds (e.g. World Bank, Asian Development Bank, Mitsubishi green fund (Japan), OCBC (Singapore), Japan Bank for International Cooperation, Mizuho Bank, Joyo Bank and Shiga Bank (all Japan)

Source: ASEAN Investment Report 2023 research.

Traditional oil and gas MNEs

Foreign MNEs are collaborating with State-owned oil and gas companies in ASEAN in carbon capture and storage activities. Shell (United Kingdom) is partnering with Petronas (Malaysia) to explore opportunities and collaboration for carbon capture and storage in Malaysia and in the region. ExxonMobil (United States) entered into a $2.5 billion agreement with Pertamina (Indonesia) in 2022 for development of a regional carbon capture and sequestration hub.

Renewable energy plants (e.g. hydropower, solar and wind)

MNEs are involved in renewable energy projects in the region as owners or sponsors; engineering, procurement and consulting contractors; technology suppliers; and funders. Opportunities to export renewable electricity and power purchase agreements are major mechanisms encouraging private investment. The existence of regional power pool arrangements in ASEAN that facilitate cross-border renewable electricity trade is an important aspect. In the Lao PDR, Keppel Infrastructure Holdings (Singapore) signed a power purchase agreement with State-owned Electricité du Laos in June 2022 to import 30 MW of renewable electricity in the dry season and 100 MW in the rainy season in both 2022 and 2023.

Many hydropower plants in the Lao PDR generate electricity for export to neighbouring countries (box 4). Chinese and ASEAN MNEs are major investors in hydropower electricity generation in that host country. In solar and wind energy projects, foreign and regional MNEs are investing in countries such as Indonesia, Malaysia, Thailand and Viet Nam. In 2022, TotalEnergies (France) made multiple investments in solar energy projects involving Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam. That same year, Mainstream Renewable Power (Ireland) announced the development of the 90 MW Libmanan onshore wind project in the Philippines in partnership with AboitizPower (Philippines). Wpd (Germany), in partnership with Triconti Windkraft (Philippines), is developing a 75.6 MW onshore wind power project in that country. Also in the Philippines, Iberdola (Spain) signed an agreement with Triconti Windkraft to develop five offshore wind power projects and Copenhagen Energy (Denmark) together with PetroGreen Energy (Philippines) is developing three floating offshore wind farms. The $10.5 billion 3.5 GW La Gan offshore wind farm in Viet Nam is being jointly developed by Copenhagen Infrastructure Partners (Denmark) and local partners Asiapetro and Novasia.

Box 4. Lao PDR: the role of policy and regional electricity trade

Renewable power generation and the export of electricity are key features of the economy of the Lao PDR, underpinned by policy that promotes energy development and the attraction of hydropower FDI. About 80 per cent of installed energy capacity in 2021 was from hydropower. International companies play a significant role in the entire energy value chain, from sources to generation, installation and transmission, and as suppliers of technology solutions and equipment. Active international project finance from multilateral institutions and banks is a major source of funding.

Foreign investment and robust MNE participation in energy development have helped the Lao PDR transform into the biggest electricity exporter among the LDCs, and as the "Battery of Southeast Asia". Electricity exports generated more than $2 billion in revenue in 2021, contributing more than 15 per cent of the country's GDP, and are a major foreign exchange earner for the country. About 65 per cent of the 11 GW of installed capacity in the country is exported to neighbouring countries through a web of power purchase agreements and concession arrangements. These countries include Cambodia, China, Malaysia, Myanmar and Viet Nam, with Thailand the largest export destination.

In 2021, more than 70 of the 90 power plants in the country were wholly owned by or involved in joint ventures with foreign MNEs. Investment in power generation led to 100 per cent electrification in 2020, up from 70 per cent in 2010. The hydropower industry is a major FDI recipient in the country. Favourable regulatory frameworks, provision of investment incentives, topographical influence and availability of renewable resources, including opportunities for electricity export, are key determinants of FDI in hydropower and renewable power plants. Policy that promotes FDI in hydropower are also an important factor.

Rapid industrial growth, power-hungry industries and national energy transition plans in neighbouring countries such as China, Thailand and Viet Nam have also motivated companies from these home countries to invest in power export and to secure their cross-border energy supply. The ASEAN power grid arrangement has further facilitated renewable power export from the Lao PDR to Singapore through transmission lines in Malaysia and Thailand.

Public-private partnerships have facilitated investment in electricity generation and transmission in the Lao PDR. Asian investors from ASEAN (mostly Thai companies) and China are the two largest sources in energy generation. China Southern Power Grid manages a large part of the country's transmission grid under a 25-year concession, through a joint-venture company in which it holds the majority stake. MNEs from Japan and the Republic of Korea are also active investors in power generation, mainly in hydropower and in plants linked with export markets.

In addition to energy and utility MNEs, international finance institutions and banks are playing a major role in power development in the country. They provided international project finance to support power projects sponsored by MNEs (mostly from their home countries). These banks included Bangkok Bank (Thailand), China EXIM Bank, EXIM Bank of Thailand, Siam Commercial Bank (Thailand) and EXIM Bank Viet Nam. Chinese banks are also providing financing facilities to power plants linked with the Belt and Road Initiative. For instance, China State-owned banks (e.g. China Development Bank and China Construction Bank) are issuing funds to a cascade of Nam Ou power projects and other power plants.

Source: WIR 2023.

An increasing number of MNEs that have manufacturing facilities in ASEAN are investing in the installation of renewable technologies such as solar panels to generate electricity for their own industrial needs. These MNEs include Applied Materials (United States); Bridgestone, Hitachi Automotive, Subaru and UD Trucks (all Japan); and Nestle (Switzerland), among others (box 5).

Box 5. Manufacturing MNEs with solar power generation facilities in ASEAN (Selected cases)

More manufacturing companies in ASEAN are installing solar panel systems at their factory sites, driven in part by their commitment towards energy transition, including to reduce electricity cost.

Facebook (United States) signed a 20-year agreement with Sembcorp (Singapore) in 2018 to support Facebook's Singapore operations, including its new data centre, with renewable power through offsite solar panels installed on almost 900 rooftops in Singapore. In 2020, Facebook signed a power purchase agreement with Sunseap (Singapore) to build and use solar panels on the rooftops of 1,200 public housing blocks and 49 government buildings. Facebook's renewable energy deals are part of its commitment to shift to using 100 per cent renewable energy.

GlobalFoundries (United States) broke ground in June 2021 in Singapore on expansion of its advanced semiconductor fab facility with state-of-the-art environmental performance and sustainable operation, which includes rooftop solar panels to help with the building's energy needs.

Intel (United States) invested $1.1 million in a solar panel system in its Viet Nam facility in 2012. In 2020, it installed rooftop solar panels in its Malaysia facilities. By 2021, those solar panels generated 4.1 MW in total installed capacity that powered six buildings across the company's Kulim and Penang campuses.

Keysight Technologies (United States) is generating solar power at its largest plant in Penang, Malaysia. Solar panels cover the rooftops of all eight buildings at the Bayan Lepas site, generating approximately 7.9 million kilowatt-hours of energy annually, which is more than 16 per cent of the total current annual consumption at the site.

Lixil (Japan) installed a 5 MW solar panel on a subsidiary's factory in Thailand, which manufactures about 30 per cent of the company's aluminium building materials. Following the installation, the subsidiary's renewable energy consumption ratio will be 8.5 per cent. The company aims to become carbon neutral by 2050.

Microsoft (United States) agreed to buy 100 per cent renewable output from a Sunseap (Singapore) 60 MW solar project. The 20-year agreement was signed in 2018. The project covers hundreds of rooftops in Singapore and focuses on serving demand from data centres. The agreement brings Microsoft's total global direct procurement in renewable energy projects to 860 MW.

MinebeaMitsumi (Japan), a major manufacturer of bearings, motors and sensors, installed solar power generation systems provided by Sharp Energy Solutions (Japan) on the roofs of two production sites in Thailand in 2021. Its operation in Thailand accounts for more than 30 per cent of the company's global production.

Nike (United States) is installing additional photovoltaic modules provided by TotalEnergies (France) and ENEOS (Japan) at a sports shoe factory in Viet Nam. The additional installation will increase its capacity to 7.5 MW peak. TotalEnergies and ENEOS will fully fund, install and operate the system, and Nike will pay for the electricity generated for 20 years.

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Box 5. Manufacturing MNEs with solar power generation facilities in ASEAN (Selected cases) (Concluded)

Smiths Detection (Australia), a provider of threat detection and security inspection technologies, completed the installation of 1,856 solar panels on the roof of its manufacturing site in Johor Bahru, Malaysia in November 2022. Electricity generated from the panels provided the site with up to 25 per cent of its annual energy needs, saving more than $92,000 a year in electricity costs.

Sumitomo Rubber Industries (Japan) started installing a 100,000 square-meter rooftop solar power array and a gas cogeneration system at its plant in Thailand in March 2023. The plant will also receive green electric power from Kansai Energy Solutions (Thailand), a wholly owned subsidiary of Kansai Electric Power (Japan)). Total output of the solar power installation is estimated to be about 22 MW – starting in January 2025 – which could power more than 2,700 homes.

Source: ASEAN Investment Report 2023 research, press releases and media.

EV and EV battery manufacturers

Many major EV manufacturers and new entrants have set up plants in the region to produce EVs and batteries. The electrification of the transportation sector, including logistics and ride-hailing services, is a major component in the energy transition (IRENA, 2022b). In Indonesia, ride hailing companies Grab and GoTo have started to use electric motorbikes in their ride-hailing and delivery service operations. Unicorn start-up Sicepat (Indonesia) is involved in the development of electric motorbikes. Dat Bike, Viet Nam's first domestic producer of electric motorbikes, is investing in technology development and battery packaging. Sleek EV, a Thai-Singaporean manufacturer of electric motorcycles, launched two models in Thailand in mid-2023. In their electrification drive, local transportation companies are partnering with MNEs for product development and access to technologies. Sleek EV is also partnering with Bosch (Germany) on electric motorcycle development.

The availability and easy accessibility of EV charging stations encourage the adoption and use of EVs. Oil and gas companies are capitalizing on their gas station networks in some Member States through investment in EV charging stations. Examples include Shell (United Kingdom) in Malaysia and Chevron (United States) in Singapore. New actors are also entering the charging station business segment, in part because charging infrastructure in the region is insufficient.

Eco-industrial parks

Several ASEAN Member States (e.g. Malaysia, Singapore, Thailand, Viet Nam) are developing eco-industrial parks, transforming existing industrial parks into eco-industrial facilities. For instance, Viet Nam introduced Decree 35/2022/ND-CP in 2022 to attract FDI in the development of such parks. The decree introduced guidelines and criteria for approval of eco-industrial park projects and granting of incentives. Sembcorp (Singapore) in March 2022 started the third expansion of the Vietnam–Singapore Industrial Park in Binh Duong with a 50-hectare onsite solar farm offering green electricity. In 2023, Becamex IDC (Viet Nam) and Sembcorp agreed to jointly develop five eco-industrial parks in Viet Nam.[8]

5.3.6. Key drivers

International investment in the energy transition in ASEAN will continue to grow. Key drivers include the rising demand for renewable energy. National and corporate commitments to carbon neutral and net zero emission are instrumental for the energy transition (box 6). Regional integration and regional power pool arrangements that facilitate cross-border renewable electricity trade will continue to play a crucial role.

Box 6. Banpu, Thailand: Transitioning from coal to green energy

Banpu (Thailand), one of the largest coal mining MNEs in Thailand, is a significant integrated energy company. It generated $7 billion in revenue in 2022, 67 per cent from coal, 22 per cent from gas, 10 per cent from power generation and the remaining 1 per cent from other businesses. Since 2015 it has rapidly diversified into green and renewable energy, while reducing the contribution of coal to its revenue generation. The group operates in three core energy businesses: energy resources (coal mining and gas exploration), energy generation (thermal including coal and renewable) and energy technology (solar rooftop and floating, energy storage system, e-mobility, energy management and trading). It has investments in different energy business portfolios in several other countries (e.g. Australia, China, Indonesia, Japan, the Lao PDR, Mongolia, the United States and Viet Nam).

Key drivers towards its energy transition include host- and home-country policy on net-zero emissions. These national energy transition plans have significantly influenced Banpu to move its investment towards green and renewable energy. The company is expanding investment in gas-fired and renewable power plant in new markets with high growth potential such as in the United States, ASEAN and locations where it already has a presence. Other key factors in its transition path have included host-country policy towards investment in green energy, as well as market potential and robust industrial growth with an associated rapid increase in energy demand. These factors also underscore why Banpu has been increasing investment in renewables in mature markets such as Australia and Japan and in gas in the United States. Other factors that have played a major role encouraging Banpu to invest in neighbouring countries such as the Lao PDR include investment opportunities, availability of renewable resources and export market potential.

Aligning with its transition plan, the company no longer invests in new coal assets overseas. It launched a five-year business plan in 2021 to accelerate its energy transition by expanding into green energy portfolio. Revenue from coal declined from more than 90 per cent in 2017 to 82 per cent in 2020, 70 per cent in 2021 and 67 per cent in 2022. The company plans to increase revenue from green and renewable activities to 50 per cent by 2025. Revenue from renewable power projects abroad and the energy technology business is expected to contribute 20 per cent, the gas business in the United States another 20 per cent and conventional power plants the remaining 10 per cent. Between 2017 and 2021, some 90 per cent of Banpu's $2 billion investment expenditure was in non-coal activities. The company has been acquiring renewable assets overseas, including gas shales in the United States. In power generation, it operates wholly owned and joint-venture plants, mostly overseas. Some 92 per cent of its $100 million in profit from power generation in 2021 came from overseas joint-venture operations.

Source: UNCTAD, based on information from Banpu.

5.3.7. Policy support

A favourable policy environment for investment in energy transition is important. Private participation, including international investment, is strongly reflected in ASEAN Member States' energy transition policy and plans (table 6). Member States are providing investment incentives to encourage FDI in renewables. Some provide incentives to consumers to switch to EV, thereby stimulating demand and encouraging FDI in the automotive and related equipment industry.

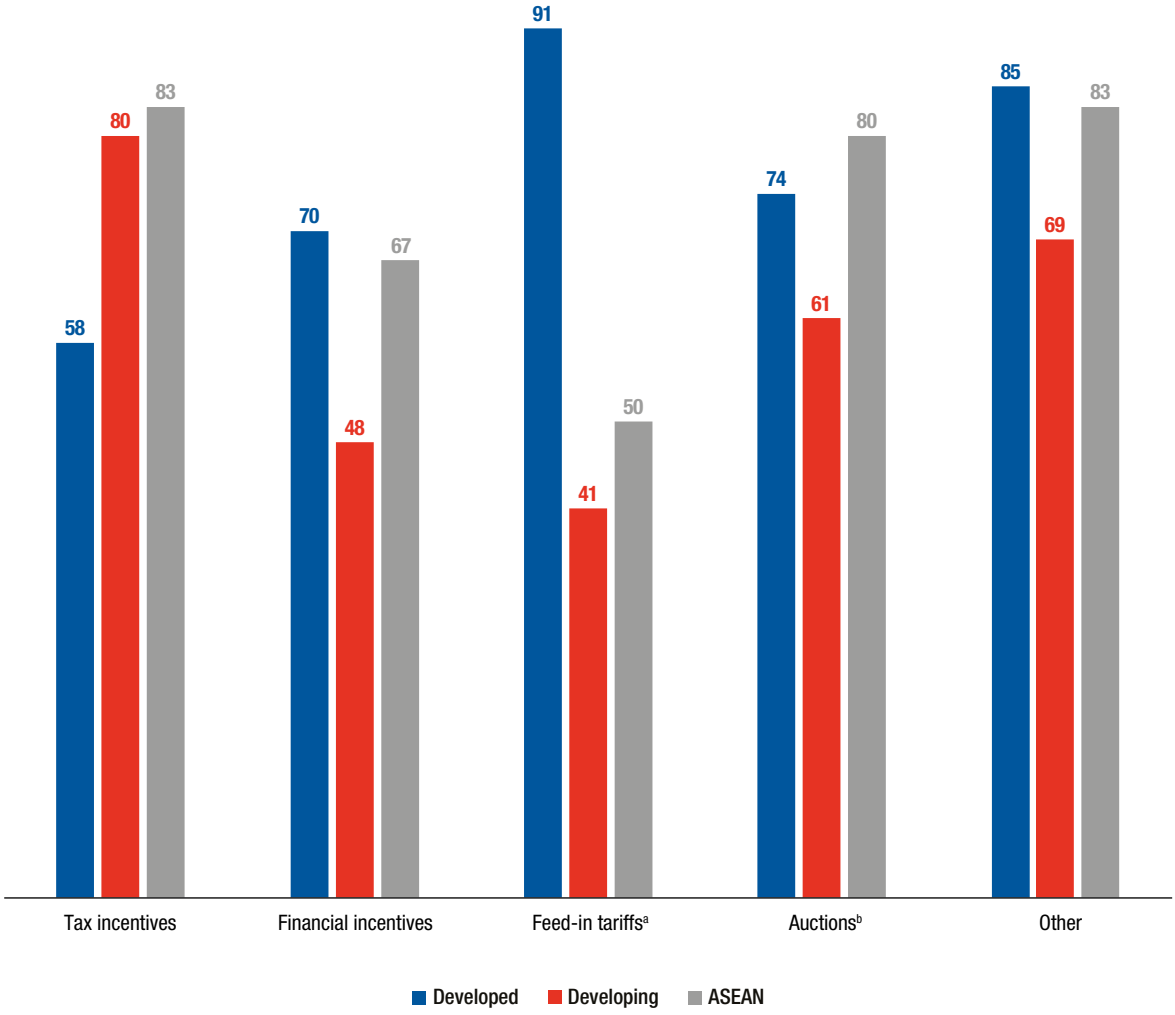
The ASEAN Plan of Action for Energy Cooperation 2016–2025 set an aspirational target to increase the share of the renewable energy component in the ASEAN energy mix to 23 per cent by 2025. Investment promotion policies in the renewable energy sector play a crucial role in realizing this objective. All Member States have laws or policies that include renewable energy provisions.[9] To promote private investment in the energy sector, ASEAN countries have adopted a wider range of policy instruments than found in other developing countries (figure 28). Over 80 per cent of ASEAN countries with private investment promotion instruments have adopted tax incentives, specifically profit-based incentives and reduction of indirect taxes and duties, to promote investment in renewable energy.

Table 6. ASEAN: Policy encouraging private sector participation in national energy plans (Selected cases)

Country	National plan/policy	Remarks
Indonesia	Electricity Business Plan (RUPTL), 2021–2030	Of the total 40.6 GW of planned additional capacity, 65 per cent is earmarked for development by independent power producers and PLN will be responsible for the remainder. The private sector is to build a significant share of the renewable capacity.
Lao PDR	Policy on Sustainable Hydropower Development (2015) and Law on Investment Promotion (2016)	Promotes private investment in hydropower plant development through concessions, power purchase agreements, permitting of exports of hydropower-generated electricity, 100 per cent foreign equity ownership and provision of investment incentives.
Malaysia	National Energy Policy 2022–2040	Promotes private sector participation in driving the energy transition, including attracting new energy technologies or innovations. Also promotes public-private partnership for developing large energy infrastructure to meet growing national energy demand.
Philippines	National Renewable Energy Program 2020–2040	Identifies renewables investment opportunities, incentives and financing options and programs for the private sector and end users.
Singapore	Singapore Energy Transition Plan	Involves concerted action from various stakeholders, including industry, the Government and the public, as well as international cooperation.
Thailand	National Energy Plan 2022	In the process of adoption. The plan includes the participation by the private sector in energy development and transition.
Viet Nam	Power Development Plan 8 (2021–2030)	Encourages private sector participation and investment.

Source: Government websites and media.

Figure 28. Prevalence of private investment promotion instruments, by type of instrument (Per cent of countries)



Source: UNCTAD, based on Climate Change Laws of the World database.
[a] Feed-in tariff and auctions data are based on a larger sample (194 countries).
[b] Other includes quota-based instruments, guarantee schemes and business facilitation.

ASEAN Member States have put in place policies to attract FDI in renewable energy and related infrastructure. Major elements of the policies include wholly owned foreign equity ownership, investment incentives such as income tax holidays and land ownership tenure (table 7). In addition to traditional instruments such as fiscal and financial incentives, Member States have also implemented more targeted measures such as business facilitation and renewable energy auctions. More than half have implemented feed-in tariff schemes to promote renewable energy, exhibiting a greater prevalence than in other developing economies. These schemes have played a key role in increasing the solar and wind power capacities in the region.

Table 7. ASEAN: Key FDI elements for attracting renewable energy projects

Country	Foreign equity ownership (Per cent)	Investment incentives	Feed-in tariff (FIT)	PPP/PPA	Land acquisition	Remarks
Brunei Darussalam	..	..	..	..	..	..
Cambodia	49	✓	..	✓	Subject to regulation	Only a Cambodian national may own land. A locally registered entity can own land if deemed to have Cambodian nationality.
Indonesia	100	✓	✓	✓	✓	Various scales of foreign equity ownership: Small-scale power generation (1–10 MW) projects, maximum equity ownership of 49% Larger-scale (> 10 MW) projects, 95% foreign equity ownership Public-private partnership scheme during concession period, 100% are allowed Land acquisition is allowed under certain conditions. FITs and PPAs are subject to negotiation.
Lao PDR	100	✓	✓	✓	✓	The Government promotes renewables development through FITs and PPAs. Land tenure or acquisition depends on the project.
Malaysia	49	✓	✓	✓	✓	49% foreign equity restriction required to benefit from FITs.
Myanmar	100	✓	..	✓	✓	In accordance with the Myanmar Investment Law (MIL) and Myanmar Special Economic Zone (SEZ) Law, Myanmar provides exemptions or reliefs on income tax, customs duties and other internal taxes for renewable projects. Foreign investors also have the right to land use for 50 years and for two consecutive of 10 years under the MIL.
Philippines	100	✓	✓	✓	✓	FIT for all renewables (solar, wind, hydro, biomass) but suspended, subject to review.
Singapore	100	✓	✗	✓	✗	Mostly focused on solar projects and renewable energy imports. Limited land availability impedes large-scale solar deployment. Financial support for renewables and improving energy efficiency. Does not provide subsidies such as FITs or utilize net metering.
Thailand	100	✓	✓	✓	✓	Differentiated FITs for different types of renewable energy and project capacity.
Viet Nam	100	✓	✓	✓	✓	All renewable energy projects may be entitled to land rental exemption for up to three years during construction.

Source: *ASEAN Investment Report 2023* research.
Note: FIT = feed-in tariff, PPP = public-private partnership, PPA = power purchase agreement.

5.3.8. Challenges

There are major challenges to promotion of investment in the energy transition. First, the investment need and investment gap are both huge and must be addressed. Mobilizing and channelling investment from all stakeholders to renewable energy will be daunting. Second, limited access to funding and international investment, higher risk profiles and higher cost of capital, lack of institutional capacity and skills, and lack of bankable projects pose additional challenges. Third, feed-in tariffs are not standardized, which creates uncertainties. Fourth, the use of tax incentives to attract energy transition investment needs to be reviewed in light of the international minimum tax reform. There are also other challenges, summarized in table 8.

The demand for electricity from renewable sources is growing, particularly from industry and the transportation sector – the two largest energy consumers. The region has untapped potential for renewable electricity generation, and a huge investment is needed to achieve renewables targets. The private sector, domestic and international, can play a role in the transition.

International investment in energy transition in ASEAN is on an upward trend – part of the reason for the high levels of FDI in the region witnessed in recent years. This growing interest in energy transition will continue to help the region attract sustained high investment inflows in the next decade; yet, capturing high levels of energy transition FDI is not automatic.

Critical challenges remain. Efforts are needed to further improve the investment environment with FDI policy that targets the entire renewable energy supply chain. Understanding the role of different actors and the key investment drivers, including the need to lower capital costs, is important. In addition to traditional energy investors, new actors are emerging across much of the renewable supply chain as significant sources of investment and suppliers of technologies.

As with electronics, a strategy to attract lead firms that in turn influence their major and lower-tier suppliers to the region can help build a competitive energy transition ecosystem – further strengthening the investment environment. As with promoting EVs to automotive consumers through incentive packages, efforts to promote investment in renewable technologies and installation of solar panels at manufacturing sites could be a way forward to cope with renewable energy demand from industries and to attract related equipment manufacturers.

More efforts are needed to attract investment in building charging stations across ASEAN. Engaging participation by the private sector, including international investment, in developing eco-industrial parks or eco-SEZs and greening data centres across the region can help achieve the region's energy transition targets. Generation and supply of renewable electricity to these places or industrial facilities should be part of national transition plans. Enhancing the regional power pool and regional cooperation on cross-border trade of renewable electricity is crucial for the energy transition and supporting regional industrial connectivity as well as facilitating regional integration.

Table 8. Investing in sustainable energy for all: key challenges

FDI trends	
Geographical concentration	Despite strong growth in international investment in renewable energy at the global level, many developing countries are lagging behind.
Sectoral and supply chain concentration	International investment focuses very much on renewable energy generation and much less on other sectors that are crucial for the energy transition.
Investment paradoxes	The pipeline of new investment projects in fossil fuels is still flowing and will for another two decades or more, with asset lifetimes exceeding 30 years.
Project finance trends	
Reliance on international investors	FDI plays a significant role in renewables projects worldwide, but more so in those countries most in need of and least attractive to international investors.
Cost of capital constraints	The high cost of capital in countries in debt distress or with high risk ratings is a strong disincentive for investors to shift towards renewable energy assets.
Insufficient and unbalanced support	International support mechanisms are crucial to catalyse investment; a relatively low share of support reaches countries with low access to electricity.
Investment policy trends	
Weak investment planning in NDCs	Nationally determined contributions and energy transition strategies in many countries do not provide a sufficient basis for effective investment promotion.
Generic investment promotion tools	Developing countries and especially LDCs rely to a large degree on investment promotion tools not designed specifically to support the energy transition.
Old-generation IIAs	Unreformed IIAs can hinder the implementation of measures needed for the energy transition.
Capital market and sustainable finance trends	
Sustainable finance momentum	Climate finance slowed in 2022, trends in energy markets caused a shift in investment portfolios back to fossil fuels and greenwashing concerns remain.
Institutional investor inertia	A majority of the world's largest funds do not yet disclose or commit to net zero in their investment strategies.
Low coverage of carbon markets	More than three quarters of global emissions are not yet covered by carbon markets, and the spread in the price of carbon across markets is too wide.

Source: *WIR 2023.*
Note: IIAs = international investment agreements, LDCs = least developed countries, NDCs = national defined contributions.

5.3.9. Policy options: Attracting energy transition investment

The investment need for the energy transition in ASEAN is enormous, and FDI can play a role in financing the investment requirement. Enhancing the role of FDI in the energy transition could be set as a priority for policy consideration. FDI can lead to the generation of green electricity to meet industrial and transportation demand, including development of eco-industrial parks and greener data centres – all of which can contribute to meeting the region's energy transition targets and individual nationally determined contributions under the Paris Agreement.

The following specific policy suggestions could be considered:

Renewable investment policy and bankable projects

Make investment policy more conducive to supporting the energy transition. This could include greater use of investment facilitation to provide investors with information on investment opportunities and to encourage the development and marketing of bankable projects. ASEAN has significant untapped potential for solar, wind, hydropower and other renewable sources to power electricity. International investment can bring technologies and capital to unleash this potential.

Regional energy pool and trade

Strengthen cooperation on a cross-border and regional energy pool to support scalability, lowering risks and lowering the cost of capital. This can help make the region more attractive for energy transition investment, including FDI in manufacturing renewable equipment and parts (e.g. solar panels and wind turbines).

Cost of capital

Reduce the capital cost of projects by involving and partnering with MDBs. The *World Investment Report 2023* established that projects that have participation by MDBs tend to have lower borrowing costs. In addition, international investors can often access cheaper finance, lowering the cost of capital for projects.

Aligning IIAs and treaty making to energy transition objectives

Make international investment agreements (IIAs) and treaties more conducive to the energy transition. As discussed in section 4.3, most old-generation IIAs are not aligned with energy transition objectives. They lack clauses that proactively support low-carbon energy investment. Many investor–State dispute settlement cases have challenged policy measures of direct relevance to climate action. Investors in the fossil fuel sector have been frequent claimants, initiating more than 200 cases (*WIR 2023*). Some specific policy recommendations elaborated in section 4.3 included the use of the UNCTAD IIA toolbox, which focuses on (i) promotion and facilitation sustainable energy investment, (ii) technology transfer and diffusion, (iii) right to regulate for climate action and the energy transition, and (iv) corporate social responsibility.

Action compact

Consider adopting an action compact for investment in sustainable energy for all, which includes establishing guiding principles and establishing design criteria for investment strategies, policies and treaties (figure 29).

Figure 29. Global Action Compact for Investment in Sustainable Energy for All

Source: WIR 2023.

Note: See UNCTAD's Investment Policy Framework for Sustainable Development for detailed national and international investment policy guidance and UNCTAD's Action Men for Investment in the SDGs for more action packages. DFI = development finance institution, IIA = international investment agreement, LDCs = least developed countries, NDCs = nationally determined contributions, PPP = public-private partnership, SEZ = special economic zone, SIDS = small island developing States.

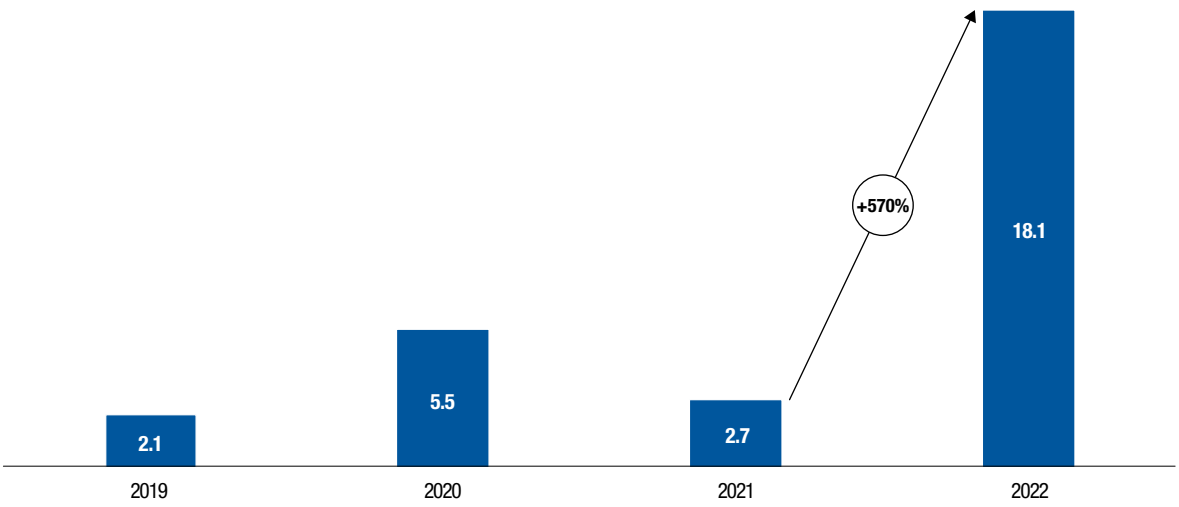
5.4. FDI IN THE EV SUPPLY CHAIN

This section analyses the key features, investment, players and policy developments in EVs and in the context of the energy transition in ASEAN. International investment[10] in EV sectors in ASEAN surged to $18 billion in 2022, growing sixfold from the previous year (figure 30); however, such investment is concentrated in a few locations. The rise spanned supply chain segments (upstream, midstream, downstream), reflecting robust investor interest.

Upstream investment concentrates on securing critical minerals, primarily in Indonesia – the world's largest producer of nickel and second largest producer of cobalt (both are key minerals for manufacturing batteries). The 2020 export ban on nickel by Indonesia drove significant investment in processing and smelting operations in past years. In 2022, a few Chinese companies invested in nickel smelting and mining projects in Indonesia. They included Ningbo Brunp Contemporary, Zhejiang Huayou Cobalt, Sunwoda Electronic and Zhejiang Weiming. Other players, such as Britishvolt (United Kingdom) and Porsche Automobile Holding (Germany), are also involved in nickel-related activities in Indonesia.

FDI in EV manufacturing mostly occurs in Indonesia, Malaysia and Thailand (the traditional regional automotive hubs) with some in other Member States (e.g. the Philippines and Viet Nam). MNEs in different industries invest in downstream activities (e.g. charging infrastructure) across the region. Some are investing in R&D in several Member States, including in Singapore. Investment from MNEs is oriented towards deepening a foothold in the region and building an integrated supply chain network. International companies, including new entrants and start-ups, play vital roles.

Figure 30. ASEAN: international investment in EV-related sectors, 2019–2022 (Billions of dollars)



Source: UNCTAD.
Note: Covers mostly mining of critical minerals (nickel and cobalt), battery production and EV manufacturing.

5.4.1. Key actors

ASEAN's EV landscape features diverse players: traditional automotive OEMs, specialized EV OEMs, technology companies, mining and energy MNEs, specialized battery manufacturers and other newcomers.

EV manufacturers

Traditional automotive and EV OEMs integrate vertically and horizontally, spanning EV assembly and battery and parts production in different Member States. Some also invest in mining and smelting of critical minerals or establish EV charging networks (e.g. Hyundai (Republic of Korea), Mercedes Benz (Germany) and Nissan (Japan)). Toyota (Japan) plans to produce diverse EV models in Indonesia.[11] Major automotive OEMs in Thailand are also involved in battery production (e.g. battery packing). Honda Automobile, Toyota Motor and Nissan Motor (all three Japan) are producing hybrid EVs in that host country. Some OEMs have partnered with other battery suppliers or with their subsidiaries in Malaysia and Thailand to secure batteries for their hybrid EV production. In Thailand, they include Mercedes-Benz and BMW (both Germany).

Several OEMs are expanding across multiple locations in the region. Mitsubishi (Japan) and Volvo[12] (Sweden) exemplify this trend (box 7). Hyundai (Republic of Korea) invests in nickel processing and is establishing an EV battery and assembly plant in Indonesia. BYD (China),

Box 7. Regional expansion by traditional automotive OEMs in ASEAN

Traditional automotive OEMs are expanding or upgrading manufacturing facilities for EV production across ASEAN, establishing plants in multiple Member States. Some invest in both upstream (mining) and downstream (batteries, EV parts and charging infrastructure) segments. In 2023, *Ford* (United States) entered a $4.5 billion deal with Vale (Brazil) and Zhejiang Huayou Cobalt (China) to construct a nickel processing plant in Indonesia and upgraded assembly facilities in Thailand and Viet Nam to bolster its supply chain.

Mercedes-Benz (Germany) and local partners set up a battery production facility and expanded a Thai plant in 2019. It also upgraded facilities in Malaysia for hybrid electric vehicles (HEV) and EV production. EV production began in Thailand in 2022, followed by Malaysia in 2023, accompanied by installation of a regional EV charging network.

Nissan (Japan) built an EV hub in Thailand in 2019 through an initial investment of $353 million for hybrid e-power vehicle production and $15 million for battery assembly. It partnered with the Thai Provincial Electricity Authority in 2022 to develop EV charging services in the country. The partnership included research, testing and innovations related to an EV charging station service and application. Nissan has also partnered with the Electricity Generating Authority of Thailand since 2021 to develop and install EV charging stations, including creating a platform and developing an EV information network.

Toyota (Japan), operating multiple factories across ASEAN, upgrades plants for HEV and EV production. It invested $65 million in HEV production in Malaysia in 2021 and announced in 2022 a $1.8 billion plan for EV production in Indonesia. In 2022, the company signed an agreement with the Government of Thailand to promote EVs.

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Box 7. Regional expansion by traditional automotive OEMs in ASEAN (Concluded)

Volvo (Sweden), under Geely Automotive (China), began assembling the all-electric XC40 Recharge model in Malaysia in 2022. The model is also exported to Indonesia and Thailand. In 2023, Volvo Thailand introduced prototype solar carport charging stations at four dealerships.

Source: Company websites and media.

with one production facility in Thailand, is establishing a second facility in another Member State and has invested $114 million in a showroom network in Malaysia. Ford (United States) invested $82 million in Viet Nam in 2020 and $900 million in Thailand in 2021 to upgrade manufacturing facilities; in 2023 the company is investing in critical minerals processing in Indonesia. Volkswagen (Germany) established a regional parts distribution centre in Malaysia in 2021 and plans to get involved in the EV supply chain in Indonesia. Specialized EV OEMs such as Tesla (United States) and Chinese manufacturers continued expanding in the region. Industrial MNEs such as ABB (Switzerland) and Bosch (Germany) are focusing on battery components and charging infrastructure development.

Diverse new entrants are investing in specific supply chain segments, often through partnerships. These entrants include electronics manufacturers and start-ups. For instance, Delta Electronics (Taiwan Province of China), a contract manufacturer, is collaborating with Nissan (Japan) to develop an EV charging system in Thailand. Shell (United Kingdom) is teaming up with ABB (Switzerland) on EV station installation across Indonesia, Malaysia, Singapore and Thailand. StoreDot (Israel) is partnering with VinFast (Viet Nam) for a rapid-charging EV battery system in Viet Nam, and Porsche (Volkswagen group) with Evolt (Thailand) to develop charging stations in Thailand in 2022. Keppel (Singapore) is joining forces with Gentari (Malaysia) to explore EV investment prospects, including building charging infrastructure in Malaysia.

Top 10 EV manufacturers

The presence in ASEAN of the top 10 EV manufacturers[13] is a significant indicator of the swift increase in EV investment in the region (table 9). Their expansion influences both suppliers and competitor MNEs to invest in the region. Their actions highlight two notable investment trends:

(i) Ongoing investment from traditional automotive OEMs with established production hubs in the region (mostly MNEs from Japan, Europe and the United States).

(ii) Recent investments from Chinese and Korean MNEs, relatively new entrants. These MNEs have entered ASEAN and rapidly scaled up compared with the traditional MNEs. Geopolitical tensions, supply chain strategy for upstream access and EV market expansion objectives drove their internationalization to ASEAN.

Traditional automotive OEMs predominantly invest in EVs in locations where they already have substantial production facilities. This strategy leverages synergies, clusters and company experience. These OEMs invested to upgrade or expand facilities to produce hybrid EVs ahead of MNEs from China and the Republic of Korea.

Table 9. Top 10 global EV manufacturers expanding in ASEAN

Name	Nationality	EV supply chain segments: Critical minerals	Battery	EV production	Charging stations	R&D	Investments in 2022–2023 (Selected cases)
BYD	China	..	..	✓	✓	..	Started construction of a $491 million EV factory in Thailand. Announced plan to build a $250 million EV component factory in Viet Nam and a second EV production facility in another member State, and to install 200 EV charging stations in Cambodia.
Tesla	United States	..	✗	✗	planned	..	Signed a $5 billion nickel mining contract with mining companies in Morowali, Indonesia. Planning to open a head office and a Tesla experience and service center in Malaysia in 2023.
VW Group	Germany	✓	✓	✓	✓	..	Partner with Vale (Brazil), Ford (United States) and Zhejiang Huayou Cobalt (China) in developing an EV battery ecosystem in Indonesia. Volkswagen group member Porsche and Shell partner to establish charge points at some Shell stations in Malaysia.
GM, including Wuling	United States, China	✗	✓	✓	✗	..	Signed an agreement with the Indonesian Government to invest in the Battery-Based Electric Vehicles project and battery production. SAIC-General Motors Wuling launched the production of Wuling Air EV in Indonesia in 2022.
Stellantis[a]	Netherlands	✗	✗	planned	✗	..	Acquired Naza Automotive (Malaysia) manufacturing plants in Malaysia to be its ASEAN hub.
Hyundai Motor	Republic of Korea	✗	✓	✓	✓	✓	Broke ground on a $1.1 billion joint venture to produce nickel, cobalt, manganese and aluminium lithium-ion battery cells with LG Energy (Republic of Korea) in Indonesia. LG Energy has a $3.5 billion smelter facility producing nickel sulfate in Indonesia. Inaugurated a $1.5 billion manufacturing plant in Indonesia to produce BEVs and EVs. Launched its first EV charging station network in Indonesia in 2023 and plans to expand R&D in Indonesia. Subsidiary Hyundai Mobis invested $60 million to manufacture battery systems in Indonesia for its flagship EV models.
BMW	Germany	✗	✓	✓	✓	..	Produce hybrid EVs and batteries in Thailand. Plans to establish a regional headquarters for EV production in Thailand in 2024. Partners with Shell to develop EV charging facilities at Shell service stations in Malaysia.
Geely	China	✗	✗	..	✗	..	Subsidiary Volvo (cars) started assembling EV SUVs in Malaysia in 2022, exporting them to Indonesia and Thailand and planning to also cover the Philippines and Viet Nam.

/...

Table 9. Top 10 global EV manufacturers expanding in ASEAN (Concluded)

Name	Nationality	EV supply chain segments					Investments in 2022–2023 (Selected cases)
		Critical minerals	Battery	EV production	Charging stations	R&D	
Mercedes-Benz	Germany	⊗	✓	✓	✓	⊗	Started production of EVs in Thailand in 2022. Installed more than 120 charging stations in Thailand in cooperation with related government agencies (i.e. Electricity Generating Authority of Thailand) and fast-charger facilities in Malaysia.
R-N-M Alliance	France, Japan	⊗	..	..	..	⊗	Mitsubishi is investing $667 million over 2022–2025 to produce EVs and battery in Indonesia and has invested $160 million to upgrade production facilities to produce EV batteries and hybrid EVs in Thailand. It is investing in EV charging stations in Thailand and plans to build a $250 million plant in Viet Nam, which will include EV production. Nissan expanded with its dealers the charging infrastructure network for the Nissan Leaf in the Philippines in 2021.

Source: EV Volumes, "Global EV sales for 2022", company websites, industry news and media..
Note: EVs = electric vehicles, SUV = sports utility vehicle.
[a] Stellantis is a member of the PSA Group including Peugeot.

Emergence of EV OEMs from China

Major EV OEMs from China have directly invested in ASEAN within the last five years, focusing on EV and battery production. BYD engages in EV and EV components production as well as in charging stations in ASEAN. In 2023 in Thailand, Dongfeng Motor started production of EV sports utility vehicles (SUVs), Hozon Auto initiated its first overseas plant with Bangchan General Assembly (Thailand) and Great Wall Motors finalized a $30 million investment for a battery pack assembly plant. Great Wall Motor acquired GM's Thailand plant in 2020, investing $650 million to transform it into a regional production centre for EVs and hybrid cars. Nio, listed on the Singapore Exchange in 2022, announced plans for an R&D centre in that country for artificial intelligence and autonomous driving. In 2023, GAC launched a $14 million completely knocked-down project in Malaysia with WTC Automotif (Malaysia); it is also committed to produce EVs in Thailand. Also in Thailand, SAIC initiated a $15 million industrial park in 2023 to expand its EV capacity in ASEAN. The investment includes a factory for battery modules and other EV components. Chery announced in 2022 a $1 billion investment for EV and battery production, and R&D facilities in Indonesia. Changan invested an initial $285 million in 2023 for HEV, EV and battery production in Thailand.

Previously Chinese EV OEMs had entered ASEAN through partnerships with domestic companies to assemble completely knocked-down and semi knocked-down units, using their partners' assembly plants (European Trade Union Institute, 2017). Chery assembled completely knocked-down units with Thai Yarnyon and CP (Thailand), and partnered with its affiliate Chery Alado (Malaysia), which has an assembly line at the Oriental Assembler plant in Malaysia. Changan Berjaya Motor (Malaysia), is assembling its M201 model at the assembly plant of Berjaya Motor (Malaysia). In Viet Nam, Changan partnered with Vietnam Engine and Agricultural Machinery (VEAM) for knocked-down production at VEAM's facility.

EV battery producers

Prominent battery production MNEs encompass the following types of players:

(i) Global automotive MNEs: e.g. Nissan, Toyota (both Japan), BMW and Mercedes-Benz (both Germany), SAIC (China), and Hyundai (Republic of Korea)

(ii) Specialized battery manufacturers: e.g. CATL, Chengxin Lithium Group (both China) and LG Energy Solution, Samsung SDI, SK Nexilis (all three Republic of Korea)

(iii) New entrants with specific expertise: e.g. TÜV SÜD (Germany), a standards and testing company, and major electronics contract manufacturers such as Foxconn and Delta Electronics (both Taiwan Province of China)

Top 10 global EV battery manufacturers

Nine of the top 10 global EV battery manufacturers, representing more than 90 per cent of global EV battery sales, are present in the region. They mainly operate in Indonesia, Malaysia, Thailand and Viet Nam. Their recent investments in ASEAN involved expansion of battery production and battery pack facilities (table 10). Most of the top 10 in EV battery production

Table 10. Top 10 global EV battery manufacturers expanding in ASEAN

Company	Headquarters	Global market share by sales volume, 2022 (%)	Facilities in ASEAN	Recent battery investments in ASEAN (Selected cases)	Year	Location
CATL	China	34	Indonesia (first major investment in ASEAN)	Invested in a $6 billion battery project, which includes recycling batteries and mining critical materials with Aneka Tambang (Indonesia) and Indonesian Battery.	2022	Indonesia
				Invested in a $104 million factory for EV battery assembly in a joint venture with Arun Plus (a subsidiary of PTT (Thailand)).	2023	Thailand
				Invested in a special green fund with the Indonesia Investment Authority and CMB International Capital (subsidiary of China Merchant Bank) for the development of the EV battery industry.	2023	Indonesia
LG Energy Solution	Republic of Korea	14	Viet Nam (manufacturing of lithium-ion battery packs)	Invested in a $1.1 billion EV battery cell plant with Hyundai Motor (Republic of Korea) as part of a $9.8 billion deal to develop integrated EV battery facilities in Indonesia.	2021	Indonesia
				Invested in a $3.5 billion smelter to produce nickel sulfate. It announced plans to build a $2.4 billion factory to produce battery precursors and cathodes.	2023	Indonesia
BYD	China	12	Thailand, Viet Nam	Building an EV plant in Thailand and planning a second one in Viet Nam.		
Panasonic	Japan	10	Thailand (alkaline and manganese dry batteries) Indonesia (manganese and lithium batteries)	..	..	..
SK	Republic of Korea	7	Malaysia (EV charging stations) Viet Nam (rooftop solar energy installation and investment in VinFast)	Subsidiary SK Nexilis invested $547 million to set up a copper foil manufacturing facility as part of SK Group's EV supply chain.	2022	Malaysia
Samsung SDI	Republic of Korea	5	Viet Nam (battery manufacturing)	A $1.3 billion EV battery cell manufacturing facility.	2022	Malaysia
CALB	China	4	..	..	..	..

/...

Table 10. Top 10 global EV battery manufacturers expanding in ASEAN (Concluded)

Company	Headquarters	Global market share by sales volume, 2022 (%)	Facilities in ASEAN	Recent battery investments in ASEAN (Selected cases)	Year	Location
Guoxuan	China	3	Indonesia, Viet Nam (battery manufacturing)	Invested in a battery pack plant.	2022	Indonesia
				Collaborating with PT VKTR Teknologi Mobilitas (Indonesia) to develop EV battery packs.	2022	Indonesia
				Invested in a battery plant in partnership with VinES (Viet Nam).	2022	Viet Nam
				Partnering with Nuovo Plus (subsidiary of PTT Group (Thailand)) to establish a battery pack plant.	2022	Thailand
Sunwoda	China	2	..	Established a subsidiary to produce lithium batteries for electronic and electrical equipment for use in EVs.	2023	Viet Nam
SVOLT	China	1	..	Established a subsidiary to build a $30 million battery module pack plant.	2023	Thailand

Source: *Visual Capitalist*, "The top 10 EV battery manufacturers in 2022"; company websites and media.

are from China and the Republic of Korea. Their investments are mostly made to secure raw materials, to strengthen their regional foothold and to be near markets. Some have invested in nickel mining and smelting to secure critical supplies.

Beyond the top 10, other Chinese and Korean EV battery manufacturers also have a significant presence in ASEAN. Eve Energy (China) invested over $400 million in 2022 for a battery plant in Malaysia catering to local manufacturers of electric bikes and power tools, while also supplying batteries for BMW EVs. Other MNEs also engaged in the EV battery supply chain included automotive, chemical and nickel mining companies (table 11).

Table 11. Other investors in EV battery supply chain in ASEAN, 2022–2023

Company	Nationality	Activity	Location	Investment ($ billion)	Year	Reason
Eramet and BASF	France and Germany	Development of HPAL complex for manufacturing of EV batteries and EVs	Indonesia	2.6	2023	Strengthen supply chain linkage.
Gem	China	Nickel project	Indonesia	0.5 (joint venture)	2023	Access critical minerals.
Foxconn	Taiwan Province of China	Manufacturing of EVs and EV batteries[a]	Indonesia	1.7 (initial investment)	2022	Expand regionally into new business activities and strengthen supply chain linkage.
Posco	Republic of Korea	Nickel smelting plant	Indonesia	0.4	2023	Increase capacity for intermediate materials for EV batteries. Plant expected in 2025.
Blackstone Minerals	Australia	Ta Khoa battery metals nickel project	Viet Nam	0.8	2022	Implement nickel refinery project.
Energy Absolute	Thailand	Energy	Malaysia	1.1	2022	Establish joint venture with Computer Forms (Malaysia) for green mobility solutions, including developing energy storage and charging platforms, and producing lithium-ion batteries.
EoCell	United States	Lithium-ion battery manufacturing	Malaysia	..	2022	Partner with Hong Seng Consolidated (Malaysia) to develop a regional manufacturing hub for EV battery and energy storage solutions.

Source: Company websites and media.
Note: EV = electric vehicle, HPAL = high-pressure acid leaching.
[a] Joint venture with Indika Energy (Indonesia).

Other EV parts and components producers

Automotive part and component manufacturers have significantly contributed to the development of a competitive automotive support industry in ASEAN. For instance, Thailand boasts more than 2,200 suppliers, including more than 525 in Tier 1 (65 per cent involving foreign ownership) and about 1,700 in Tier 2 and Tier 3 (70 per cent are owned by Thai operators).[14] Indonesia has at least 1,500 suppliers.

The EV transition presents challenges and opportunities. Although some traditional part and component manufacturers (e.g. for internal combustion engines (ICE) and transmission systems) will be affected when the production of ICE vehicles is phased out, others can adapt their products (e.g. tires, mirrors, brakes) and manufacturing processes for EV production. The evolving landscape provides opportunities for expansion, investment and modernization of plants to meet growing demand. The EV revolution also offers opportunities for new types of manufacturers and technology companies to produce EV-related parts and components (e.g. batteries, battery parts, capacitors) for the growing industry.

Foreign EV part and component companies are investing in ASEAN. Murata (Japan) constructed a multilayer ceramic capacitors factory in Thailand in 2023, crucial for EVs given the need for up to 10,000 capacitors per vehicle.[15] Great Wall Motor (China) is bringing subsidiaries (Mind Electronics, Hycet and Nobo Auto) to Thailand for electronics, power trains and seat parts.[16] SKC (Republic of Korea) is expanding in Malaysia because of the demand for lithium-ion batteries and the availability of materials. Posco (Republic of Korea) is developing a carbon capture and storage project and expanding its steel processing plant in Malaysia to support new business segments such as EVs, batteries and green energy.[17] In 2023, Infineon (Germany) and VinFast (Viet Nam) began setting up a joint application centre in Hanoi for smart mobility solutions.[18]

Other new players

Since 2021, Foxconn (Taiwan Province of China) has collaborated with PTT (Thailand) in a $1 billion project to produce EVs in Thailand. In 2022, it established a joint venture with Indika Energy (Indonesia) to manufacture batteries and EVs in Indonesia.

Start-ups also enter the EV supply chain in ASEAN. Oyika (Singapore), which offers electric scooters with battery swap services, is expanding to Indonesia. Tada (Republic of Korea), a ride-hailing app company, is setting up an electric tuk-tuk factory in Cambodia. TVS Motor (India) is investing in EV start-up ION Mobility (Singapore). Zapp (United Kingdom) established a design studio, prototyping and engineering workshops in Thailand for high-performance EV development. In 2022, City Energy (Singapore) and EV Connection (Malaysia) launched a cross-border app for EV charging stations. Autel Energy (United States) installed two charging stations in Singapore in 2023, extending its reach across the region. Charge+ (Singapore) plans a network of EV charging facilities across 5,000 km in five Member States (Singapore, Malaysia, Thailand, Cambodia and Viet Nam).

Venture capital funds are participating in the EV supply chain in the region. Horizons Ventures (Hong Kong, China) invested $15 million in Ilectra Motor Group (Indonesia) to produce e-scooters. Jungle Ventures (Singapore) invested in Dat Bike (Viet Nam), an electric motorcycle manufacturer. In 2023, Ondine Capital (Singapore), invested $3 million in Swap Energy (Indonesia), a battery-swapping solutions provider for two-wheeled electric vehicles.[19] ADB Ventures (Philippines) signed an agreement to invest in Selex Smart Electric Vehicles (Viet Nam), a manufacturer of electric two-wheeled vehicles and battery packs.

Investors in EV infrastructure

The charging infrastructure in the region is at a nascent stage of development but holds significant growth potential. The number of charging stations is small relative to the potential number of EVs on the road and to figures from Europe or China (table 12). In 2021, Europe had an estimated 375,000 charging stations. A study suggests that the EU-27 will require a minimum of 3.4 million operational public charging points by 2030.[20] China, with 5.2 million public and private charging units in 2022, aims to build even more for an expected 20 million EVs by 2025.[21] Investment in charging infrastructure is attracting different categories of players, from EV OEMs to energy and technology companies, and real estate developers, including start-ups. Further investment in this segment is crucial to support the effective growth of the EV industry.

Many international investments in EV charging infrastructure occur through joint ventures and partnerships, often involving automotive OEMs, energy conglomerates, technology solution providers and local companies. For instance:

- Mercedes-Benz (Germany) collaborates with Petronas Dagangan and EV Connection (both Malaysia) to deploy fast-charging stations in Malaysia.
- ABB (Switzerland) provided technology to the Provincial Electricity Authority of Thailand and Bangchak (a Thai energy company) for the installation of 124 EV fast chargers in Thailand.
- Caltex (owned by Chevron (United States)) established EV charging facilities in Cambodia in 2022.

Table 12. ASEAN: Target number of charging stations, various years (Number)

Country	Number	Target year
Brunei Darussalam	646–3,300	2035
Cambodia	> 10	2022
Indonesia	> 20,000	2025
Lao PDR	..	..
Malaysia	10,000	2025
Myanmar	3,647	2050
Philippines	147,000	2040
Singapore	6,000	2030
Thailand	12,000	2030
Viet Nam	..	..

Source: ASEAN Investment Report 2023 research, based on government websites and media.

- Blue Dot (Lao PDR) and PTT (Thailand) agreed in 2023 to install charging facilities at PTT gas stations in the Lao PDR.
- Pertamina (Indonesia) partnered with Grab (Singapore), which operates more than 8,500 EVs in Indonesia, to foster the EV ecosystem. Hyundai (Republic of Korea) is supporting Grab's electric cars endeavours. Grab also partners with Kymco (Taiwan Province of China) and two domestic motorbike manufacturers in Indonesia.

5.4.2. Policy development

Across most ASEAN Member States, policies endorsing the development of the EV industry are evident, though specifics vary. These policies generally encourage EV adoption, FDI in EV supply chains and investment in EV infrastructure. Policies and measures favourable to investment and programmes supporting EV adoption are important drivers.

Incentives for EV adoption

Most Member States offer purchase incentives, subsidies and reduced excise taxes to stimulate EV adoption. For example, Cambodia reduced the import duty for EVs from 30 per cent to 10 per cent in 2021, about 50 per cent lower than for ICE vehicles.[22] The Lao PDR issued a new policy in 2021 reducing annual road taxes for EVs to 30 per cent lower than for ICE vehicles of equal engine capacity. Myanmar exempts battery EVs (and their batteries) from income tax, commercial tax, special goods tax and other internal taxes, according to the Myanmar Investment Commission[23] and the Ministry of Planning and Finance.[24] Viet Nam exempted the registration fee for battery EVs for the first three years and offers a 50 per cent fee reduction for the next two years.[25]

Incentives to attract EV investments

Many Member States extend incentives to lure investment in various segments of the EV supply chain (table 13). Indonesia is working on a programme to lower electricity tariff charges for charging stations. The Government also reduced tax incentives to restrict investment in lower-quality nickel products, including nickel pig iron and second-class nickel ore processing products, to encourage more high-value downstream investment. Thailand expanded investment incentives for EVs, including for smaller charging stations. It also reduced import duty and excise tax, offers programmes to fast-track the growth of the EV market and streamlined investment project approvals.

Malaysia provides incentives for establishing EV charging stations and is streamlining investment approvals. Singapore adopted a three-pronged approach: provision of tax incentives, establishment of regulations and standards, and deployment of EV chargers. Incentives and grants are provided to investors for a range of EV-related business functions, including R&D, lithium battery development and recycling, manufacturing, and headquarters services. The adoption of EVs and the development of the EV ecosystem in Cambodia and the Lao PDR is at a nascent stage, and both governments are promoting private investment in EV charging stations.

Table 13. ASEAN: EV policies development

Country	EV adoption target (sales)[a]	Subsidy for consumers' EV adoption	EV supply chain segments: Critical mineral (mining smelting)	EV supply chain segments: EV production	EV supply chain segments: EV battery	EV supply chain segments: EV charging network	Foreign wholly owned or majority-owned equity	Remarks
Brunei Darussalam	60% by 2035	..	..	Still developing EV policies and regulations			..	Launched a two-year EV pilot project in 2021 to raise awareness of EV usage.
Cambodia	40% by 2050	..	..	..	..	..	..	Reduced EV import duties since 2022. Developing further incentives. In discussion with private companies on investment in EV charging stations.
Indonesia	20% by 2025	✓	✓	✓	✓	✓	✓	Provides a subsidy for EV adoption in 2023 until 2024. Drafting a new incentive program for EVs and supporting industries, including charging stations.
Lao PDR	30% by 2030	✓	✓	✓	✓	✓	✓	Encourages private investments in EV industry. Working out specific incentives and lower tariff rates.
Malaysia	15% by 2030	✓	✓	✓	✓	✓	✓	Launched incentives in 2021 for EV production and development of the EV ecosystem. Provided incentives for sustainable mining projects.
Myanmar	100% by 2030	✓	..	✓	✓	✓	✓	Imposed zero tariffs on EVs imports effective November 2022 to encourage the use of EVs according to the Ministry of Planning and Finance's Notification No. 90/2020 and No. 31/2023. Provides income tax exemptions and reliefs for EVs and related activities as prescribed in the MIC's Notification No. 1/2023.[b]
Philippines	50% by 2040	✓	✓	Developing the Comprehensive Roadmap for the EV Industry to attract EV and EV infrastructure investment.			✓	The Electric Vehicle Industry Development Act, April 2022 provides EV adoption subsidies and investment incentives for EV production, batteries and ecosystem. Developing an incentive strategy for EV manufacturing, including electronic parts, batteries, charging stations and testing facilities.[c]
Singapore	Phase out of ICE sales by 2030	✓	..	✓	✓	✓	✓	Provides incentives for development of the EV ecosystem (including mobility solutions, high-technology components, technology solutions, charging stations, R&D centres).
Thailand	30% by 2030	✓	✓	✓	✓	✓	✓	Launched in 2022. Enhanced incentives for EV and EV parts production.
Viet Nam	100% by 2050	✓	..	Investment in EV projects are encouraged				Limited subsidy (reduction of excise tax on domestically manufactured, assembled and imported EVs). Investment incentives for EVs currently governed under the country's investment law. Policy framework dedicated to EVs and charging infrastructure in the development stage.

Source: Government websites, media and industry news.

[a] Refers to cars only.

[b] *The Global New Light of Myanmar*, "MIC to prioritize electric vehicles and related business sector", 19 February 2023.

[c] *Manila Bulletin*, "DTI to seek FIRB okay on incentive-driven EV program", 30 May 2023.

Regional policy development

In May 2023, leaders of ASEAN Member States adopted a Declaration on Developing Regional Electric Vehicle Ecosystem, emphasizing EVs in the region's energy transition. This Declaration and its implementation are poised to significantly influence the investment landscape, especially for international investment in the EV supply chain within the region.

5.4.3. Key drivers

Key drivers for FDI in EV-related sectors in ASEAN include (i) access to critical minerals (e.g. nickel and cobalt) and the need to be close to suppliers (e.g. batteries), (ii) EV adoption growth and regional market potential, (iii) the vibrant manufacturing environment for EVs and batteries, (iv) improving investment environment, (v) the influence of international supply chain restructuring, (vi) significant EV infrastructure needs and (vi) the strong policy push for the energy transition.

The presence of major global EV manufacturers and battery producers further attracts suppliers, fostering supply chain development. The ASEAN EV industry is projected to grow at a compound average growth rate of 33 per cent from 2023 to 2028 – nearly triple the rapid growth of data centres in the region (*ASEAN Investment Report 2020–2021*). The EV market in ASEAN was valued at about $500 million in 2021 and $859 million by 2023 and is expected to reach $3.5 billion by 2028.[26]

Business linkages

Creating an efficient EV support industry is crucial for ASEAN's goal of establishing a competitive EV hub. Business linkages involving OEMs and different types of part and component manufacturers are pivotal. These relationships encompass diverse arrangements such as between OEMs and their part and component subsidiaries in the region, between OEMs and independent Tier 1 and Tier 2 suppliers, and linkages between SME-OEMs and SMEs and Tier 1 and Tier 2 suppliers.

Many part and component manufacturers supply customers and OEMs within the same host country. In Thailand, Nissan Powertrain supplies Nissan Motor (Japan) for hybrid EV production, Thonburi Energy Storage supplies Mercedes Benz (Germany) for plug-in hybrid EVs, and DTS Draexlmaier supplies BMW for plug-in hybrid EV production. Many Tier 1 suppliers are affiliates of OEMs.

ASEAN-based manufacturers also produce specific parts for OEMs in other Member States. Samsung SDI (Republic of Korea) produces lithium-ion battery cells in Malaysia for VinFast (Viet Nam) in Viet Nam, showcasing cross-border production. Mitsubishi Electric (Japan) manufactures inverters for traction motors in Thailand for a Honda (Japan) facility in Malaysia. AGC Automotive (Japan) in Thailand supplies rear and front window glass to a Toyota (Japan) operation in Indonesia.

Tier 2 manufacturers supply Tier 1 companies in other Member States. Mitsui Siam Components (Thailand), a wholly owned subsidiary of Mitsui Kinzoku Act (Japan) and Sanko Gosei (Japan),

supplies parts to Perodua in Malaysia. Pacific Industries (Thailand), jointly owned by Pacific Industrial (Japan) and Gajah Tunggal (Indonesia), supplies parts and components to IRC Inoac (Japan), a Tier 1 manufacturer in Indonesia, which then supplies Toyota, Suzuki and Nissan in that country. Some part and component manufacturers not only produce specific parts for automotive OEMs and Tier 1 suppliers in the host country but also manufacture parts for customers outside the ASEAN region. For instance, Tigerpoly, a subsidiary of Tigers Polymer (Japan), supplies parts produced in Thailand to automotive OEMs in the United States (e.g. American Honda Motor and Mitsubishi Motors). Daisin (33 per cent owned by Hitachi Astemo (Japan)) in Thailand supplies its sister company, Hitachi Astemo Americas (United States).

SME linkages

Foreign and local SMEs can play a role in the development of a robust EV support industry. They traditionally support Tier 1 and Tier 2 manufacturers and OEMs. Toyota's operations in Indonesia and Thailand involve a wide range of suppliers. Toyota Motor Manufacturing Indonesia has a network of more than 840 suppliers (i.e. its own subsidiaries and affiliates, other foreign subsidiaries, domestic companies and SMEs). Nissan Thailand works with more than 250 part and component manufacturers, including SMEs. Some EV start-ups have also partnered with MNEs, spanning downstream supply chain segments (annex table 8).

The interplay between SMEs and Tier 1 and Tier 2 suppliers within the automotive supply chain highlights the complex relationships that contribute to the production of vehicles in ASEAN. Several examples of linkages and collaborations illustrate the interconnected nature of these relationships.

SMEs supply OEMs through Tier 1 and Tier 2 suppliers. Indosafety Sentosa Industry and Shei Tai Industrial (both Indonesia) supply Aisin (Japan), a Tier 1 supplier of Toyota, in Indonesia. Berdikari Metal & Engineering and Induro International (both Indonesia) supply Astra Otoparts (Tier 1 supplier to Toyota in Indonesia). Ampas Auto Mirror and CH Radiators (both Thailand) supply Siam Toyota Manufacturing in Thailand. Keing Rungruang Auto Part (Thailand) supplies Siam Aisin (Tier 1), which in turn supplies Toyota in Thailand.

Some domestic SMEs also directly supply OEMs in the same host country. Asalta Mandiri Agung (Indonesia) supplies Toyota Indonesia and Panjawattan Plastics (Thailand) to Nissan Thailand. Somboon Advance Technology (Thailand) supplies Mitsubishi, Nissan and Toyota in Thailand.

Some foreign and local SMEs supply Tier 1 and Tier 2 companies through cross-border transactions. MDI Heat Treatment (Thailand) supplies Exedy in Thailand, which then supplies Aisin (Japan) in Indonesia. Megatama Spring (Indonesia) supplies Hitachi Astemo (Japan) in Viet Nam. Berdikari Metal & Engineering (Indonesia) supplies Astra Otoparts, a Tier 1 supplier to Perodua in Malaysia and to other OEMs in Indonesia.

Some domestic companies and SMEs establish partnerships with foreign component manufacturers. Asano Gear (Japan) and Inti Ganda Perdana (Indonesia) supply OEMs such

as Daihatsu, Kawasaki, Toyota, Hino and Honda in Indonesia. Daido Metal (Japan) and Seri Wathana Industry (Thailand) supply GM, Toyota, Honda, Nissan and Auto Alliance in Thailand.

***

The collaborations, joint ventures and interactions within the supply chain underscore the importance of strong relationships between SMEs, Tier 1 and Tier 2 suppliers, and OEMs. The intricate web of interactions ensures a steady flow of parts, components and materials necessary for the production of EVs in ASEAN.

5.4.4. Challenges

The EV market in ASEAN is at a nascent stage of development – both for adoption and for production (figure 31) – but is growing. Converting traditional production facilities from ICE to EV requires significant investment and industry adjustments, which are major challenges. Helping existing suppliers adapt and attracting new EV parts and component manufacturers are keys to smooth development of a supply chain.

Another significant challenge is the lack of charging stations, which affects both investment in and adoption of EVs. The current investment in charging infrastructure is low compared with that in Europe and in China. More efforts are needed at national and regional levels to develop a strong EV industry and market.

FDI in the EV industry is uneven. Investment in some segments of the supply chain is concentrated in a few Member States but has spillover potential to other parts of the region depending on complementary location advantages. Regional cooperation in the development of the EV ecosystem called for by the ASEAN leaders in 2023 is a significant move.

5.4.5. Policy options: Strengthening and attracting FDI in EV supply chain

Several policy options might be considered for attracting foreign technologies and EV FDI (see figure 31). Specific actions could focus on the following:

(i) Encouraging MNEs to engage in various EV supply chain segments, fostering strong links with SMEs and local companies

(ii) Promoting greater EV adoption

(iii) Facilitating investment in EV infrastructure and downstream activities

(iv) Developing a robust EV support industry, promoting seamless flows of parts and components within the region

(v) Attracting investment in battery recycling, aligning with the efforts to develop a green economy and advance the energy transition in the region

(vi) Achieving full realization of the AEC by 2025 for an improved investment environment.

(vii) Implementing the 2023 ASEAN Declaration on Developing Regional Electric Vehicle Ecosystem with clear plans, milestone indicators and regular assessments

Figure 31. ASEAN: Major EV challenges and policy options

	Enhance production efficiency	Description	Policy options
Production	Strengthening of ecosystems and EV supply chain	A few ASEAN member States are developing EV hubs, but none could capture the entire EV supply chain.	To take advantage of opportunities for division of labour based on locational complementarities, develop a regional EV supply chain across all segments to make the ecosystem more attractive for production involving different categories of players. To build a competitive EV ecosystem, target investment promotion to players involved in different segments of the supply chain.
	Policy and industrial facilities support	The more developed countries of ASEAN have introduced policies to promote greater FDI investment in EV activities.	Develop highly specialized investment incentive packages targeting players in the EV supply chain.
	Better integration of EV supply chain	Regional production networks to improve efficiency have been a key feature of automotive production in ASEAN. It is no different for EVs.	Strengthen the regional EV supply chain and production networks that connect countries by facilitating smooth flow of inputs, batteries, other parts and components and EVs across ASEAN. Develop a competitive regional EV supporting industry, including cross-border cooperation on charging infrastructure.
	Increase adoption of EVs	**Description**	**Policy options**
Adoption	Regional market importance	Except in one or two member States, domestic automotive markets in ASEAN are too small to optimize economies of scale.	Promote a regional market of more than 670 million consumers through free flow of goods and services under the AEC.
	Policy support for adoption	Not all member States have policies and incentives that support EV adoption. High cost of imported EV replacement parts could be a deterrent.	Share experiences with EV policy and incentives among member States as tools to increase adoption. Cooperate to develop a strong regional EV part and component industry and facilitate free flow of parts and components within the region.
	Insufficient EV infrastructure	Limited charging stations are a major concern for adoption of EVs.	Set a policy target of expanding EV infrastructure. Attract FDI to help develop this segment of the ecosystem.
	High EV purchase cost	High cost is another key factor deterring EV adoption. ASEAN member States are providing incentives to reduce purchase cost to encourage adoption.	Share experiences of related member States to show what has worked and what has not.

Source: Adapted from *ASEAN Investment Report 2022*.

(viii) Creating strategic alliances, such as an SME-EV linkage alliance involving stakeholders such as policymakers, OEMs, MNEs, SME part and component associations, and EV experts (to identify specific measures to build a robust EV support industry).

The results of such an alliance could be reported annually to the ASEAN Investment Area Council or ASEAN Economic Ministers or relevant ASEAN energy transition bodies. Activities of the alliance could include sharing industry information, developing EV policy, building capacity, identifying investment opportunities and networking. Within the alliance, OEMs and Tier 1 suppliers could coach and mentor SMEs through a regional programme.

NOTES

[1] Bloomberg, “Ford takes stake in Indonesia nickel project to ensure supplies”, 31 March 2023.

[2] Measured by announced greenfield projects and international project finance deals.

[3] Based on mid-range estimate from IRENA (2022b) and IEA (2022).

[4] Carbon neutral refers to having a balance between emitting carbon and absorbing carbon from the atmosphere. Cambodia, Malaysia, Myanmar, the Philippines and Thailand are committed to carbon neutrality by 2050. The other Member States are committed to net-zero emissions by 2050 (by 2060 in Indonesia).

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[22] Asia Nikkei, “Cambodia builds up EV infrastructures to speed electric ambitions”, 10 May 2022.

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[25] Decree 10/2022.

[26] Mordor Intelligence, “ASEAN EV Market Size and Share Analysis – Growth Trends and Forecasts (2023–2028).”

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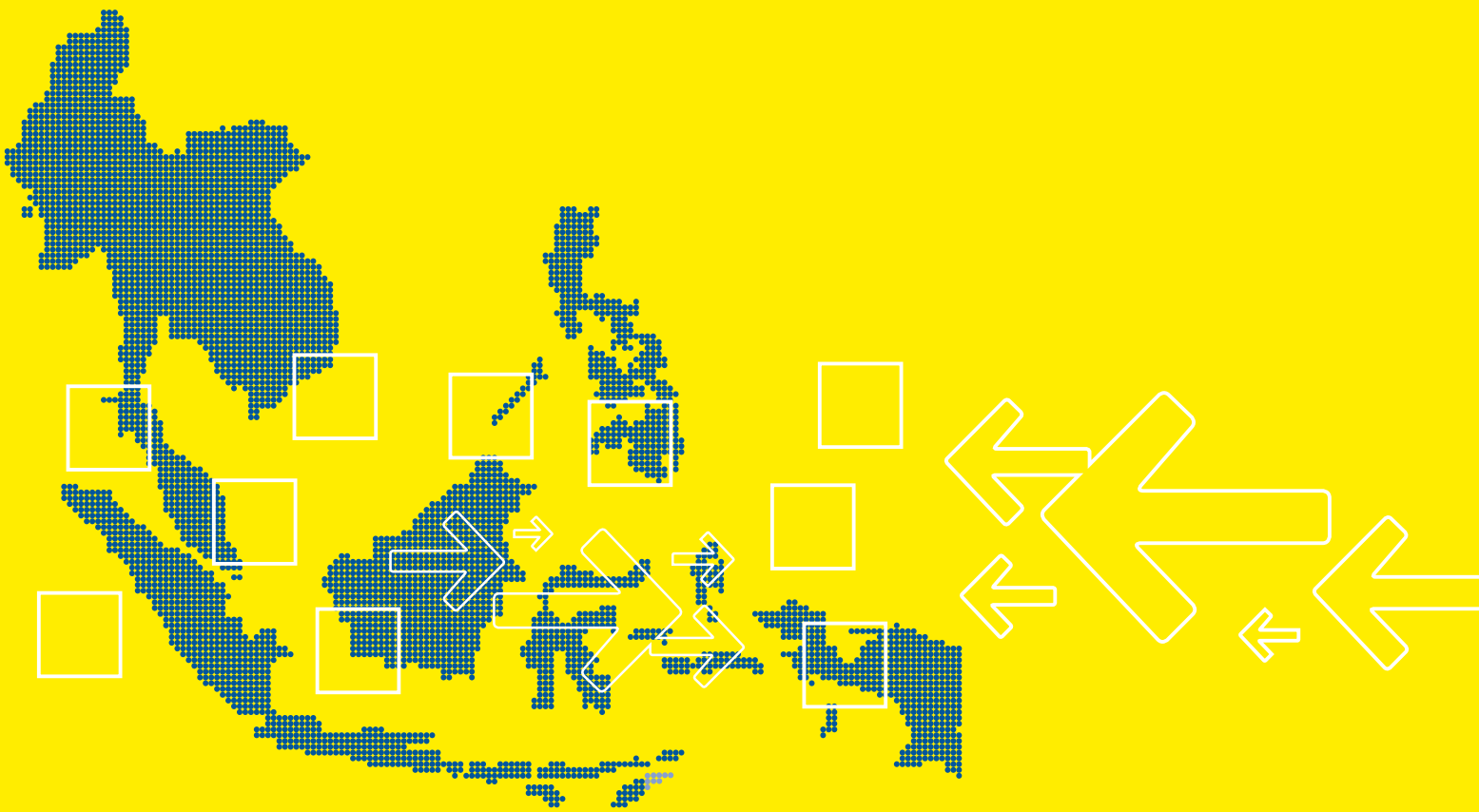

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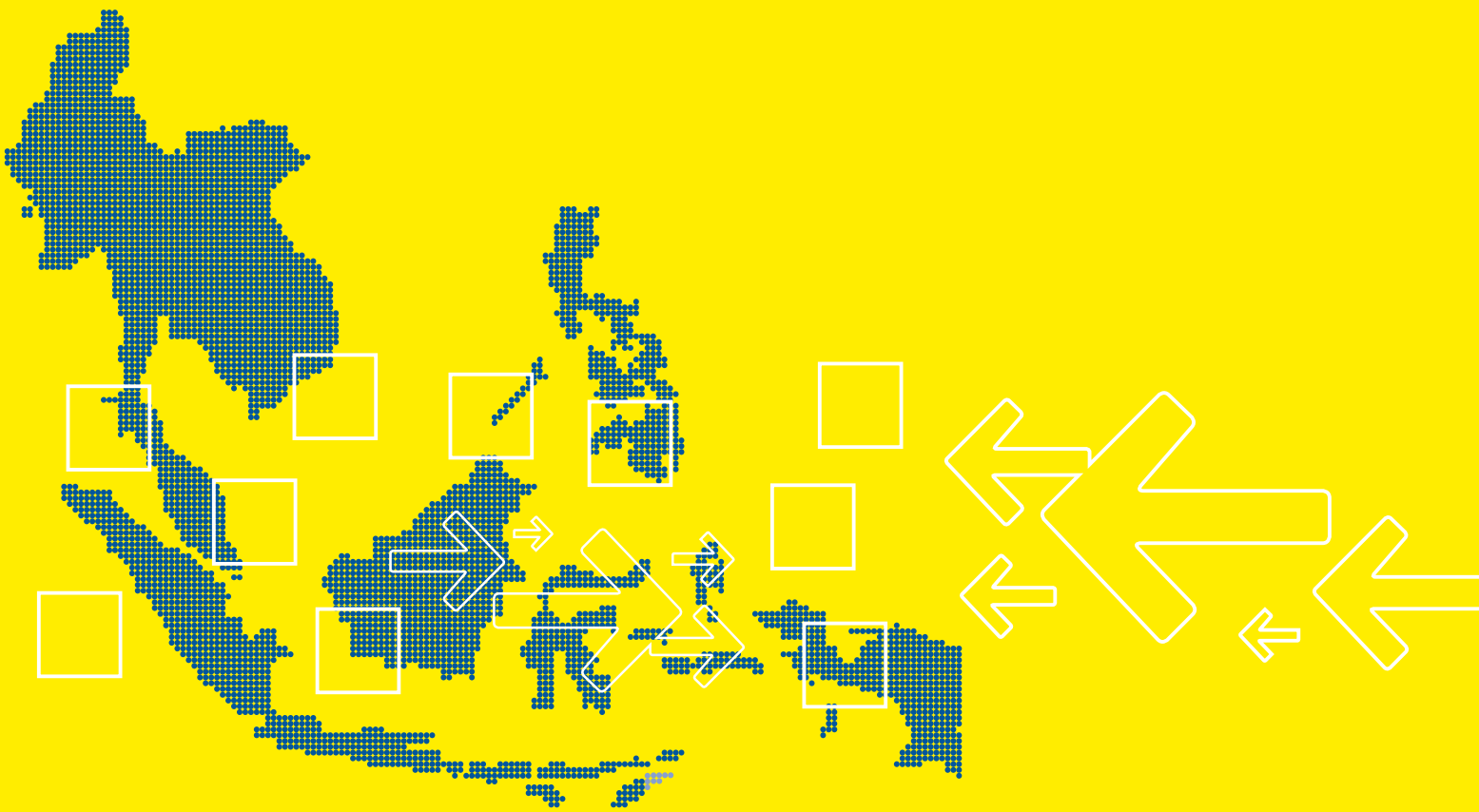
ANNEXES



Annex table 1. ASEAN: data centre expansion, 2022–2023 (Selected cases)

MNE	Headquarters	Activity	Location	Date	Motivation
AirTrunk	Australia	150 MW data centre	Malaysia	2023	Second facility after centres established in Singapore
Amazon	United States	2 edge data centres in Hanoi and Ho Chi Minh	Viet Nam	2022	Growing demand
BDx	Hong Kong (China)	100 MW data centre 15 MW data centre	Indonesia Indonesia	2022 2023	Growing demand
Bridge Data Center	Singapore	110 MW data centre in Johor	Malaysia	2022	Growing demand
Edge Centres	Australia	Solar powered data centre	Viet Nam	2022	Expanding regional footprint; joint venture with USDC Technology (Viet Nam)
Equinix	United States	Fifth data centre	Singapore	2022	Growing demand
Etix Everywhere	Luxembourg	Expansion of existing data centre	Thailand	2023	Strengthening existing capacity; joint venture with Interlink Telecom (Thailand)
GAW Capital Partners	Hong Kong (China)	20 MW data centre	Viet Nam	2022	Growing demand
Google	United States	Third data centre/data centre	Singapore	2022	Part of an $850 million investment expansion
Microsoft	United States	Data centre academy	Singapore	2022	Vertical integration
NTT	Japan	45 MW data centre Third data centre in Bangkok	Indonesia Thailand	2022 2023	Growing demand Expanding capacity
Oracle	United States	Second cloud region (cluster of data centres)	Singapore	2023	Strengthening regional presence
Princeton Digital Group	Singapore	96 MW data centre	Indonesia	2023	Expanding capacity
SentinelOne	United States	New data centre	Singapore	2022	Strengthening regional presence
Singtel	Singapore	51 MW hyperdata centre	Indonesia	2023	Strengthening regional presence; joint venture with Medco Power and Telkom (both Indonesia)

Source: ASEAN Investment Report 2023 research, based on information from company websites and media.

Annex table 2. Top 10 semiconductor MNEs with the largest revenues in 2022 that are expanding in ASEAN (Per cent)

MNE	Headquarters	Global market share by revenue (%)	Recipient country	Expansion activity in 2021–2023 (Selected cases)
Samsung Electronics	Republic of Korea	10.9	Singapore	Partnering with IBM (United States) and M1 (Singapore) to establish an Industry 4.0 technology centre
			Viet Nam	Expansion of a manufacturing facility for printed circuit boards and other electronic components
				Construction of a $220 million research and development centre for smart devices and network technology
Intel	United States	9.7	Malaysia	Expansion of test and assembly operation with a new production facility (part of a $7.1 billion expansion project)
			Singapore	Expansion of Asia-Pacific headquarters and logistics centre
			Thailand	Partnering with Ericsson (Sweden) for 5G development
			Viet Nam	Launch of a $475 million expansion of a test and assembly facility
SK Hynix	Republic of Korea	6.0	Indonesia	Expansion in Indonesia
			Malaysia	Construction of a $547 million copper foil manufacturing plant to support the EV value chain
Qualcomm	United States	5.8	Indonesia	Collaboration with Telkomsel (Indonesia) and Ericsson (Sweden) to support 5G development and digitalization, involving a 4-nanometer baseband chip application
			Thailand	Collaboration with AIS (Thailand) and ZTE (China) to enhance 5G development involving a 4-nanometer baseband chip application
			Viet Nam	Collaboration with the Viettel Group (Viet Nam) to support 5G development
Micron Technologies	United States	4.6	Malaysia	Construction of a $1 billion second semiconductor facility
Broadcom	United States	4.0	Thailand	Partnering with T3 Technology (Thailand) to launch WiFi7 technology in South-East Asia
AMD	United States	3.9	Malaysia	Launch of an engineering facility for server platform solutions, involving advanced processors
				Expansion of a manufacturing facility in Penang with TF (China) at an estimated cost of $341 million
			Singapore	Expansion of R&D semiconductor workforce through a $50 million investment project
			Viet Nam	Collaboration with Viettel (Viet Nam) for 5G development
Texas Instruments	United States	3.1	Malaysia	Construction of an additional plant in Melaka
MediaTek	Taiwan Province of China	3.0	..	..
Apple	United States	2.9	Singapore Thailand	Establishment of a retail presence in Singapore and Thailand in 2022. Expansion of many of its suppliers (e.g. Foxconn, Pegatron, Wistron, Luxshare, Taiwan Semiconductor Manufacturing (all Taiwan Province of China); Intel (United States); Infineon Technologies (Germany)

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Annex table 2. Top 10 semiconductor MNEs with the largest revenues in 2022 that are expanding in ASEAN (Per cent)
(Concluded)

MNE	Headquarters	Global market share by revenue (%)	Recipient country	Expansion activity in 2021–2023 (Selected cases)
Other examples	France, Germany, United States	46.1	Indonesia	Infineon Technologies (Germany): expansion of its backend operation with a $1.9 billion investment (2022)
			Singapore	GlobalFoundries (United States): expansion of a $4 billion facility (since 2021)
			Singapore	Soitec (France): doubling of the capacity of its wafer plant (2022)
			Viet Nam	Amkor Technology (United States): construction of a $1.6 billion facility in Viet Nam (2022)

Source: *ASEAN Investment Report 2023* research, based on Gartner (January 2023), respective company websites and media.
Note: Large semiconductor projects take a few years to complete construction, so some projects started in 2021 are included. Most projects listed started construction in 2022.

Annex table 3. ASEAN: regional expansion by MNEs already present in the region, projects constructed or ongoing, 2022–2023 (Selected cases)

MNE	Headquarters	Activity	Location	Investment ($ million)	Date
Advanced Semiconductor Engineering	Taiwan Province of China	Expand semiconductor production facility in Penang	Malaysia	300	2022
BMW	Germany	Part of BMW's production network in Asia	Viet Nam	..	2022
Chin Poon Industrial	Taiwan Province of China	Expand PCB manufacturing facility	Thailand	..	2022
Coretronic	Taiwan Province of China	Build second plant for electronic components	Viet Nam	48	2022
Daihatsu	Japan	Expand and upgrade manufacturing facility with technology investment	Indonesia	195	2022
Dyson	United Kingdom	Add manufacturing facility for next-generation batteries	Singapore	Part of 1,100 (for the next few years)	2023
Ford	United States	Expand and upgrade manufacturing facilities	Thailand	900	2021/2022
Foxconn	Taiwan Province of China	Expand with a new EV factory (joint venture with PTT (Thailand))	Thailand	1,000	2022
GSK	United Kingdom	Add pharmaceutical manufacturing facility	Singapore	33	2022
Kraft Heinz	United States	Upgrade manufacturing facilities with technology investment	Indonesia	84	2023
Lam Research	United States	Expand manufacturing facility for wafer fabrication equipment	Malaysia	170	2021/2022
LG Electronics	Republic of Korea	Expand manufacturing facility for display screens	Viet Nam	750 (Feb 2022) 1,400 (Aug 2022)	2022
MSD	United States	Expand a multi-product pharmaceutical manufacturing facility	Singapore	280	2022
Nestle	Switzerland	Add manufacturing facility with technology upgrade	Indonesia	220	2021/2022
Pall	United States	Expand with an advanced manufacturing facility for semiconductors	Singapore	100	2022
Roland DG	Japan	Expand manufacturing facility for printers	Thailand	3	2023
SAIC Motor CP	China	Build manufacturing facility for EV and EV battery modules	Thailand	15	2023

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Annex table 3. ASEAN: regional expansion by MNEs already present in the region, projects constructed or ongoing, 2022–2023 (Selected cases) (Concluded)

MNE	Headquarters	Activity	Location	Investment ($ million)	Date
Samsung SDI Energy	Republic of Korea	Build EV battery cell manufacturing facility.	Malaysia	1,300	2022
Simmtech	Republic of Korea	Implement second phase of production facility for PCBs and semiconductors	Malaysia	50	2022
		Completed an 18-acre manufacturing facility	Malaysia	150	2022
United Microelectronics	Taiwan Province of China	Expand semiconductor manufacturing capacity	Singapore	5,000	2022/2023

Source: *ASEAN Investment Report 2023* research.
Note: EV = electric vehicle, PCB = printed circuit board.

Annex table 4. MNEs investing in ASEAN in manufacturing activities for the first time, 2022–2023 (Selected cases)

MNE	Headquarters	Activity	Location	Investment ($ million)	Date	Motivation
Arevo	United States	Build a 3D printing manufacturing facility.	Viet Nam	135	2022	Market and investment opportunities
Applied Materials	United States	Build a manufacturing facility and conduct R&D in semiconductors.	Singapore	600	2022	Building a regional presence, improving investment environment
AT&S	Austria	Build a manufacturing facility for integrated circuit substrates.	Malaysia	1,800 (over three years)	2021–2023	Increasing regional and global demand, improving investment environment
BYD	China	Build its first manufacturing facility in ASEAN (automotive).	Thailand	491	2022	Developing a regional manufacturing hub, market opportunities
Changan	China	Build first right-hand drive electric vehicle (EV) and EV battery production facility outside of China.	Thailand	285	2023	Establishing a manufacturing hub in ASEAN, improving investment environment
CNGR Advanced Material	China	Add capacity for a nickel smelter; joint venture with Jhonlin Group (Indonesia).	Indonesia	400	2022	Expanding to ASEAN
Evonik	Germany	Build a manufacturing facility for alkoxides (specialty chemicals).	Singapore	..	2023	Expanding to ASEAN
Ferrotec Holdings	Japan	Build a manufacturing facility for semiconductor equipment.	Malaysia	114	2022	Expanding to supply the region and abroad
Lanco Integrated	United States	Build a facility for production of automation equipment.	Malaysia	3	2022	Expanding to ASEAN, regional market opportunities, improving investment environment
Neta	China	Build an EV factory (its first in the region).	Thailand	-	2023	Expanding to ASEAN
TTM Technologies	United States	Build new manufacturing facility for PCBs.	Malaysia	130	2022	Expanding, market reasons, improving investment environment
Yongjin Metal Science and Technology	China	Build a manufacturing facility.	Viet Nam	125	2022	Expanding to ASEAN

Source: *ASEAN Investment Report 2023* research, based on information from company websites and media.
Note: EV = electric vehicle, PCB = printed circuit board.

Annex table 5. ASEAN: cross-border M&A megadeals, 2022

Ultimate acquiring company	Headquarters	Target company	Target industry	Target country	Total ($ million)	Shares owned after
ESR Cayman	Hong Kong (China)	ARA Asset Management	Real estate agents and managers	Singapore	5,269	100
United Overseas Bank	Singapore	Citigroup–Thailand & Malaysia consumer banking business	Banks	Thailand	3,653	100
Ivanhoe Capital Sponsor	United States	SES Holdings	Battery storage	Singapore	3,124	100
Bridgetown 2	United States	PropertyGuru	Information retrieval services	Singapore	1,783	100
Ooredoo QPSC	Qatar	Hutchison 3 Indonesia	Radiotelephone communications	Indonesia	1,719	100
Blackstone	United States	Interplex Holdings	Prepackaged software	Singapore	1,600	100
PT Medco Daya Abadi Lestari	Indonesia	ConocoPhillips Indonesia Holding	Natural gas liquids	Indonesia	1,355	100
Saudi Arabia	Saudi Arabia	Olam Agri Holdings	Investors, nec	Singapore	1,240	35.4
SK Ecoplant	Republic of Korea	Tes-Envirocorp	Refuse systems	Singapore	1,038	100
ESR Cayman	Hong Kong (China)	ARA LOGOS Logistics Trust	Real estate investment trusts	Singapore	994	100
Stonepeak Partners	United States	Greenship Gas Manager	Deep-sea foreign transportation of freight	Singapore	700	100
EDP Energias de Portugal	Portugal	Sunseap Group	Electric services	Singapore	695	91.4
Investor group	United States	Coda Payments	Functions related to depository banking, nec	Singapore	690	..
Investor group	Canada	Bersama Digital Infrastructure Asia	Data processing services	Singapore	610	47.5
China Uwin Technology	Hong Kong (China)	Global Dining Holdings	Retail bakeries	Singapore	609	63.8
Axiata Group	Malaysia	Link Net	Information retrieval services	Indonesia	608	66.0
SCC Straits	Singapore	Frasers Logistics & Commercial Asset Management–Cross Street Exchange	Operators of nonresidential buildings	Singapore	603	100
HSBC Holdings	United Kingdom	AXA Insurance Singapore	Life insurance	Singapore	575	100
Undisclosed acquirer	Unspecified	Capitaland Development–Capital Place Building Hanoi	Operators of nonresidential buildings	Viet Nam	557	100

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Annex table 5. ASEAN: cross-border M&A megadeals, 2022 (Concluded)

Ultimate acquiring company	Headquarters	Target company	Target industry	Target country	Total ($ million)	Shares owned after
Provident Capital Indonesia	Indonesia	Tower Bersama Infrastructure	Radiotelephone communications	Indonesia	546	73.3
Liberty Mutual Holding	United States	AmGeneral Insurance	Insurance agents, brokers and service	Malaysia	544	100
Investor group	United Arab Emirates	Princeton Digital Group	Telephone communications, except radiotelephone	Singapore	505	..
KKR	United States	Silver Peak Holdings	Investors, nec	Singapore	441	100
AHK Holdings	Singapore	Golden Energy Mines	Bituminous coal and lignite surface mining	Indonesia	420	30
Nippon Steel	Japan	Asia Credit Opportunities I (Mauritius)	Pension, health and welfare funds	Thailand	419	100
Dongguan Feite Semiconductor	China	Future Technology Devices International	Semiconductors and related devices	Singapore	414	80.2
CVC Advisers	United Kingdom	Affin Hwang Asset Management	Investment advice	Malaysia	367	68.4
Assicurazioni Generali	Italy	AXA Affin General Insurance	Insurance agents, brokers and service	Malaysia	311	53.0
Axiata Group	Malaysia	Link Net	Information retrieval services	Indonesia	308	99.5
Investor group	United States	Sinar Digital Terdepan	Information retrieval services	Indonesia	300	..

Source: UNCTAD.
Note: Deals exceeding $300 million.

Annex table 6. ASEAN: investment projects related to building supply chain capacity, 2022–2023 (Selected cases)

MNE	Headquarters	Activity	Location	Investment ($ million)	Date	Motivation
Aoshikang Technology	China	Build PCB production facility.	Thailand	172	2022	Expanding into ASEAN and strengthening supply chain; new investor in host country
BYD Electronics	China	Build manufacturing facility for electronic components (first and second phases).	Viet Nam	269 (first phase) 184 (second phase)	2022/2023	Diversifying and expanding to strengthen supply chain capacity
BOE Technology	China	Build manufacturing facility for electronics (phase 1). Add electronics manufacturing facility (phase 2).	Viet Nam	400	2023	Geopolitical tensions, concern about supply chain disruptions; new investor in host country
Cargill	United States	Build a sweetener plant for food and beverages.	Indonesia	2.4	2022	Upgrading technology and production capacity to strengthen supply chain
Compeq	Taiwan Province of China	Build a manufacturing facility for PCBs.	Thailand	29	2023	Geopolitical tensions, concern about supply chain disruptions
Dynamic Electronics	Taiwan Province of China	Build a production facility for automotive PCBs.	Thailand	..	2023	Geopolitical tensions, concern about supply chain disruption
Foxconn	Taiwan Province of China	Add electronics manufacturing facilities.	Viet Nam	300	2022/2023	Geopolitical tensions, strengthening supply chain capacity
Goertek	China	Add third manufacturing facility for electronic components (Apple supplier).	Viet Nam	300	2023	Strengthening supply chain capacity, reducing costs
Infineon Technologies	Germany	Expand semiconductor manufacturing facility (Batam).	Indonesia	2,400	2022	Strengthening supply chain capacity
Jindal Stainless	India	Build nickel pig iron smelter (joint venture with Eternal Tsingshan (China)).	Indonesia	157	2023	Integrating vertically and strengthening supply chain linkages
Ju Teng International Holdings	Taiwan Province of China	Build a manufacturing facility for electronic and automotive parts.	Viet Nam	200	2022	Strengthening supply chain capacity
Kingboard Holdings	China	Build a manufacturing facility for fiberglass yarn and fabric.	Thailand	230	2022	Strengthening supply chain capacity; new investor in host country
Kuraray	Japan	Build a chemical manufacturing plant.	Thailand	310	2023	Strengthening supply chain capacity
Kuraray and Sumitomo	Both Japan	Build a manufacturing facility for advanced chemical (resins for EV).	Thailand	520	2023	Strengthening supply chain capacity

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Annex table 6. ASEAN: investment projects related to building supply chain capacity, 2022–2023 (Selected cases) (Concluded)

MNE	Headquarters	Activity	Location	Investment ($ million)	Date	Motivation
Luxshare ICT	China	Add a manufacturing facility for electronic products.	Viet Nam	150	2022	Geopolitical tensions, concern about supply chain disruption
Murata Manufacturing	Japan	Build a multilayer ceramic capacitors manufacturing plant (part of EV supply chain).	Thailand	87	2023	Expanding regionally with a new plant, strengthening supply chain capacity
Quanta Computer	Taiwan Province of China	Build an electronics manufacturing facility.	Viet Nam	120	2023	Strengthening supply chain capacity
Pegatron	Taiwan Province of China	Build an electronics manufacturing facility (Apple supplier).	Viet Nam	481	2023	Geopolitical tensions, concern about supply chain disruptions
Sihui Fuji Electronics	China	Build a manufacturing facility for PCBs.	Thailand	72	2023	Strengthening supply chain capacity; new investor in host country
Skretting	Netherlands	Manufacture aquafeed.	Viet Nam	24	2022	Strengthening supply chain capacity
Soitec	France	Expand a wafer fabrication facility.	Singapore	571	2022	Strengthening supply chain capacity
Taiwan PCB Techvest	Taiwan Province of China	Build a manufacturing facility for PCBs.	Viet Nam	30	2022	Strengthening supply chain capacity
Taiwan Union Technology	Taiwan Province of China	Build a production facility for automotive and other PCBs.	Thailand	..	2023	Geopolitical tensions, concern about supply chain disruption
TF AMD	China	Build a manufacturing facility (second semiconductor plant in host country).	Malaysia	455	2022	Expanding ASEAN presence with a second plant, strengthening supply chain capacity
Tripod Technology	Taiwan Province of China	Manufacture PCBs and computer products.	Viet Nam	200	2023	Geopolitical tensions, strengthening supply chain capacity; new investor in host country
Unimicron	Taiwan Province of China	Build a production facility for PCBs.	Thailand	366	2023	Geopolitical tensions, concern about supply chain disruption
Wus Printed Circuit	Taiwan Province of China	Build a PCB manufacturing facility.	Thailand	280	2023	Geopolitical tension, strengthening supply chain linkages

Source: *ASEAN Investment Report 2023* research, based on information from company websites and media.
Note: EV = electric vehicle, PCB = printed circuit board.

Annex table 7. International project finance deals in renewables, 2022 (Selected cases)

Project	Location	Cost ($ million)	Project industry	Ultimate sponsor	Headquarters
AES Binh Thuan offshore wind farm	Viet Nam	13,000	Wind	AES	United States
Thailand green hydrogen and ammonia plant	Thailand	7,000	Hydrogen, synthesis gas	PTT Government of Saudi Arabia Electricity Generating Authority of Thailand	Thailand Saudi Arabia Thailand
Anantara Energy Riau Islands solar and battery storage	Indonesia	5,000	Solar	DIF Management	Netherlands
Carbon dioxide capture, utilization and storage	Indonesia	572	Carbon capture	Marubeni Pertamina	Japan Indonesia
150 MW Binh Phuoc biomass power plant	Viet Nam	341	Biomass	erex Government of Viet Nam T&T Group	Japan Viet Nam Viet Nam
Vietnam biomass power	Viet Nam	341	Biomass	Electric Power Development VINAFOR	Japan Viet Nam
Iligan solar PV	Philippines	324	Solar	Eren Groupe San Ignacio Energy Resources	Luxembourg Philippines
Isabela solar power	Philippines	324	Solar	Eren Groupe San Ignacio Energy Resources	Luxembourg Philippines
Balikpapan Refinery Processing Unit carbon capture and utilization technology	Indonesia	321	Carbon capture	Pertamina Air Liquide	Indonesia France
Singapore-Australia liquified carbon dioxide transport and storage	Singapore	314	Carbon capture	Chevron Mitsui OSK Lines	United States Japan
Xuan Thien solar acquisition	Viet Nam	284	Solar	EDP Energias de Portugal Xuan Thien Group	Portugal Viet Nam
Laos geothermal power plant	Lao PDR	256	Geothermal	GEIOS Technology Lao Development and Investment Wealth Power Viet Nam Group	United States Lao PDR Viet Nam
Indonesia pump storage hydroelectricity facility and battery energy storage system	Indonesia	246	Hydroelectric, battery storage, hydrogen	Government of Saudi Arabia Perusahaan Listrik Negara	Saudi Arabia Indonesia
Tanawon flash geothermal power plant	Philippines	243	Geothermal	Toshiba Lopez	Japan Philippines

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Annex table 7. International project finance deals in renewables, 2022 (Selected cases) (Continued)

Project	Location	Cost ($ million)	Project industry	Ultimate sponsor	Headquarters
Malaysia and Cambodia hydrogen power plant	Cambodia	242	Hydrogen, hydroelectric	PESTECH International Hydrogène de France	Malaysia France
Sarawak carbon capture and storage hub	Malaysia	239	Carbon capture	Government of Malaysia Posco Holdings	Malaysia Republic of Korea
Indonesia solar, battery energy storage system and hydrogen portfolio	Indonesia	227	Hydrogen, solar, battery storage	Ayala Puri Usaha Group	Philippines Indonesia
Riau Island green hydrogen plant	Indonesia	227	Hydrogen	ReNu Energy DIF Management	Australia Netherlands
Sarawak H2biscus green hydrogen and ammonia	Malaysia	221	Hydrogen, synthesis gas	Posco Holdings Sarawak Energy Lotte Chemical Samsung Engineering Sarawak Economic Development	Republic of Korea Malaysia Republic of Korea Republic of Korea Malaysia
Singapore carbon capture utilization sequestration (CCUS) solutions	Singapore	219	Chemicals and plastics, carbon capture	Chevron Keppel Air Liquide CNPC	United States Singapore France China
Mitsubishi, Pertamina, Pupuk Indonesia hydrogen,ammonia value chain and CCUS	Indonesia	213	Hydrogen, carbon capture	Mitsubishi Pertamina Pupuk Indonesia	Japan Indonesia Indonesia
Sumatra clean hydrogen production	Indonesia	213	Hydrogen	Pertamina Sembcorp Industries EFG Hermes Holdings	Indonesia Singapore Egypt
Sumatra green hydrogen	Indonesia	213	Hydrogen, synthesis gas	Chevron Keppel Pertamina	United States Singapore Indonesia
HDF Energy, PTSC Singapore green hydrogen production	Singapore	208	Hydrogen	PetroVietnam Hydrogène de France	Viet Nam France
Viet Nam hydrogen and renewable energy generation	Viet Nam	200	Hydrogen	Saigon Asset Management Hydrogène de France	Viet Nam France

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Annex table 7. International project finance deals in renewables, 2022 (Selected cases) (Continued)

Project	Location	Cost ($ million)	Project industry	Ultimate sponsor	Headquarters
HDF Energy, PTSC Vietnam hydrogen power plants	Viet Nam	200	Hydrogen	PetroVietnam Hydrogène de France	Viet Nam France
HDF Energy, PTSC Vietnam green hydrogen production	Viet Nam	200	Hydrogen	PetroVietnam Hydrogène de France	Viet Nam France
Lake Mainit hydroelectric power acquisition	Philippines	199	Hydroelectric	Electric Power Development Frabelle Fishing	Japan Philippines
Deltamas City solar power	Indonesia	130	Solar	Sojitz Surya Utama Nuansa	Japan Indonesia
Sunseap Riau Islands solar energy and storage plant	Indonesia	130	Solar	EDP Energías de Portugal	Portugal
Hengjaya Mine solar farm	Indonesia	130	Solar	Nickel Mines Quantum Power Asia	Australia Singapore
Bluebird Solar Laos solar plant	Lao PDR	128	Solar	Bluebird Solar	India
Shizen Malaysia Top Glove Factories rooftop solar	Malaysia	127	Solar	Shizen Energy	Japan
Kulim Building integrated PV power generation facilities and solar rooftops	Malaysia	127	Solar	EDP Energías de Portugal Reservoir Link Energy	Portugal Malaysia
Malaysia rooftop- and ground-mounted solar farm	Malaysia	127	Solar	EDP Energías de Portugal Reservoir Link Energy	Portugal Malaysia
Currimao solar power plant	Philippines	122	Solar	Manila Electric Vena Energy Holdings	Philippines Singapore
Wesleyan University Philippines solar installation	Philippines	122	Solar	Maoneng Australia	Australia
New Clark City and Ciudad de Calamba renewable energy plants	Philippines	122	Solar	Engie ALG Holdings	France Philippines
Trece Martires City solar photovoltaic system and energy storage system	Philippines	122	Solar, battery storage	Manila Electric Seochang Electric	Philippines Republic of Korea
Philippines solar energy portfolio	Philippines	122	Solar	Nickel Asia Shell	Philippines United Kingdom

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Annex table 7. International project finance deals in renewables, 2022 (Selected cases) (Continued)

Project	Location	Cost ($ million)	Project industry	Ultimate sponsor	Headquarters
Asia Brewery Philippines solar PV	Philippines	122	Solar	Tangent Holdings	United States
Malvar solar power	Philippines	122	Solar	Xcel Energy Manila Electric Yamaha Motor Philippines	United States Philippines Philippines
Cleantech Solar Asia acquisition	Singapore	115	Solar	Keppel FMO	Singapore Netherlands
2.5 MW CJ Vina Agri Plant rooftop solar	Viet Nam	115	Solar	Government of Singapore CJ	Singapore Republic of Korea
Norsk Solar Song Than and Bac Ninh rooftop solar power plants	Viet Nam	115	Solar	Valinor AS	Norway
Ineco Solar Solutions acquisition	Indonesia	113	Solar	Yinson Holdings	Malaysia
Singapore low-carbon energy hub and microgrid system	Singapore	103	Transmission line, hydrogen	Keppel Shell	Singapore United Kingdom
Duofu International Holding Group Indonesia wind and solar power plants	Indonesia	101	Wind, solar, car manufacturing	Duofu International Holding	China
Tanah Laut wind and energy storage system	Indonesia	100	Wind, battery storage	Adaro Energy Eren Groupe	Indonesia Luxembourg
Shikoku Electric Power Phu Yen solar farm acquisition	Viet Nam	99	Solar	Shikoku Electric Power B.Grimm Power Truong Thanh Vietnam Group	Japan Thailand Viet Nam
Cat Hiep solar farm acquisition	Viet Nam	99	Solar	Kumagai Gumi Lucia Holding Greenyellow Smart Solutions	Japan France Viet Nam
1 GW Dak Cheung Xekong wind farm	Lao PDR	99	Wind	Bangchak	Thailand
3.4 GW Iberdrola–Triconti–Stream Invest Holding wind offshore	Philippines	94	Wind	Iberdrola Stream Invest Holding Windkraft Group	Spain Switzerland Philippines

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Annex table 7. International project finance deals in renewables, 2022 (Selected cases) (Concluded)

Project	Location	Cost ($ million)	Project industry	Ultimate sponsor	Headquarters
Bulalacao Oriental Mindoro offshore wind	Philippines	94	Wind	The Blue Circle CleanTech Global Renewables	Singapore Philippines
Aboitiz–Climate Capital–RMI Offshore Wind	Philippines	94	Wind	Aboitiz Equity Ventures Climate Capital RMI (Rocky Mountain Institute)	Philippines United States United States
Oslob wind power	Philippines	94	Wind	Coro Energy	United Kingdom
Buhawind Energy Northern Mindoro wind offshore	Philippines	94	Wind	Government of Denmark Philippine Dealing System Holding	Denmark Philippines
Buhawind Energy East Panay wind offshore	Philippines	94	Wind	Government of Denmark Philippine Dealing System Holding	Denmark Philippines
Vietnam offshore wind farm	Viet Nam	89	Wind	PetroVietnam RENOVA	Viet Nam Japan
Ba Ria offshore wind farm	Viet Nam	89	Wind	Macquarie Group Fecon	Australia Viet Nam
Son La wind farm	Viet Nam	89	Wind	ROSATOM An Xuan Energy	Russian Federation Viet Nam
UPC Philippines Wind Investment power plants acquisition	Philippines	86	Wind	UPC Solar	United States
19 MW rooftop solar	Viet Nam	25	Solar	ThomasLloyd Cleantech Solar Electric Viet Nam	Germany Viet Nam

Source: UNCTAD, based on Refinitiv.

Annex table 8. ASEAN: EV-related start-ups and business linkages with MNEs (Selected cases)

Start-up	Headquarters	Activity	Foreign MNE partner	Headquarters	Activity of foreign partner	Partnership activity	Year
Beep	Singapore	Provide e-mobility platform	GoJek (unicorn)	Indonesia	Ride hailing, delivery, last-mile logistics	Participate in Beep's Voltnet, a digital platform connecting charge point operators and e-mobility service providers	2022
			ComfortDelgro Engie	Singapore France	EV charging stations		
			Shell Recharge	United Kingdom	Shell EV charging stations		
Casion	Indonesia	Provide electric charging stations	Porsche	Germany	Automotive OEM	Build EV charging station network in Indonesia	2023
Charged	Indonesia	Manufacture electric motorbikes	Vmoto Soco	Italy	Manufacture and distribute electric two-wheeled vehicles	Invested $38 million	2022
Dat Bike	Viet Nam	Manufacture EV motorbikes	Gojek (unicorn)	Indonesia	Ride hailing, delivery, last-mile logistics	Provide access for Gojek drivers to Dat Bike motorbikes in Viet Nam	2023
HaupCar	Thailand	Host app-based platform for EV rental	BMW	Germany	Automotive OEM	Provide fleets of BMW EVs to platform	2021
Ion Mobility	Singapore	Design and manufacture electric motorbikes	TVS	India	Manufacture motorbikes	Manufacture electric motorbikes at TVS facility in Indonesia	2023
Selex Motors	Viet Nam	Manufacture electric motorbikes	Schneider Electric Energy Access Asia	France	Investment fund	Invested $5.5 million to expand Selex, including a network of EV motorcycle battery-swapping stations across Viet Nam	2023
			ADB Ventures	Multilateral funding institution	Investment fund		
			Touchstone Partners	Viet Nam	Venture capital		
Strom	Thailand	Manufacture electric motorbikes	Winnoni	Thailand	Provide battery-swapping stations	Develop an electric motorcycle ecosystem	2023
			KILATS	Singapore	Provide low-voltage electric motorcycle technology		
			Mu Sashi Seimitsu Industry	Japan	Design and manufacture different gears		
			Thoresen Thai Agencies	Thailand	Invest		

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Annex table 8. ASEAN: EV-related start-ups and business linkages with MNEs (Selected cases) (Concluded)

Start-up	Headquarters	Activity	Foreign MNE partner	Headquarters	Activity of foreign partner	Partnership activity	Year
Swap Energi	Indonesia	Provide battery-swapping solutions for two-wheeled electric vehicles	Ondine Capital	Singapore	Invest venture capital	Invested $7.2 million	2023
Volta	Indonesia	Manufacture e-bikes	Indrive	United States	Host ride-hailing platform	Hosts subscription platform allowing drivers to purchase Volta electric motorbikes over time	2023

Source: Crunchbase, Tracxn, company websites and media.

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