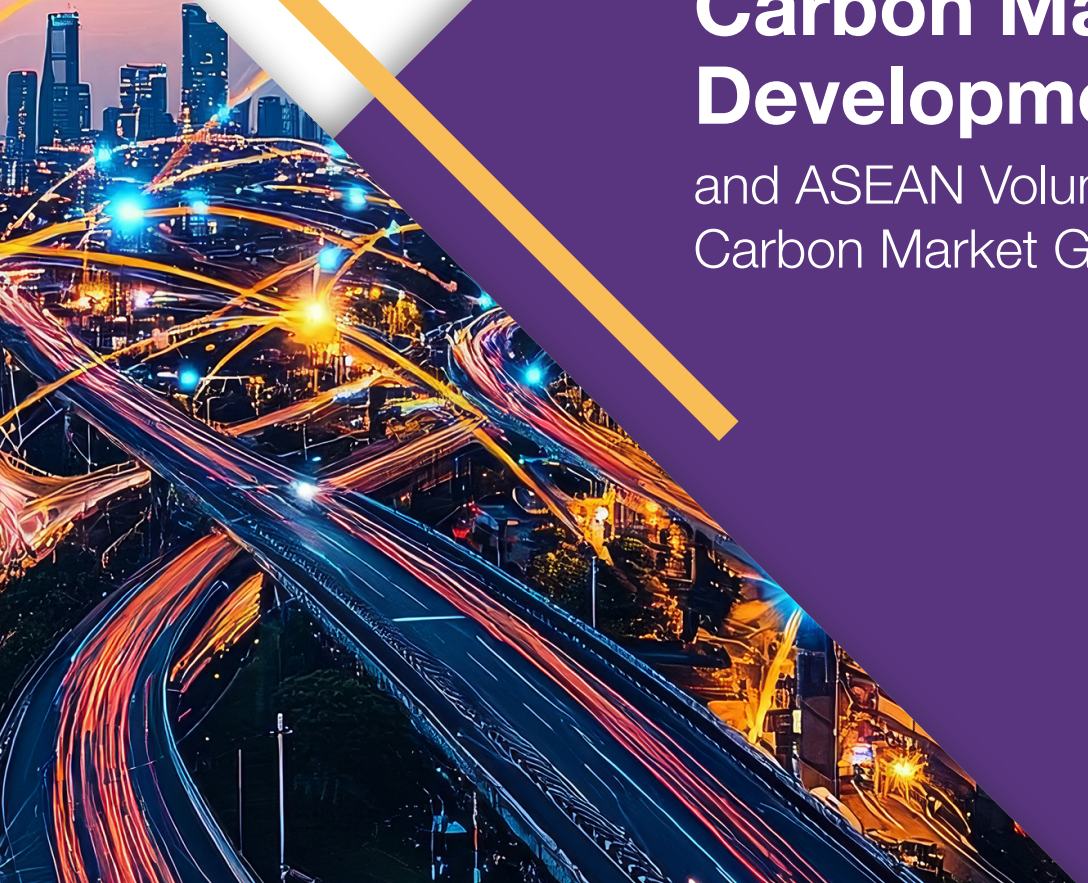
ASEAN Capital Markets Forum



ACMF Voluntary Carbon Market Development Plan

and ASEAN Voluntary Carbon Market Guidance



Malaysia
November 2025

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Foreword

by the Chair, ASEAN Capital Markets Forum 2025

Carbon markets are increasingly crucial for mobilising climate finance to support mitigation efforts globally. The diversity of the ASEAN landscape in terms of economic progress, institutional capacity, and energy mix is often viewed as a challenge to developing scalable carbon markets.

Yet, the potential benefits of well-functioning carbon markets in Southeast Asia are significant, given the opportunity to unlock up to US$3 trillion in value by 2050. This stems primarily from the region's abundant natural resources and growing demand for carbon credits to meet ASEAN member states' net-zero targets.

Against this backdrop, there is growing recognition that high-quality carbon credits are essential, to provide legitimacy and transparency to carbon credit generation. To this end, the ACMF Action Plan 2026-2030 identifies Voluntary Carbon Markets (VCM) as a key initiative under the Strategic Thrust of Building a Sustainable and Resilient ASEAN.

In several ASEAN member states, we are also observing the interplay between VCMs and Compliance Carbon Markets. This convergence is encouraging as it enhances the overall carbon market ecosystem and strengthens governance systems.

Building on IOSCO's Report on Voluntary Carbon Markets published in 2024, the ACMF commissioned the Economic Research Institute for ASEAN and East Asia (ERIA) to develop the ACMF Voluntary Carbon Market Development Plan and ASEAN Voluntary Carbon Market Guidance.

An interoperable approach to the development of VCMs can drive scale, increase transparency around transaction costs, and boost investor confidence across the region. Collectively, these efforts aim to ensure high-quality projects are adequately funded and carbon credit prices reflect the value of projects that deliver environmental and social co-benefits beyond carbon reduction.

Designed as a multi-year plan of action, the ACMF VCM Development Plan and ASEAN VCM Guidance, aim to address the role of securities regulators in promoting financial integrity within the VCM ecosystem, while also recognising interdependence with environmental actors. Given the varying levels of VCM maturity across ASEAN member states, the ASEAN VCM Guidance adopts a building block approach based on ecosystem readiness and institutional capacity.

I would like to express my sincere appreciation to ACMF members for their active engagement and hard work, ERIA for their support and unwavering commitment, and to all regional stakeholders whose valuable contributions have shaped this document. Their insights and feedback have been instrumental in charting the direction and scope of the path ahead.



Mohammad Faiz Azmi

Chair, ASEAN Capital Markets Forum 2025

Foreword

by the President, Economic Research Institute for ASEAN and East Asia

Southeast Asia stands at a pivotal juncture in its pursuit of sustainable growth and carbon neutrality. The urgency of addressing climate change has never been greater, and the collective actions we take today will shape the resilience of our economies and societies in the decades ahead. In this journey, voluntary carbon markets represent both an opportunity and a responsibility—an opportunity to mobilise much-needed finance and technology, and a responsibility to ensure that these markets are credible, transparent, and aligned with regional and global commitments.

Achieving carbon neutrality in ASEAN countries requires not only innovation and ambition, but also effective financial mechanisms. High-integrity carbon markets are central to this effort. They can drive investment in clean energy, support hard-to-abate sectors, and deliver tangible benefits to local communities.

The Economic Research Institute for ASEAN and East Asia (ERIA) is honoured to collaborate with the ASEAN Capital Markets Forum (ACMF) in strengthening ASEAN's voluntary carbon market ecosystem—ensuring it is credible, interoperable, and inclusive while linking regional priorities with global opportunities.

This report demonstrates how voluntary carbon markets can serve as a bridge: helping countries finance low-carbon technologies and accelerate solutions across energy, industry, and land use. It also underscores the importance of interoperability and regional cooperation to ensure ASEAN's carbon credits are trusted and competitive globally.

Looking ahead, ERIA will continue to work closely with ASEAN Member States, the ACMF, and international partners to build a robust voluntary carbon market that safeguards energy security, advances sustainable development, and ensures a just and inclusive transition. I extend my sincere appreciation to all contributors and hope this report serves as a valuable reference for policymakers, market participants, and partners.



Tetsuya Watanabe

President, Economic Research Institute for ASEAN and East Asia

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We extend our sincere appreciation to the authors and research team from ERIA—Intan Murnira Ramli, Alloysius Joko Purwanto, Sho Hayashi, Ayu Pratiwi Muyasyaroh, and Sayo Hosoi—for their commitment and rigorous analysis in preparing this report. We also thank the Mitsubishi Research Institute (MRI) team, led by Akiko Ishii and comprising Yuika Iwabuchi, Gota Seto, Saki Kato, and Vu Thi Ngoc Ha, for their valuable technical inputs and research assistance.

We are deeply grateful to the ACMF and its Sustainable Finance Working Group, under the leadership of the Securities Commission Malaysia, for their strategic guidance and policy insights throughout this process. Our sincere thanks also go to all ACMF members for their active engagement and constructive feedback during consultations, which significantly enhanced the quality and relevance of this report.

This work has greatly benefited from the cooperation and insights of a wide range of stakeholders, including government agencies, carbon exchanges, registries, project developers, and market participants across ASEAN. Consultations conducted as part of the study involved representatives from carbon exchanges, standard-setting bodies, financial institutions, as well as private-sector actors and validation and verification bodies (VVBs), whose perspectives helped strengthen the analytical foundation and regional applicability of the report.

Finally, we express our deepest gratitude to Mr. Mohammad Faiz Azmi, Chair of the ASEAN Capital Markets Forum, and Mr. Tetsuya Watanabe, President of ERIA, for their leadership, continued support, and encouragement.

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List of Acronyms

ABAC	Anti-Bribery and Anti-Corruption
ACMF	ASEAN Capital Markets Forums
AML	Anti-Money Laundering
AMS	ASEAN Member States
API	Application programming interfaces
ASEAN	Association of Southeast Asian Nations
ATFG	ASEAN Transition Finance Guidance
CCP	CCP the Core Carbon Principles
CO_2	carbon dioxide
ERIA	Economic Research Institute for ASEAN and East Asia
ESG	environmental, social, and governance
GDP	gross domestic product
GHG	greenhouse gas
ICVCM	Integrity Council for the Voluntary Carbon Market
IEA	International Energy Agency
IFRS	International Financial Reporting Standards
IOSCO	International Organization of Securities Commissions
IP&LCs	Indigenous Peoples and local communities
ISSB	International Sustainability Standards Board
KYC	know your customer
Lao PDR	Lao People's Democratic Republic
LULUCF	land use and land-use change and forestry
MAC	marginal abatement cost
MRV	monitoring, reporting, and verification
Mt	metric tonne
$MtCO_2$	million tonnes of CO_2
NBS	nature-based solution
NDC	nationally determined contribution
SMEs	small and medium-sized enterprises
toe	tonne of oil equivalent
VCM	voluntary carbon market
VCMI	The Voluntary Carbon Markets Integrity Initiative
VVB	validation and verification body

Essential terms

Voluntary carbon market (VCM)	VCM is "a type of carbon market where entities voluntarily buy credits generated from projects that are structured to or intended to (i) assist in the reduction of [carbon dioxide] [CO_2] emissions or (ii) permanently remove CO_2 emissions from the atmosphere, thereby allowing these buying entities to offset some or all of their CO_2 emissions or to contribute to climate change mitigation (International Organization of Securities Commissions, 2024: 10).
Article 6	"Article 6 of the Paris Agreement enables international cooperation to tackle climate change and to unlock financial support for developing countries" (United Nations Framework Convention on Climate Change [UNFCCC], n.d.).
Article 6.2	"Provides accounting and reporting guidance for Parties to use internationally transferred mitigation outcomes towards their nationally determined contributions" (UNFCCC, n.d.)
Article 6.4	"Establishes a new UNFCCC mechanism which can be used to trade high-quality carbon credits" (UNFCCC, n.d.)
Net zero	In this report, it refers to net zero greenhouse gas emissions which is described as "[A] condition in which metric-weighted anthropogenic greenhouse gas (GHG) emissions are balanced by metric-weighted anthropogenic GHG removals over a specified period" (International Panel on Climate Change [IPCC], n.d.).
Carbon neutrality	"[A] condition in which anthropogenic carbon dioxide (CO_2) emissions associated with a subject are balanced by anthropogenic CO_2 removals" (IPCC, n.d.).

Executive summary

As the Association of Southeast Asian Nations (ASEAN) advances its sustainability agenda, the development of high-integrity voluntary carbon markets (VCMs) has emerged as a key priority to unlock climate finance and support low-carbon transitions. Recognising this potential, the ASEAN Capital Markets Forum (ACMF) identified the scaling of VCMs as a key initiative under the ACMF Action Plan 2026–2030, within Strategic Thrust 2: Building a Sustainable and Resilient ASEAN.

In 2024, ACMF published *Study on a High-Quality Voluntary Carbon Market for ASEAN*, which examined the role of VCMs in supporting ASEAN's transition to a low-carbon economy. In the same year, the International Organization of Securities Commissions (IOSCO) released *Final Report on Voluntary Carbon Markets,* outlining 21 good practices to strengthen market structures and ensure financial integrity in VCMs.

Acknowledging the growing importance of VCMs, ACMF, through the Sustainable Finance Working Group, in collaboration with the Economic Research Institute for ASEAN and East Asia, developed the ACMF Voluntary Carbon Market Development Plan and the ASEAN Voluntary Carbon Market Guidance.

A well-functioning VCM must combine financial integrity with environmental integrity. The development plan and the guidance provide a practical direction for ASEAN countries on how to engage effectively in VCMs, ensuring alignment with regional financial markets and broader economic integration efforts.

Following an assessment of ASEAN's readiness to scale its VCM ecosystem towards meeting decarbonisation targets, the guidance was designed to strengthen market frameworks. Emphasis was placed on the role of securities regulators in ensuring fair, orderly, and structurally resilient trading.

Chapter 1 provides the analytical foundation. It shows that although emissions from energy-related sectors are expected to increase in the short term, deep reductions will be required after 2030 if ASEAN is to achieve carbon neutrality by mid-century. These reductions should be driven by renewable energy, low-carbon fuels, carbon capture, and other advanced technologies.

Chapter 2 examines the supply and demand dynamics of ASEAN's VCM. On the supply side, ASEAN hosts a significant number of carbon projects, with nature-based solutions contributing most credits to date, and renewable energy and industrial projects emerging as additional sources. On the demand side, most credits generated in ASEAN are currently purchased and retired by entities outside the region, highlighting the need to expand domestic demand and align credit use with ASEAN's decarbonisation pathways.

Chapter 3 explores the role of carbon pricing, particularly VCMs, in ASEAN. It reviews carbon credit activities and examines the readiness of ASEAN's VCM ecosystem across four variables: (i) market structure and liquidity (primary and secondary market), (ii) policy stability and predictability, (iii) market reach, and (iv) economic viability and longevity. Based on these, ASEAN Member States are grouped into advanced, emerging, and developing categories, reflecting varying levels of VCM activity and infrastructure.

Chapter 4 presents a stakeholder analysis of ASEAN's VCM. Eighteen stakeholders were identified and clustered into four groups—subjects, key players, context setters, and the crowd—each with varying levels of influence and involvement. Special attention is given to strengthening the participation of Indigenous Peoples and local communities and the media, who play crucial roles in safeguarding ecosystems and shaping public perceptions. This

chapter identifies areas where stakeholders require deeper understanding to foster stronger collective action.

Chapter 5 introduces the ASEAN VCM Guidance, structured about 35 criteria across four segments in line with IOSCO's 21 good practices: (i) regulatory frameworks; (ii) primary market issuance; (iii) secondary market trading; and (vi) use, disclosure, and retirement of carbon credits. Building on ACMF's existing initiatives, the guidance sets out principles and criteria tailored to the regional context, whilst aligned with international standards to ensure interoperability.

Chapter 6 highlights key considerations for implementation. It emphasises the dual role of VCMs in ASEAN's decarbonisation progress: enabling cost-effective solutions for emissions mitigation, especially in hard-to-abate sectors, whilst generating new revenue streams for clean technologies and renewable energy. Establishing a robust, interoperable, and high-integrity VCM requires greater alignment and harmonisation within ASEAN, from registry-level data to sustainable finance frameworks. Such efforts will ensure inclusive participation from diverse stakeholders and lay the foundation for linking ASEAN with global carbon markets. In addition to that, this chapter also outlines the key limitations encountered in the study, including data gaps and methodological constraints. It proposes approaches to address these, such as improving data definitions and methodological rigour, which could provide valuable guidance for future studies.

In conclusion, this report highlights ACMF's commitment to advancing the VCM agenda as an integral part of ASEAN's pathway to carbon neutrality. By ensuring integrity, interoperability, and regional cooperation, ASEAN's VCM can serve as a cornerstone of the region's sustainable finance architecture, mobilising capital for the transition to net zero, whilst delivering benefits for economies, societies, and the environment.

Chapter 1: ASEAN Decarbonisation Roadmap

According to *ASEAN Strategy for Carbon Neutrality* (Association of Southeast Asian Nations [ASEAN], 2023), the impacts of climate change will be significant across ASEAN. Carbon emissions from energy demand, for example, are projected to increase at an average annual growth rate of 3.3%, from 425 million tonnes of carbon in 2019 to about 1,177 million tonnes in 2050 (Economic Research Institute for ASEAN and East Asia [ERIA], 2023). If left unaddressed, climate change could reduce global gross domestic product (GDP) by 11% by 2100, about 87 million people in ASEAN would face heightened risks from flooding. GermanWatch (2025) reports that in 1993–2022, three ASEAN Member States (AMSs) were amongst the 20 countries most affected by extreme weather events.

ASEAN Strategy for Carbon Neutrality aims to accelerate an inclusive transition towards a green economy, fostering sustainable growth whilst complementing national efforts through collective regional effort.

One of the eight strategies identified to initiate ASEAN's journey towards carbon neutrality is the development of credible and interoperable carbon market, both within the region and with global markets. This includes harmonising measurement, reporting, and verification (MRV) standards and policies to access global liquidity and fully utilise regional carbon sink potential. A regional MRV framework can facilitate the generation of high-quality carbon credits, whilst policy support will enable seamless international exports of such credits.

Whilst recognising the importance of compliance-based carbon pricing instruments, the International Energy Agency (IEA) (2024) stresses the potential contribution of carbon credits in scaling up low-emission technologies, including low-carbon hydrogen, direct air capture, and sustainable aviation fuels.

The IEA (2024) identifies several practices in the use of carbon credits:

- Developing countries use cross-border financing infrastructure established by carbon credit markets to channel pay-for-performance funding into national carbon projects.
- Non-state actors and governments use carbon credits, mostly from voluntary carbon markets (VCMs), to offset residual emissions and claim carbon neutrality or net-zero achievements as part of their voluntary climate targets.
- Airlines use carbon credits to comply with obligations under the Carbon Offsetting and Reduction Scheme for International Aviation.
- Until 2020, some governments used carbon credits from the Kyoto Protocol's flexibility mechanisms to comply with their emissions mitigation obligations. Since 2020, several governments have started, or have been considering, using internationally transferred mitigation outcomes under Article 6 of the Paris Agreement to cooperate voluntarily to reach or exceed their nationally determined contributions.

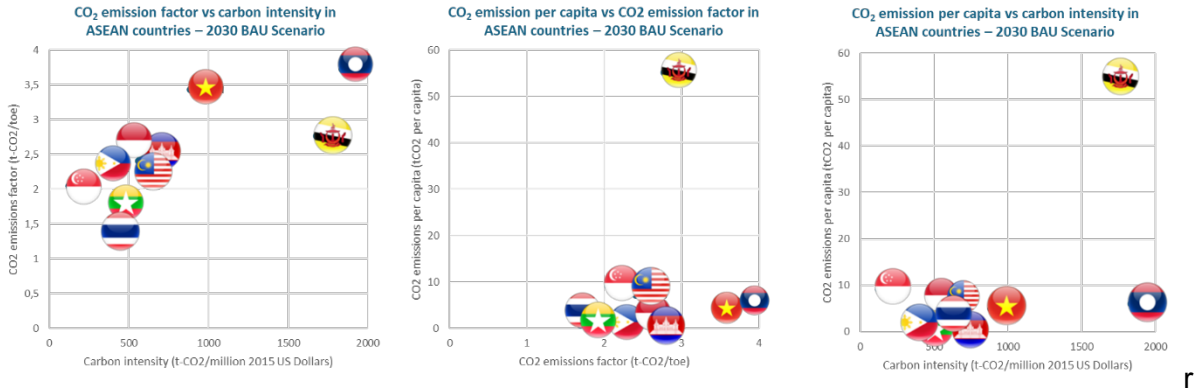
Drawing on ERIA studies, this chapter presents the status of carbon emissions across AMSs. It provides a decarbonisation roadmap for the region and for individual countries, starting with an analysis of the current energy supply. It then outlines the emission reduction trajectories required in each member state and each energy-consuming sector to reach carbon neutrality and net-zero emissions by mid-century, along with the associated costs.

1.1. Introduction

From the perspective of carbon emissions, energy-related technologies, and economic conditions, AMSs differ across at least three key indicators: (i) the carbon emission factor, measured as the average amount of carbon dioxide (CO_2) emitted per unit of primary energy consumption (expressed in tonnes of CO_2 per tonne of oil equivalent [tCO_2/toe]); (ii) CO_2 emissions per capita, representing the average emissions per inhabitant); and carbon intensity, defined as the average amount of CO_2 emitted per unit of GDP.

A country's carbon emission factor (CO_2/toe) reflects the overall efficiency or cleanliness of its energy-related technologies. High carbon emission factors indicate the use of highly inefficient or relatively polluting technologies while low carbon emission factors in general indicate the use of highly efficient or relatively clean technologies. Emissions per capita (tCO_2/capita) reflect the average carbon output per inhabitant, which can be linked to both the level of energy use per person and the efficiency or cleanliness of end-use technology. Carbon intensity, expressed as tonnes of CO_2 per unit of GDP, indicates the level of energy efficiency or the cleanliness of technologies underpinning a country's economic activity.

Figure 1-1. ASEAN Member States' Mapping for 2030: Carbon Dioxide Emission Factor, Carbon Intensity, and Carbon Dioxide Emissions per Capita



ASEAN = Association of Southeast Asian Nations, BAU = business as usual.
Source: ERIA (2023).

As shown in Figure 1-1, AMSs' carbon emission profiles can be mapped using these three indicators, estimated for 2030 in *East Asia Energy Outlook and Saving Potential* (ERIA, 2023).

Brunei Darussalam exhibits the highest CO_2 emissions per capita alongside high carbon intensity, suggesting both intensive end-use energy consumption and less-efficient technology for generating GDP. The Lao People's Democratic Republic (Lao PDR) shows high carbon intensity and high emission factors, indicating widespread use of inefficient technologies. Viet Nam also shows relatively high emission factors and carbon intensity.

The remaining AMSs cluster more closely around the ASEAN average, although differences remain. For example, whilst Thailand records similar carbon intensity levels to its peers, it has the lowest carbon emission factor in the group. By contrast, Indonesia and Cambodia show relatively high emission factors. Similarly, although Singapore and Viet Nam have comparable per capita emissions, Singapore records the lowest carbon intensity, whist Viet Nam records the highest.

These indicators provide preliminary insights into the priority for emission reduction. Brunei Darussalam, with its high per capita emissions, should focus on reducing energy use in end-use sectors such as transport and residential consumption. Lao PDR should address its

growing use of coal for power generation, whilst Viet Nam should increase its investments in improving the efficiency of its industrial sector.

Further country-level analysis is required to assess AMSs' potential demand for carbon credits to offset emissions in hard-to-abate sectors, given the high marginal abatement costs (MACs) associated with reducing emissions solely through domestic measures. Such analysis should also identify the potential for credit supply credits from national carbon projects. Beyond the traditional forestry and land-use sectors, which hold significant credit-generation potential in developing countries, opportunities also exist in hard-to-abate energy related sectors. These sectors require substantial financing to support cleaner and more efficient technologies, as well as the high costs of renewable energy deployment.

This chapter sets out how AMSs could achieve their decarbonisation targets. It presents the key assumptions, methodology, and results of *Decarbonisation of ASEAN Energy Systems: Optimum Technology Selection Model Analysis up to 2060: Updated 202*5 (ERIA, 2025). The discussion establishes the context for assessing how VCMs can contribute to AMSs' decarbonisation pathways and help achieve carbon neutrality by mid-century.

The following sub-sections present AMSs' carbon neutrality targets, the assumptions of the ERIA study, and its main results.

1.2. ASEAN Member States' Decarbonisation Targets and Study Assumptions

Most AMSs have announced decarbonisation targets, expressed either in terms of carbon neutrality or net zero. Whilst the two terms are often used interchangeably, their implications differ. Carbon neutrality refers to balancing carbon emissions with an equivalent amount of offset, typically through carbon credits, and it tends to include only direct carbon emission produced during the operation and energy use. Net zero is more comprehensive, encompassing all greenhouse gases as well as indirect emissions generated along the supply chains of economic activities.

The target years set by AMSs cluster around the middle of this century, as shown in Table 1-1. In ERIA's decarbonisation study, it was assumed that each AMS would achieve carbon neutrality by a specified year, with energy-related CO_2 reductions estimated from 2017 onwards. The study also incorporated contributions from land use and land-use change, and forestry (LULUCF) as natural carbon sinks to absorb emissions.

Table 1-1. ASEAN Member States' Announced Decarbonisation Targets, Assumed Carbon Neutrality Target Years, and Assumed Carbon Sink Use in the Target Year

Country	Announced Target	Assumed CN Target Year	Energy-related CO_2 Emission Reduction Target from 2017	Assumed Natural Carbon Sink (LULUCF) in Target Year
Brunei Darussalam	2050(NZ)	2050	-50% (3.5 Mt)	Brunei information (-4.4 Mt)
Cambodia	2050 (CN)	2050	+37% (26.0 Mt)	LTS4CN scenario 2050 (-50.2 Mt)
Indonesia	2060 (NZ)	2060	-50% (245.5 Mt)	LCCP scenario 2050 (-300 Mt)
Lao PDR	2050 (NZ)	2050	-100%	-
Malaysia	2050 (NZ)	2050	-22% (164.0 Mt) *1	2016 inventory (-241Mt)

Myanmar	2040 (NZ in LULUCF)	2060	-60% (12.0 Mt)	2040 unconditional NDC (-13 Mt)
Philippines	No defined year	2060	-100%	-
Singapore	2050 (NZ)	2050	-100%	-
Thailand	2065 (NZ)	2050	-61% (95.5 Mt) *2	LTS carbon neutrality pathway (-120 Mt)
Viet Nam	2050 (NZ)	2050	-54% (88.8 Mt) *3	2030 unconditional NDC (-59 Mt)

ASEAN = Association of Southeast Asian Nations, CN = carbon neutrality; CO_2 = carbon dioxide; Lao PDR = Lao People's Democratic Republic; LCCP = low-carbon scenario compatible with the Paris Agreement target; LTS = long-term strategy; LTS4CN = long-term strategy for carbon neutrality; LULUCF = land use, land-use change, and forestry; Mt = metric tonne; NDC = nationally determined contribution, NZ = net-zero.

*1: Consistent with the *National Energy Transition Roadmap* (Ministry of Economy, 2023).

*2: Consistent with the long-term low emissions development strategy (Office of Natural Resources and Environmental Policy and Planning, 2022).

*3: Consistent with *National Strategy on Climate Change by 2050* (Government of Viet Nam, 2022).

*4: '–' indicates countries excluded from consideration due to lack of data.

Source: ERIA (2025) and additional information on the announced targets.

Other key assumptions of the ERIA decarbonisation study include the following:

- **Economic growth.** Average annual GDP growth in ASEAN is assumed at 4.1% during the simulation period. Short-term growth rates are based on International Monetary Fund (2024) projections. This assumption reflects the prolonged impacts of the coronavirus disease (COVID-19) pandemic, the ongoing Ukrainian crisis, and global inflationary pressures.
- **Demographic growth.** Population assumptions are based on the United Nations (2022), which provides projections up to 2100. The adopted assumptions represent moderate demographic trends.
- **Fossil fuel prices.** Future coal and natural gas prices are estimated from ASEAN historical data using the stated policy scenarios of *IEA World Energy Outlook* (IEA, 2023b). Crude oil prices are estimated in the same way, using international market prices.
- **Annual CO_2 storage capacity**. Annual storage capacity is set at 0.3% of cumulative potential in 2040, increasing to 0.6% by 2050. This assumption ensures sustainable CO_2 storage beyond 2050. Whilst accurate estimates remain challenging, the IEA (2021) reports that ASEAN possesses abundant potential, with a cumulative storage capacity of 133.4 gigatonnes of CO_2 across six countries: Brunei Darussalam, Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam. The study considers the possibility of cross-border CO_2 imports and exports within ASEAN.
- **Other assumptions.** Detailed assumptions are made regarding factors influencing ASEAN's energy system and its emissions. These include development of the ASEAN power grid; introduction of hydrogen and ammonia as new energy sources and carriers; expansion of renewable energy resources such as solar, wind, hydro,

geothermal, and biomass; supply potential of biofuels for road transport; detailed cost assumptions for power generation (capital expenditure, operational expenditure, and fuel costs); capital cost and energy consumption of direct air capture; and the deployment of energy storage technologies, including pumped hydro, batteries, and compressed hydrogen tanks.

1.3. ERIA Decarbonisation Study to Support the ACMF Voluntary Carbon Market Development Plan

The ACMF Voluntary Carbon Market Development Plan is underpinned by ERIA's decarbonisation roadmap study (ERIA, 2025). This study was conducted using the Institute of Energy Economics, Japan–New Earth model, an optimal technology model developed by Otsuki et al. (2022, 2019), which encompasses the entire energy system.

The model covers all 10 AMSs over 2017–2070, using 2017, 2030, 2040, 2050, 2060, and 2070 as representative years. It analyses the relationship between energy consumption and CO_2 emissions, incorporating energy technology costs and MACs.

In essence, the model seeks the optimal combination of technologies and energy resources for each AMS, allowing them to reach their assumed carbon neutrality targets (as outlined in Table 1-1) at the lowest possible cost. Formulated through linear programming, it incorporates the cost and performance parameters of individual technologies as input values. The output is a cost-minimising combination of technology scales and operational patterns across ASEAN, subject to constraints such as CO_2 emissions limits and supply–demand balance.

The model covers energy conversion and end-use sectors, including industry, transport, residential, and commercial. More than 350 technologies are incorporated, assessed according to capital expenditure, fuel costs, and CO_2 emissions. The optimisation minimises the total energy system cost for ASEAN as a whole, rather than for each country individually.

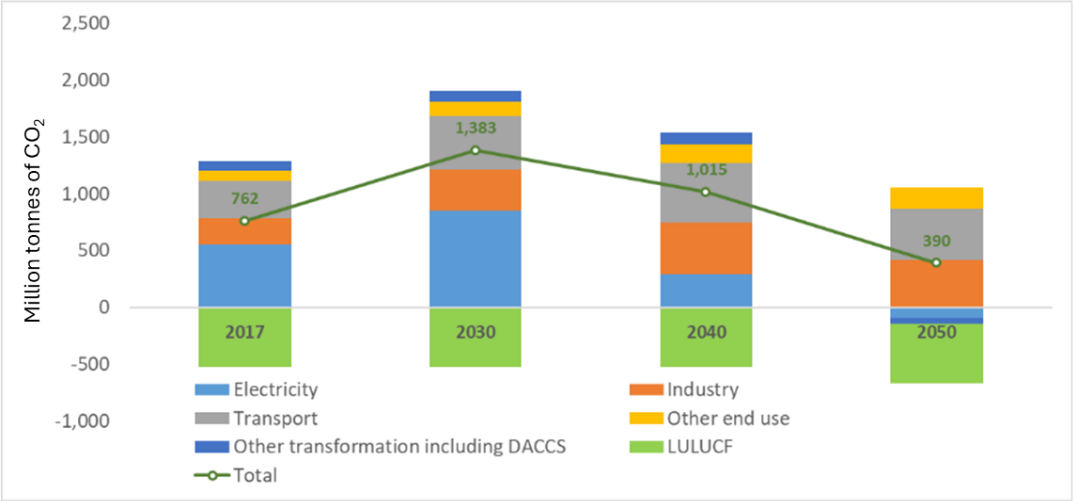
Technologies represented in the model include low-carbon options such as solar photovoltaic, onshore and offshore wind, hydrogen, and ammonia–fired power generation, as well as negative-emission technologies such as direct air capture with carbon storage and bioenergy with carbon capture and storage. The model captures the full energy chain, from primary energy production and imports, through secondary energy conversion and intraregional energy trade, to CO_2 capture and storage and final energy consumption.

The modelling of end-use sectors draws on data from ERIA's energy outlook, the IEA energy balance tables, and the Institute of Energy Economics, Japan outlook.

1.4. Main Results: Energy-related Sectors' Carbon Dioxide Emissions

This section presents the main results of ERIA's decarbonisation study in terms of CO_2 emissions from energy-related sectors. Figure 1-2 shows the expected evolution of the ASEAN CO_2 emissions under the decarbonisation roadmap (ERIA, 2025) from 2017 to 2050.

Figure 1-2. Energy-related Carbon Dioxide Emissions and Offsets in the ASEAN Decarbonisation Roadmap by Sector (2017–2050)



ASEAN = Association of Southeast Asian Nations, CO_2 = carbon dioxide; DACCS = direct air carbon capture and storage; LULUCF = land use, land-use change, and forestry.
Note: The LULUCF figure does not include data of countries where data was unavailable.
Source: ERIA (2025).

As shown in Figure 1-2, total CO_2 emissions from energy-related sectors in ASEAN are expected to increase from 762 million tonnes ($MtCO_2$) in 2017 to 1,383 $MtCO_2$ in 2030, before reducing to 390 $MtCO_2$ by 2050.

Electricity, transport, industry, and other end-use sectors contribute positively to emissions throughout the modelling period. By 2050, these four sectors will still emit about 914 $MtCO_2$. However, LULUCF are projected to absorb 524 $MtCO_2$, whilst other transformation sectors, including direct air carbon capture and storage, absorb a further 144 $MtCO_2$. This results in a net positive emission of 390 $MtCO_2$ by 2050. These residual emissions reflect the fact that reduction targets are set at the country level, with reliance on natural carbon sinks, including those from LULUCF.

LULUCF in several AMSs is expected to act as a natural carbon sink, generating negative emissions (Figure 1-2). The values of these negative emissions were assumed exogenously for the target years, based on consultation with AMSs during the study (ERIA, 2025) and are consistent with the assumptions set out in Table 1-1. Except for Lao PDR, Singapore, and the Philippines, all AMSs are assumed to have natural carbon sink capacity through LULUCF measures. The absorbed CO_2 values from 2017 to the target years were assumed to remain constant. Whilst alternative assumptions could be applied, these would require further justification. The adoption of constant values is considered a conservative and safe assumption, reflecting the input of national experts and agreement during the study process.

CO_2 emissions from the power sector are expected to decrease significantly from 2040 onwards. Power generation itself is projected to increase significantly faster than final energy consumption during the modelling period. After 2030, renewable-based electricity generation, mainly solar photovoltaic, is expected to expand rapidly.

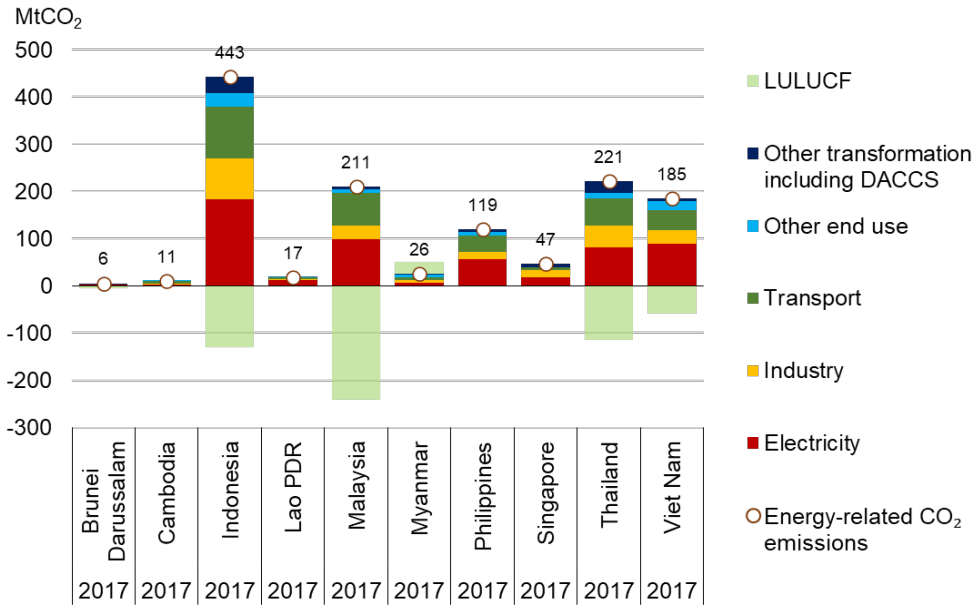
By 2050, more than 1 terawatt of variable renewable energy capacity is assumed to be installed, giving renewables a 64% share in ASEAN's power mix. Significant battery storage will be deployed in combination with low-carbon, fuel-fired power plants to address the intermittency of variable renewables. From2050 onwards, power sector emissions are expected to become negative through the large-scale deployment of biomass-based electricity with carbon capture and storage technology, offsetting residual emissions from high-cost abatement sectors such as high-temperature industrial processes and heavy-duty transport.

The overall energy mix shows rising electricity demand as electrification becomes the primary driver of efficiency improvements, whilst the use of natural gas and oil declines. Natural gas demand increases mainly in the industrial sector, whereas electricity demand increases across industry, transport, and the residential and commercial sectors. The decline in oil consumption is primarily due to the electrification of passenger vehicles.

Primary energy supply reflects these structural changes in final demand and power generation. CO_2 emissions from fossil fuels are reduced through carbon capture and storage (CCS). Initially, capture facilities are installed in coal-fired power plants, before expanding to gas- and biomass-fired plants. CCS is applied to blast furnaces, cement kilns, and chemical plants. However, these decarbonisation measures increase the cost of the energy system.

Figure 1-3 to Figure 1-6 show energy-related CO_2 emissions in ASEAN by country for 2017, 2030, 2040, and 2050, respectively. Figure 1-3 and Figure 1-4 show that most of the emission increase from 2017 to 2030 is expected to occur all AMSs, with strong upward trends in Viet Nam, Brunei Darussalam, Indonesia, the Philippines, and Cambodia.

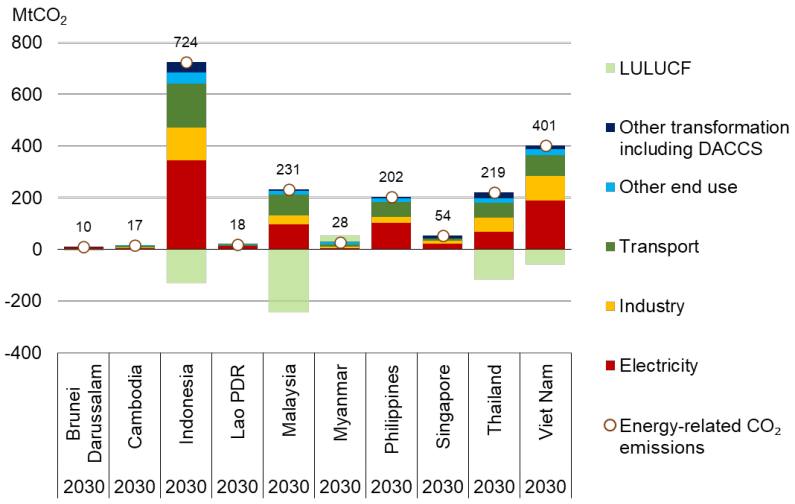
Figure 1-3. Energy-related Carbon Dioxide Emissions in the ASEAN Decarbonisation Roadmap by Country, 2017



ASEAN = Association of Southeast Asian Nations; CO_2 = carbon dioxide; DACCS = direct air carbon capture and storage; Lao PDR = Lao People's Democratic Republic; LULUCF = land use, land-use change, and forestry; $MtCO_2$ = million tonnes of carbon dioxide.
Source: ERIA (2025).

From 2030 (Figure 1-4) to 2040 (Figure 1-5), ASEAN's total energy-related CO_2 emissions are expected to decrease by just more than 19%. All AMSs except Cambodia are expected to see reductions, with the electricity sector being the only sector showing a decrease from 2030 to 2040.

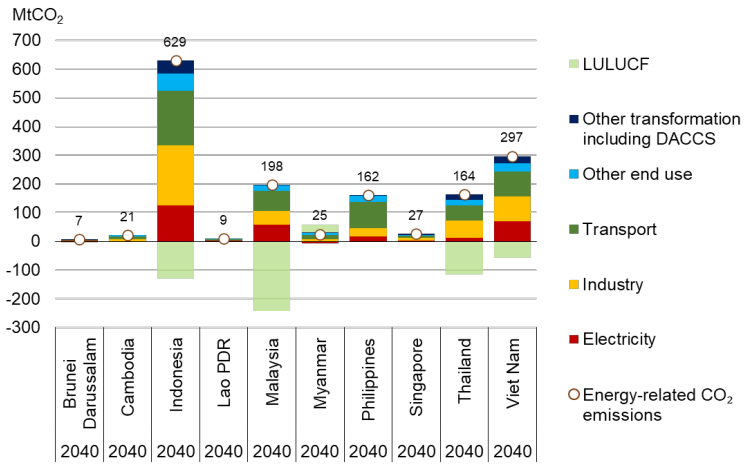
Figure 1-4. Energy-related Carbon Dioxide Emissions in the ASEAN Decarbonisation Roadmap by Country, 2030



ASEAN = Association of Southeast Asian Nations; CO_2 = carbon dioxide; DACCS = direct air carbon capture and storage; Lao PDR = Lao People's Democratic Republic; LULUCF = land use, land-use change, and forestry; $MtCO_2$ = million tonnes of carbon dioxide.
Source: ERIA (2025).

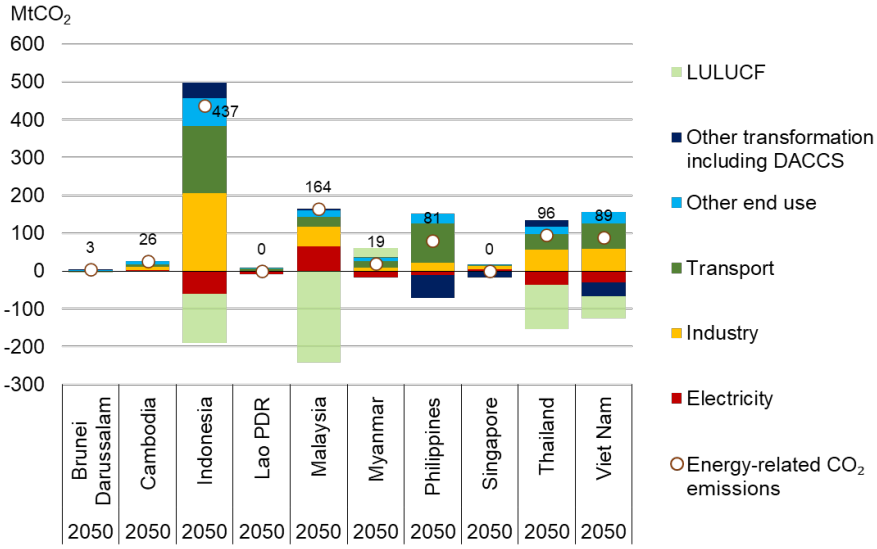
From 2040 (Figure 1-5) to 2050 (Figure 1-6), ASEAN's energy-related CO_2 emissions are projected to fall by more than 40%. All AMSs are expected to record reductions, with Lao PDR and Singapore achieving carbon neutrality in their energy-related sectors by 2050. During this period, all sectors, except 'other end-use', are expected to record declines in emissions.

Figure 1-5. Energy-related Carbon Dioxide Emissions in the ASEAN Decarbonisation Roadmap by Country, 2040



ASEAN = Association of Southeast Asian Nations; CO_2 = carbon dioxide; DACCS = direct air carbon capture and storage; Lao PDR = Lao People's Democratic Republic; LULUCF = land use, land-use change, and forestry; $MtCO_2$ = million tonnes of carbon dioxide.
Source: ERIA (2025).

Figure 1-6. Energy-related Carbon Dioxide Emissions in the ASEAN Decarbonisation Roadmap by Country, 2050

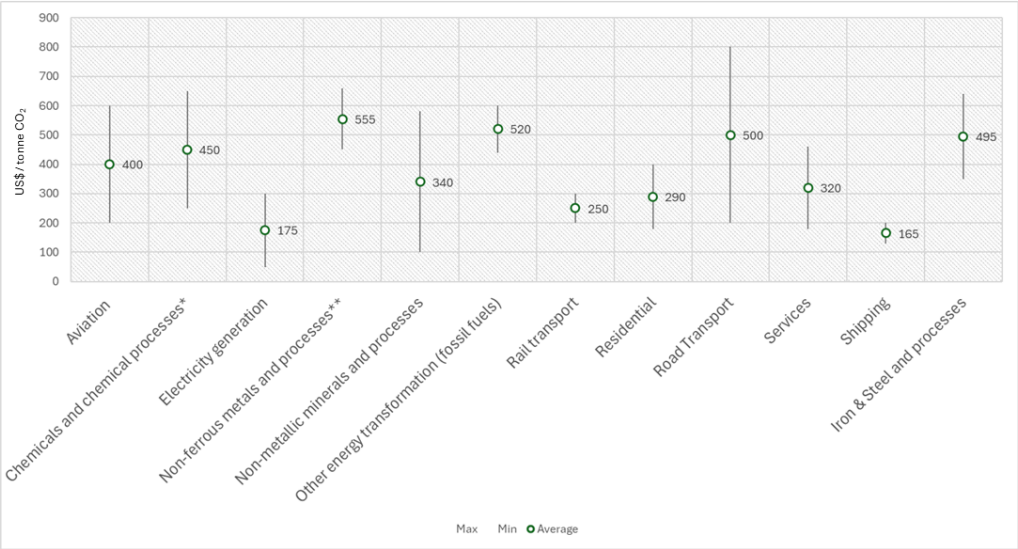


ASEAN = Association of Southeast Asian Nations; CO_2 = carbon dioxide; DACCS = direct air carbon capture and storage; Lao PDR = Lao People's Democratic Republic; LULUCF = land use, land-use change, and forestry; $MtCO_2$ = million tonnes of carbon dioxide.
Source: ERIA (2025).

1.5. Costs for Reducing Carbon Dioxide

The difficulty of reducing carbon emissions varies across energy-consuming sectors, and this difficulty is reflected in the cost required for abatement. MSCI Carbon Markets (2023) shows the estimated average cost for reducing 40% of CO_2 emissions from 2019 levels by 2030 across different sectors worldwide.

Figure 1-7. Estimated Average Abatement Cost to Achieve 40% Emission Reduction by 2030 (US$/tCO₂e)



tCO_2e = tonne of carbon dioxide equivalent.
*Including ammonia.
**Including aluminium.
Source: MSCI Carbon Markets (2023), based on the average cost of each sector reducing its emissions by 40% from 2019 levels by 2030 in line with science-based 2050 net-zero scenarios. See 'Using Carbon Credits to Meet Corporate Climate Targets', MSCI Carbon Markets (formerly Trove Research), 24 November 2023, and 'Synthesis Report of the IPCC Six Assessment Report (AR6)', Intergovernmental Panel on Climate Change, 20 March 2023.

The figure shows that sectors such as non-ferrous metals and processes, other energy transformation (fossil fuels), and road transport face the highest average costs of carbon abatement. These sectors can therefore be considered amongst the hard-to-abate sectors in terms of carbon emissions. By contrast, sectors such as shipping and power generation incur lower average abatement costs.

Although the average cost of reducing carbon emissions provides a general indication of expenses, another indicator, MAC, is more useful for policy. MACs identify the cost-effectiveness of incremental reductions, revealing which options are the most efficient for achieving additional emission cuts.

MAC, developed in the ERIA decarbonisation study, measures the cost of reducing the final one tonne of GHG emissions (e.g. CO_2). By definition, MAC is higher than average abatement cost, as it represents the most expensive intervention—technological or policy-based—needed to eliminate the last tonne of emissions.

The ERIA decarbonisation study (ERIA, 2025) identified combinations of technologies and energy resources that would allow AMSs to achieve their mid-century decarbonisation targets at the lowest possible cost, i.e. at the minimum MAC.

As shown in Table 1-2, the MACs of the different AMS are expected to increase with time. This signifies that AMS will use first the cheapest means to reduce their carbon emissions before using the more expensive ones. With time, the access to cheap abatement measures and technologies will become rarer and therefore the MACs become more expensive.

Table 1-2. Estimated Marginal Abatement Cost of Carbon in ASEAN Countries (2017–2050), Decarbonisation Roadmap

	2030	2040	2050
ASEAN	77	156	287
Brunei Darussalam	76	141	332
Indonesia	84	143	181
Cambodia	81	136	214
Lao PDR	95	179	231
Myanmar	82	137	217
Malaysia	74	183	252
Philippines	9	145	376
Singapore	115	277	377
Thailand	67	155	220
Viet Nam	98	187	410

ASEAN = Association of Southeast Asian Nations, Lao PDR = Lao People's Democratic Republic.
Source: ERIA (2025).

ASEAN's average MAC is expected to increase from US$77 per tonne of CO_2 in 2030 to US$287 per tonne of CO_2 by 2050. Differences in MACs amongst AMSs reflect varying access to energy resources and clean technologies. Within ASEAN, the primary factor is the differing availability of renewable energy resources (wind, solar, hydro, geothermal, biomass, etc.). AMSs with greater renewable energy potential generally face lower MACs than those with more limited potential.

A similar approach was applied to global modelling. For instance, in a global scenario consistent with the 2°C warming limit, Cline (2011) estimated that by 2050, the abatement costs of developing countries could be about half those of industrial countries, expressed as percentages of GDP.

For some countries or sectors, reducing GHG emissions entirely through domestic measures may be burdensome. VCMs can provide alternative compliance pathways in at least two ways.

First, through offsetting. This mechanism allows sectors or entities to meet their commitments by purchasing and using carbon credits. Ideally, the price of carbon credits should be lower than the entity's own MAC, but not so low as to undermine fair equivalence. Alignment is therefore necessary between an entity's MAC and the market price of carbon. At the same time, carbon prices should increase progressively to reflect the growing difficulty of abating the final tonne of emissions, as shown by the evolving MAC.

Second, by financing the development of emission-abatement technologies. Entities can develop projects that generate carbon credits for sale in the market. Potential projects include renewable energy generation, more efficient energy technologies, sustainable aviation fuels, green ammonia, and green hydrogen. Revenues from carbon credit sales can then be reinvested to expand projects and strengthen future abatement capacity.

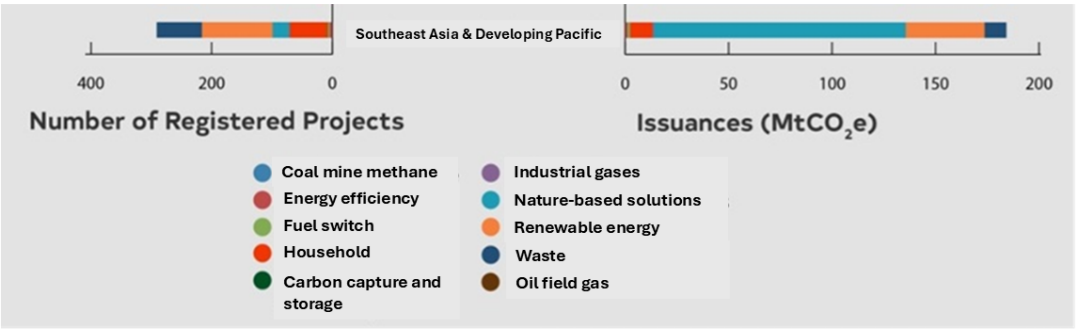
Chapter 2: Supply and Demand of Carbon Credits

This chapter analyses carbon credits from both supply and demand sides in AMSs. It provides details on how credits are produced and used in the region and concludes by summarising the challenges and opportunities in ASEAN's carbon credit market, as well as ways to optimise their use in meeting decarbonisation targets.

2.1. Supply-side Readiness

According to Climate Focus (2023), as of 2023, Southeast Asian countries had 284 carbon projects and had issued 171.5 million tonnes of carbon dioxide equivalent. Nature-based solution (NBS) projects accounted for only 5.3% of the region's total projects (Figure 2-1), yet delivered 73% of the total issuances. Renewable energy projects ranked second in terms of issuances (15%–20%) but constituted most of the projects (about 30%).

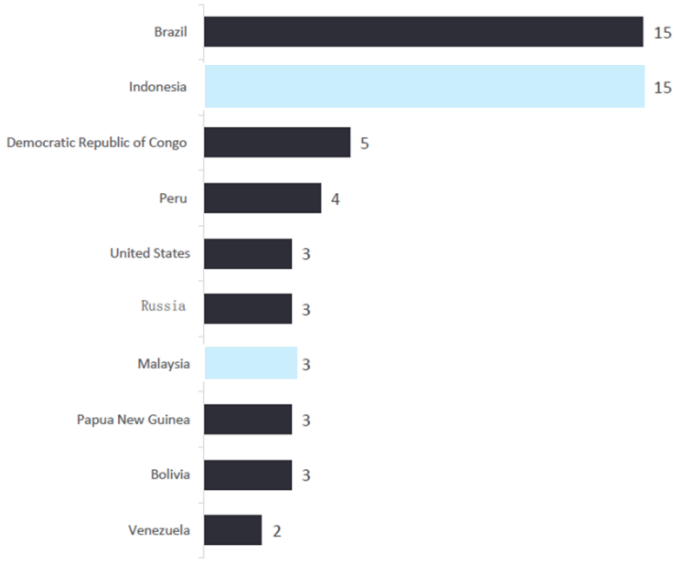
Figure 2-1. Voluntary Carbon Market Project Registration and Issuance in Southeast Asia and the Developing Pacific



$MtCO_2e$ = million tonnes of carbon dioxide equivalent.
Source: Modified from Climate Focus analysis of data collected by the Voluntary Carbon Market Dashboard (July 2023).

Figure 2.2, based on the United Kingdom Government and Malaysian Sustainable Finance Institute (2022), shows that Indonesia and Malaysia ranked second and seventh globally in terms of potential to generate NBS credits, with respective shares of 15% and 3%. Malaysia, for example, has 18 million hectares of forest cover, which could be managed for permanent carbon sequestration. Its carbon potential is estimated at up to 40 million tonnes annually from NBS projects, equivalent to 3% of the world's NBS potential.

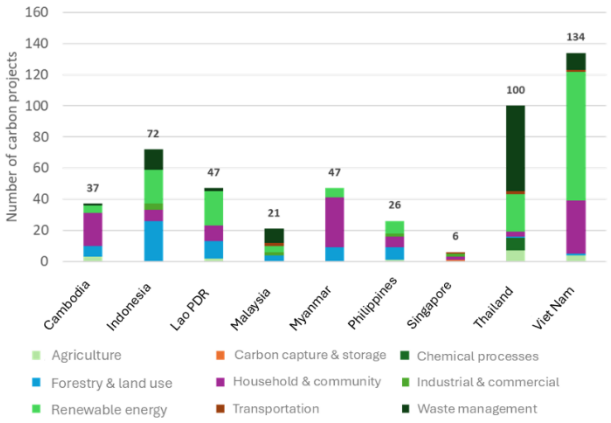
Figure 2-2. Top Countries by Potential Global Share of Nature-based Solutions (%)



Source: United Kingdom Government and Malaysian Sustainable Finance Initiative (2025).

Figure 2-3 shows the breakdown of projects by scope (sector) and by country. Renewable energy projects account for the largest share overall, although the composition varies significantly across countries. Viet Nam had the highest number of projects, with renewable energy projects dominating, followed by household and community initiatives. Thailand ranked second in number of projects, with waste management projects forming the biggest share, followed by renewable energy. Indonesia stood out for its high share of forestry projects, whilst Myanmar and Cambodia were marked by high shares of household and community projects.

Figure 2-3. Number of Carbon Projects in ASEAN by Scope and Country (2004–April 2025)

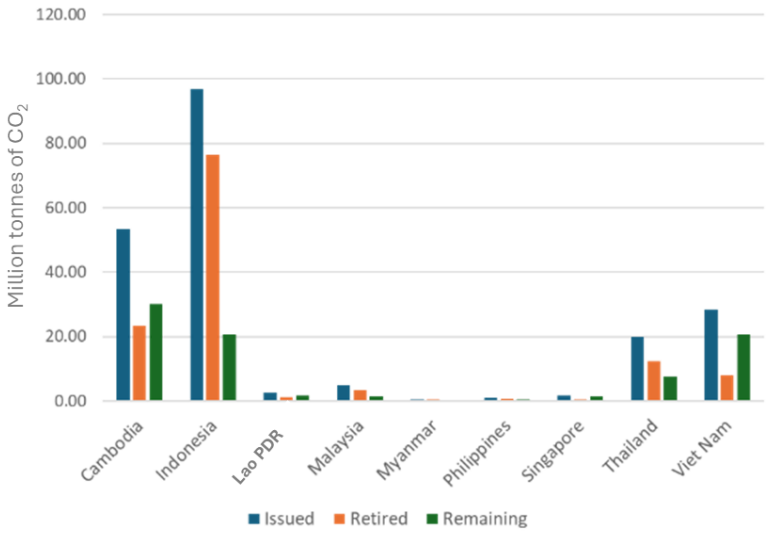


ASEAN = Association of Southeast Asian Nations, Lao PDR = Lao People's Democratic Republic.
Source: Author's processed data from Berkeley Public School (2025), Voluntary Registry Offsets Database.

Figure 2-4 shows that Indonesia had the highest number of issued, retired, and remaining carbon credits, followed by Cambodia, Viet Nam, and Thailand. Cambodia, however, recorded the highest number of remaining credits, with Indonesia and Viet Nam ranking next. Figure 2-5 further shows credits per project by country. Cambodia ranked first in credits issued per project, followed by Indonesia, whilst Indonesia led in retired credits per project, followed by Cambodia.

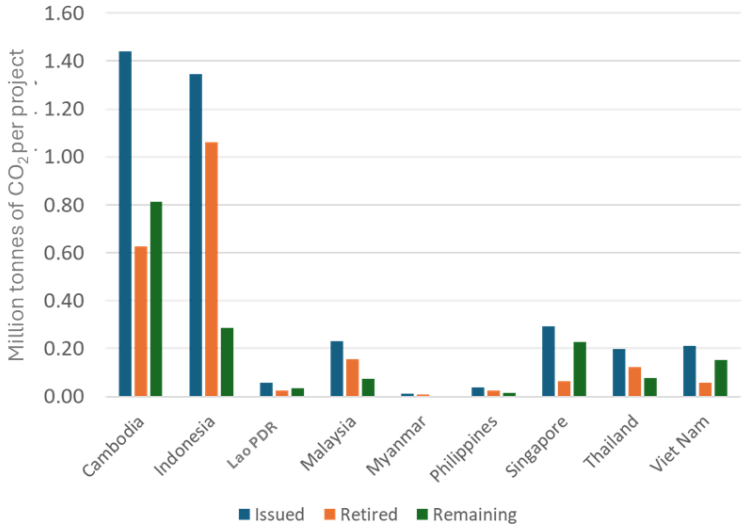
The relatively lower percentage of retired credits in Cambodia compared with Indonesia may be explained by the types of credits issued. The ex-ante or pre-purchase carbon credits should make most of the credit issued in Cambodia. Ex-ante carbon credits are issued for emissions reductions or carbon removal that will take place in the future, i.e., where retiring them will not happen immediately after an entity bought them. For example, afforestation or reforestation project could issue ex-ante carbon credits against the expected carbon benefit they have calculated, whilst their activities are in the early stages e.g. seedlings are planted and are starting to grow. The actual carbon benefit will occur later, once the seedlings have successfully grown into trees. Impact of an ex-ante credit has not yet occurred, and their retirement should be in the future. On the other hand, ex-post credit would make up most of credits issued in Indonesia, where the retirement happens immediately after the credits are bought. Ex-post carbon credits are issued for emissions reductions or carbon removal that has already taken place. For instance, in an afforestation or reforestation project, ex-post carbon credits would mean that the forest has already grown, and has removed and stored the planned amount of carbon emissions.

Figure 2-4. Number of Issued, Retired, and Remaining Credits in ASEAN Countries (2004–April 2025)



ASEAN = Association of Southeast Asian Nations, CO_2 = carbon dioxide, Lao PDR = Lao People's Democratic Republic.
Source: Author's processed data from Berkeley Public School (2025), Voluntary Registry Offsets Database.

Figure 2-5. Number of Issued, Retired, and Remaining Credits per Project by ASEAN Countries (2004–April 2025)



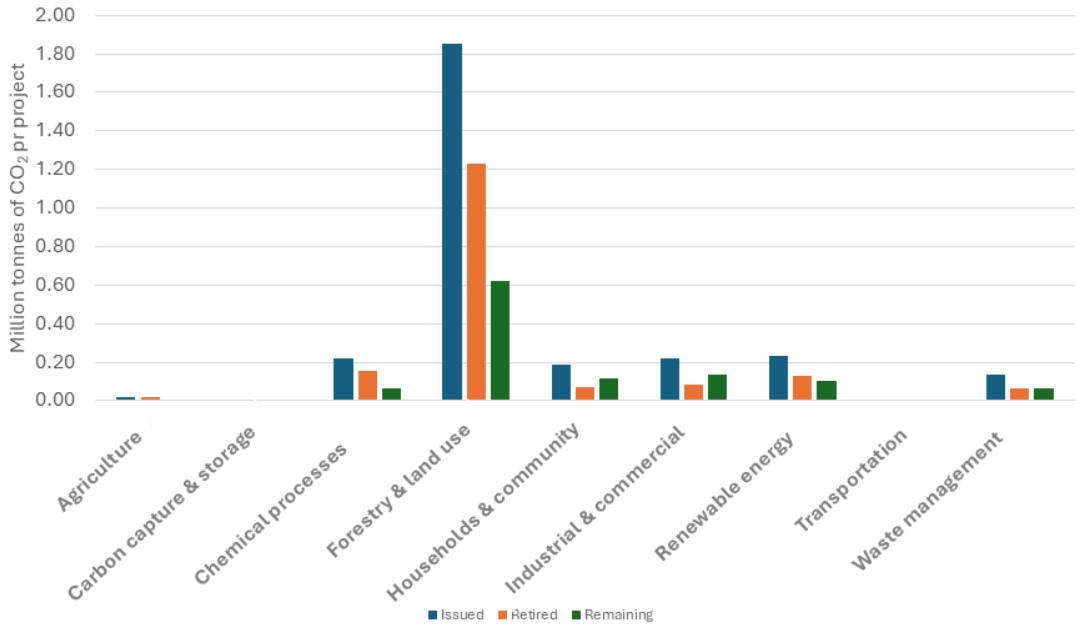
ASEAN = Association of Southeast Asian Nations, CO_2 = carbon dioxide, Lao PDR = Lao People's Democratic Republic.
Source: Author's processed data from Berkeley Public School (2025), Voluntary Registry Offsets Database.

Finally, Figure 2-6 shows that projects in forestry and land use generated the highest number of issued, retired, and remaining credits in ASEAN. This explains the dominance of credits from forestry and land use projects in Indonesia and Cambodia, where these projects form a significant share of the total portfolio.

In Cambodia,[1] carbon credit development and generation are coordinated and overseen by the government. The Ministry of Environment serves as the lead agency for the voluntary carbon market (VCM), promoting carbon credit generation and trading, particularly through forest conservation and other NBS projects, most of which are linked to reducing emissions from deforestation and forest degradation (REDD+).

[1] The Cambodia REDD+ [reducing emissions from deforestation and forest degradation] Taskforce was established in 2013 by the Decision of the Ministry of Agriculture, Forestry, and Fisheries. It serves as the primary coordinating and decision-making body across the government. The task force is chaired by the deputy director-general of Forestry Administration, and vice-chaired by the deputy director-general of the General Department of Natural Protection and Conservation of the Ministry of Environment.

Figure 2-6. Number of Issued, Retired, and Remaining Credits per Project by Scope in ASEAN (2004–April 2025)

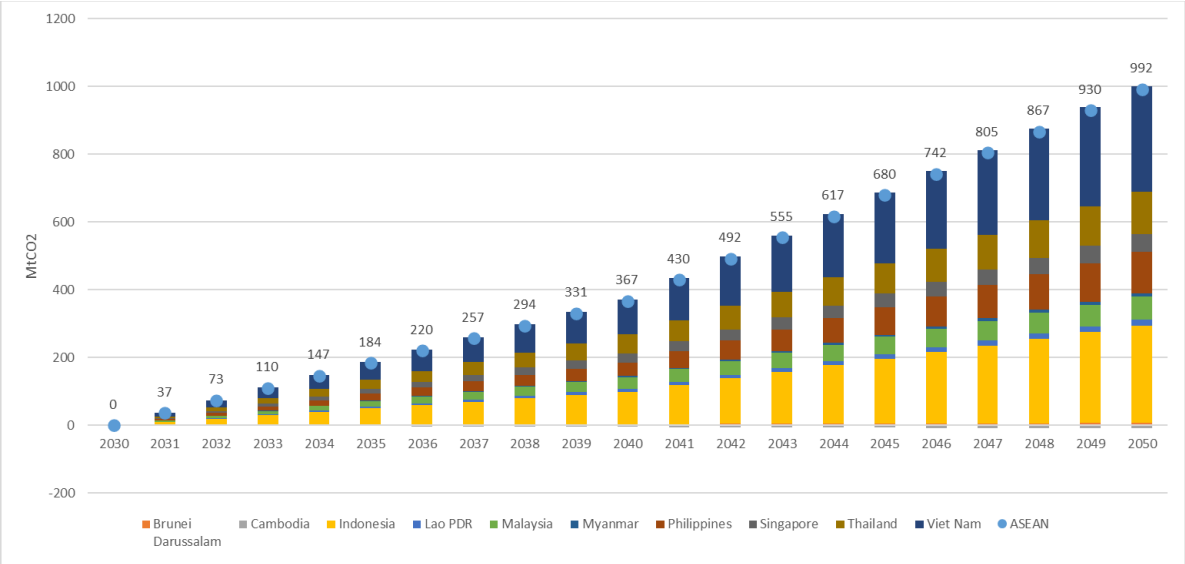


ASEAN = Association of Southeast Asian Nations, CO_2 = carbon dioxide.
Source: Author's processed data from Berkeley Public School (2025), Voluntary Registry Offsets Database.

2.2 Carbon Credit Demand Potential from the Decarbonisation Roadmap

According to ERIA (2025), all AMSs need to reduce their emissions by mid-century. Using 2030 emissions as the benchmark, the ASEAN region will need to reduce cumulative emissions by 992 million tonnes of carbon dioxide ($MtCO_2$) in 2030–2050 to achieve carbon neutrality and net-zero targets by mid-century. By 2050, Viet Nam is projected to account for 31.5% of ASEAN's total emission reductions, followed by Indonesia (29%), Thailand (12.5%), and the Philippines (12.2%).

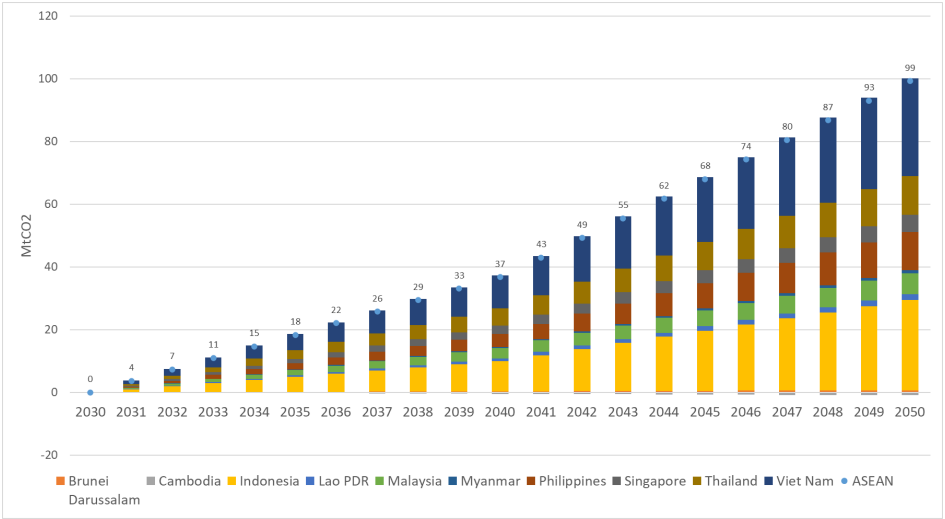
Figure 2-7. Cumulative Emission Reduction in ASEAN Decarbonisation Roadmap by Country



ASEAN = Association of Southeast Asian Nations, Lao PDR = Lao People's Democratic Republic, $MtCO_2$ = million tonnes of carbon dioxide.
Source: Authors' calculation based on ERIA (2025).

If offsetting of up to 10% is allowed, then the potential demand for carbon credits through offsetting in the region's decarbonisation roadmap could reach 99 $MtCO_2$ by 2050 (Figure 2-8).

Figure 2-8. Cumulative Carbon Credit Demand from ASEAN Member States in the Regional Decarbonisation Roadmap



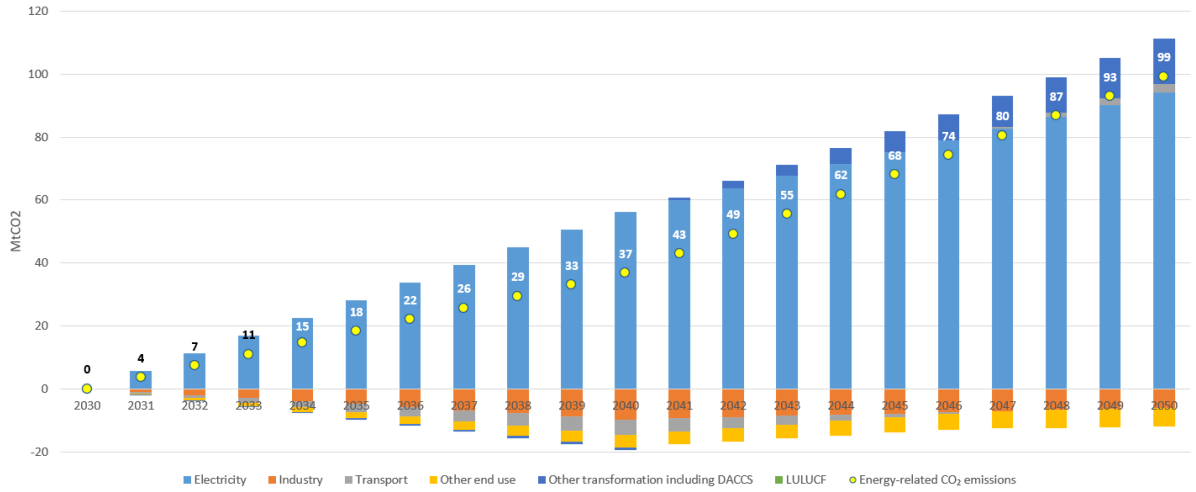
ASEAN = Association of Southeast Asian Nations, Lao PDR = Lao People's Democratic Republic, $MtCO_2$ = million tonnes of carbon dioxide.
Source: Authors' calculation based on ERIA (2025a).

As shown in Figure 2-9, to reach carbon neutrality targets, carbon credit demand from the power generation sector is expected to dominate, as this sector's GHG emissions are expected to decline the most up to mid-century. Emissions from other transformation sectors

and transport are expected to begin declining from 2041, which implies that demand for carbon credits from these sectors will appear post-2040.

By contrast, emissions from industry, transport, and other end-use sectors are expected to continue increasing until 2050. As a result, demand for carbon credits from these sectors is considered less likely, although not entirely impossible.

Figure 2-9. Cumulative Carbon Credit Demand in ASEAN Decarbonisation Roadmap by Sector

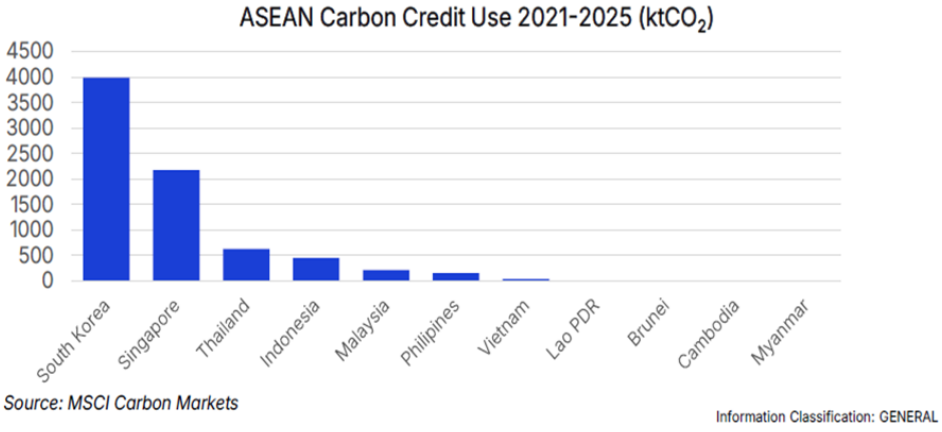


ASEAN = Association of Southeast Asian Nations; CO_2 = carbon dioxide; DACCS = direct air carbon capture and storage; LULUCF = land use, land-use change, and forestry.
Source: Authors' calculation based on ERIA (2025a).

2.3 Current Demand-side Dynamics

Most of ASEAN's carbon credits continue to be absorbed by buyers outside the region. According to Turner (2025), in 2021–2025, the main buyers of credits produced in ASEAN were Republic of Korea entities, followed by those from Singapore (Figure 2-10).

Figure 2-10. ASEAN Carbon Credit Use, 2021–2025 ($ktCO_2$)



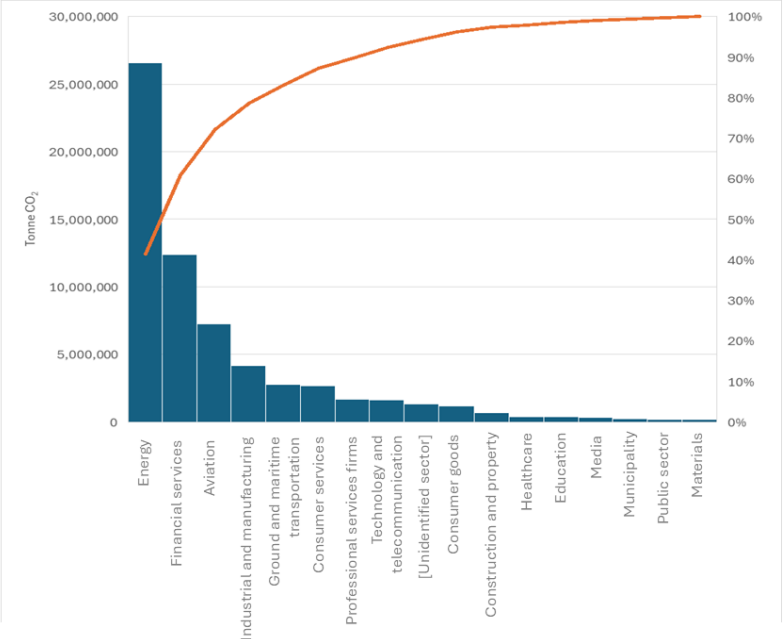
ASEAN = Association of Southeast Asian Nations, $ktCO_2$ = kilotonnes of carbon dioxide, Lao PDR = Lao People's Democratic Republic.
Source: Turner (2025)

A more detailed examination of retired credit volumes from ASEAN projects reveals that from January 2007 to January 2025, credits equivalent to 65.76 $MtCO_2$ were retired. Of this, 64.03 $MtCO_2$ were retired by ASEAN-based entities or companies outside ASEAN, whilst only 1.73 $MtCO_2$ were retired by entities and companies in the region. Thus, over this period, only 2.6% of credits produced in ASEAN were retired domestically, compared with 97.4% by external buyers.

Non-ASEAN buyers were dominated by entities in the energy sector (41.5%), followed by financial services (19.3%) and aviation (11.3%) (Figure 2-11). The strong demand from financial services is linked to institutions meeting their environmental, social, and governance (ESG) targets and the sustainability requirements of their clients. According to PricewaterhouseCoopers (PwC, 2024), financial institutions may also view carbon credits as a new asset class for developing innovative products such as tokenised structured instruments and green bonds, offering portfolio diversification and seamless client services.

The big demand from the aviation sector outside ASEAN has been driven by the implementation of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), designed to reduce CO_2 emissions from international flights and mitigate the sector's climate impact. CORSIA uses market-based mechanisms requiring aircraft operators to purchase carbon credits. It was developed by the International Civil Aviation Organization and adopted in October 2016, with the goal of achieving carbon-neutral growth from 2020. The scheme has been voluntary since 2021 but will become compulsory from 2027 onwards.

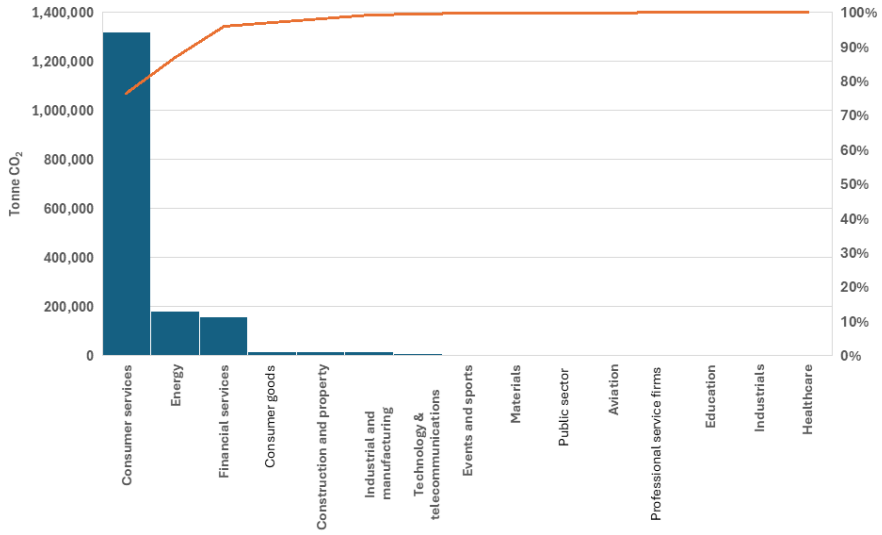
Figure 2-11. Retired Credit Volumes from ASEAN Projects Purchased by Non-ASEAN Buyers, By Sector (January 2007–January 2025)



ASEAN = Association of Southeast Asian Nations, CO_2 = carbon dioxide.
Source: Authors' processed data from AlliedOffsets (2025).

By contrast, Figure 2-12 shows that buyers within ASEAN were mostly entities in the consumer services sector (76.4%), followed by energy (10.5%) and financial services (9.2%).

Figure 2-12. Retired Credit Volumes from ASEAN Projects Purchased by ASEAN Buyers, by Sector (January 2007–January 2025)



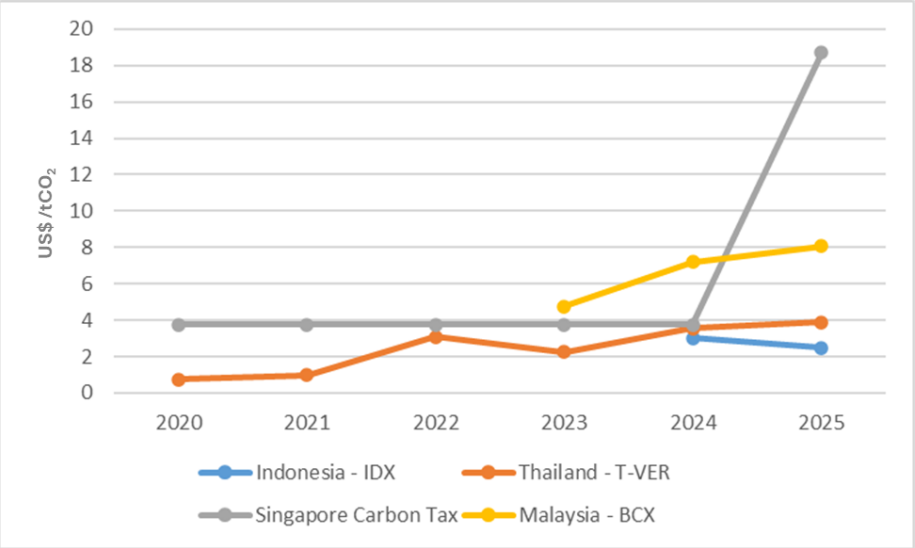
ASEAN = Association of Southeast Asian Nations, CO_2 = carbon dioxide.
Source: Authors' processed data from AlliedOffsets (2025).

The profiles of ASEAN and non-ASEAN buyers differ considerably. Non-ASEAN buyers are concentrated in sectors with emission reduction obligations, such as energy and aviation, and primarily use ASEAN credits for offsetting. Conversely, ASEAN buyers are mainly consumer service companies, whose retirement of credits appears more strongly motivated by branding, reputation, or other ESG-related purposes rather than compliance with direct emission reduction targets.

2.4 Carbon Price Development

Carbon prices in ASEAN countries have so far remained at relatively low levels, as shown in Figure 2-13, which compiles data from ASEAN's registries and Singapore's carbon tax.

Figure 2-13. Historical and Current Carbon Prices in Several ASEAN Countries

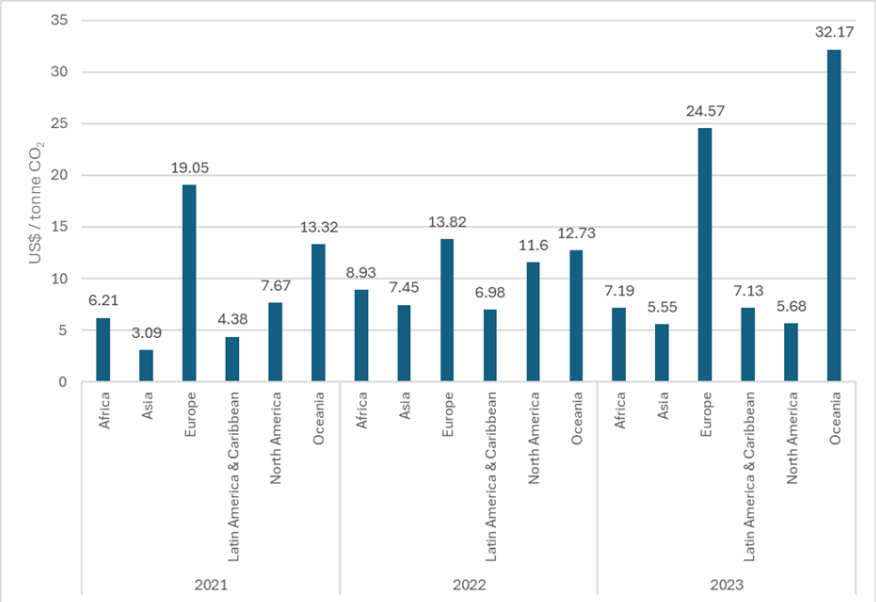


ASEAN = Association of Southeast Asian Nations, tCO_2 = tonnes of carbon dioxide.
Sources: Authors' compiled and processed data from Indonesia's Stock Exchange, Singapore's Carbon Tax, Thailand Voluntary Emission Reduction Programme, and Malaysia's Bursa Carbon Exchange.

With the exception of Singapore's carbon tax, which exceeded US$18 per tonne of CO_2 (tCO_2) by 2025, carbon prices in ASEAN have remained below US$8 per tCO_2 since 2020. If carbon prices are to be developed close to, but still below, the average MACs, then, according to the average MACs, based on ERIA's decarbonisation study (ERIA, 2025), the ASEAN average should be near US$38 per tCO_2 by 2025, compared with the estimated regional MAC of US$28 per tCO_2.

The average price of carbon credits issued from projects in Asia has been lower than in other regions. Figure 2-14 shows that Asian carbon prices have consistently been the lowest worldwide, increasing only from US$3.09 per tCO_2 in 2021 to US$5.55 per tCO_2 in 2023. These findings are consistent with the data in Figure 2-13.

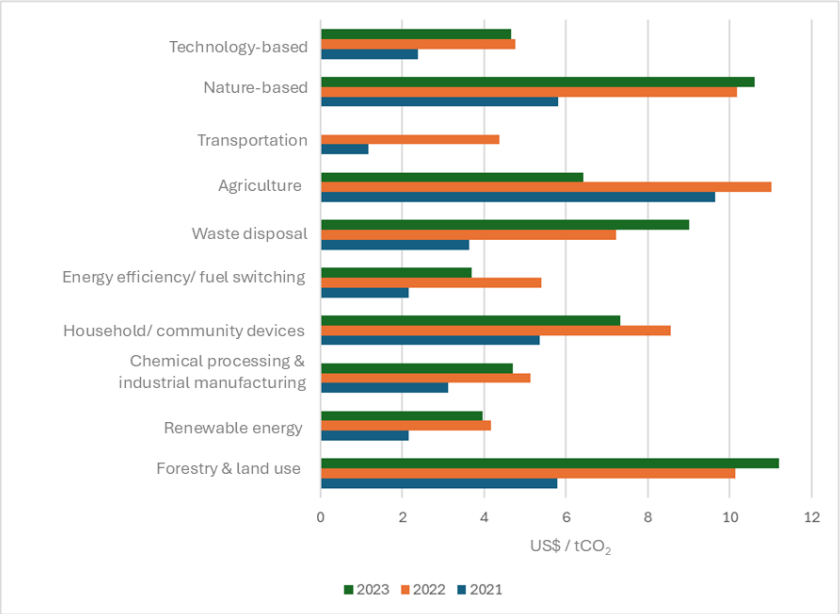
Figure 2-14. Average Carbon Credit Prices from Projects, by World Region



CO_2 = carbon dioxide.
Source: King Abdullah Petroleum Studies and Research Center Datasource, 2025.

Figure 2-15 shows that nature-based project categories—forestry, land use, and agriculture—have consistently higher values than technology-based categories. Forestry and land-use projects recorded the highest carbon prices, ranging from US$5.8 per tCO2 in 2021 to US$11.2 per tCO2 in 2023. Amongst technology-based categories, waste disposal projects showed the highest values, rising from US$3.6 per tCO2 in 2021 to US$9 per tCO2 in 2023. By contrast, renewable energy and energy efficiency and fuel switching projects recorded the lowest prices.

Figure 2-15. Global Voluntary Carbon Market Transaction Prices, by Project Category, 2021–2023 (YTD)



tCO_2 = tonnes of carbon dioxide, YTD = Year to Date
Source: Ecosystem Marketplace (2023).

Figure 2-16 shows the average prices of carbon credits issued in ASEAN. Sectoral averages in the region differ significantly from global averages. For example, the arithmetic average of ASEAN carbon prices from 16 September 2024 to 16 September 2025 was only US$5.3 per tCO_2, compared with the Asian average of US$6.6 per tCO_2 in 2023 (Figure 2-14).

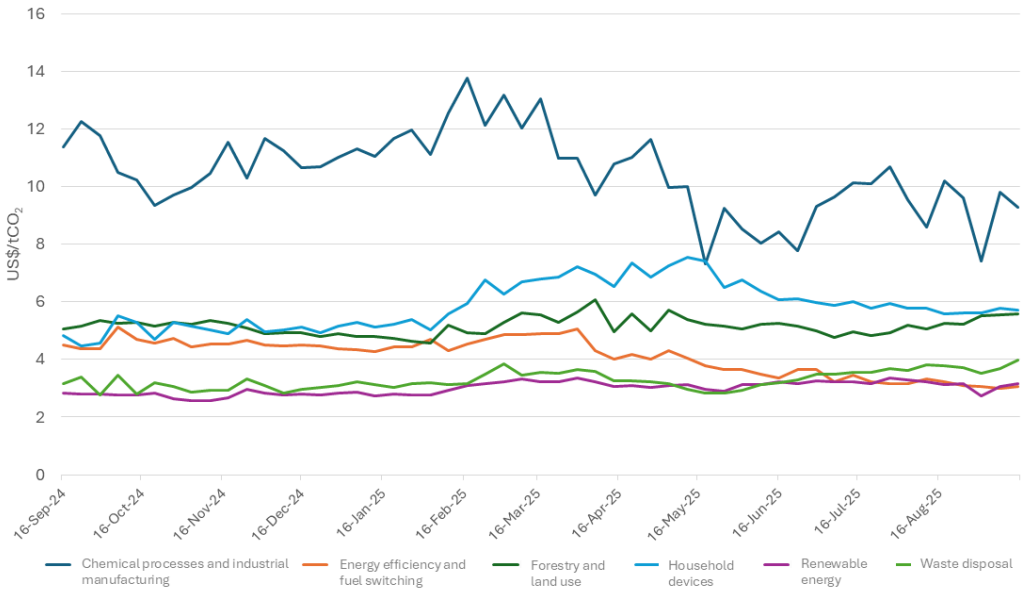
ASEAN's sectoral averages during this period were forestry and land use, US$ 5.2 per tCO2; renewable energy, US$3.0 per tCO_2; chemical processing and industrial manufacturing, US$10.5 per tCO2; household and community devices, US$5.8 per tCO_2; energy efficiency and fuel switching, US$4.1 per tCO_2; and waste disposal, US$3.3 per tCO_2.

When compared with 2023 global averages, ASEAN prices were significantly lower in forestry and land use (54% lower), renewable energy (25% lower), household and community devices (20% lower), and waste disposal (64% lower). Conversely, ASEAN's average carbon price in chemical processing and industrial manufacturing (US$10.5 per tCO_2) was more than twice the 2023 global average of US$4.7 per tCO_2, whilst energy efficiency and fuel switching (US$4.1 per tCO_2) was also above the global average of US$3.7 per tCO_2.

Thus, within ASEAN, the highest average carbon prices were observed in chemical processing and industrial manufacturing, and the lowest in renewable energy.

From 16 September 2024 to 16 September 2025, strong annual growth was observed in credits issued from waste disposal (29.5%) and renewable energy (22.5%). Prices of credits from chemical processes and industrial manufacturing and energy efficiency and fuel switching remained stagnant, whilst prices of forestry and land use credits declined by 4.5% annually.

Figure 2-16. Weighted Average Weekly Offered Price of Carbon Credits Issued from Projects in ASEAN, 16 September 2024–15 September 2025



CO_2 = carbon dioxide, tCO_2 = tonne of carbon dioxide.
Source: Author's processed data from AlliedOffsets (2025)

Aligning VCM with ASEAN's decarbonisation targets means that emission-intensive sectors in AMSs, such as power generation, industry, transport, and end-use energy, must be able to offset their emissions by purchasing credits generated within ASEAN. To date, this practice has largely been undertaken by entities outside ASEAN, particularly in the energy and aviation sectors.

When companies or entities in ASEAN's power generation, industry, transport, and end-use energy sectors are ready, or sufficiently incentivised, to use offsetting mechanisms, they should be supplied with credits generated in the region. These credits should be priced lower, but close to their marginal abatement costs (MACs), to ensure a fair and well-functioning and offsetting mechanism.

At present, most carbon projects in ASEAN have issued credits from the forestry and land-use sectors. Renewable energy and waste disposal projects have produced the lowest-priced credits, whilst chemical processing and industrial manufacturing projects have issued the most expensive ones. Consequently, ASEAN's VCMs provide a wide range of credits across sectors and price levels. Hard-to-abate sectors may benefit from purchasing premium credits, such as those from chemical or industrial projects, whilst other sectors may find it more cost-effective to buy cheaper credits that better reflect their MACs.

In parallel, energy-intensive sectors in ASEAN may need financial support to strengthen their capacity or upgrade technologies for decarbonisation. In this regard, sectors such as power generation, transport, industry, and end-use energy could also develop carbon projects that generate revenues to reinvest in new technologies. This would enable them to move progressively towards achieving decarbonisation independently.

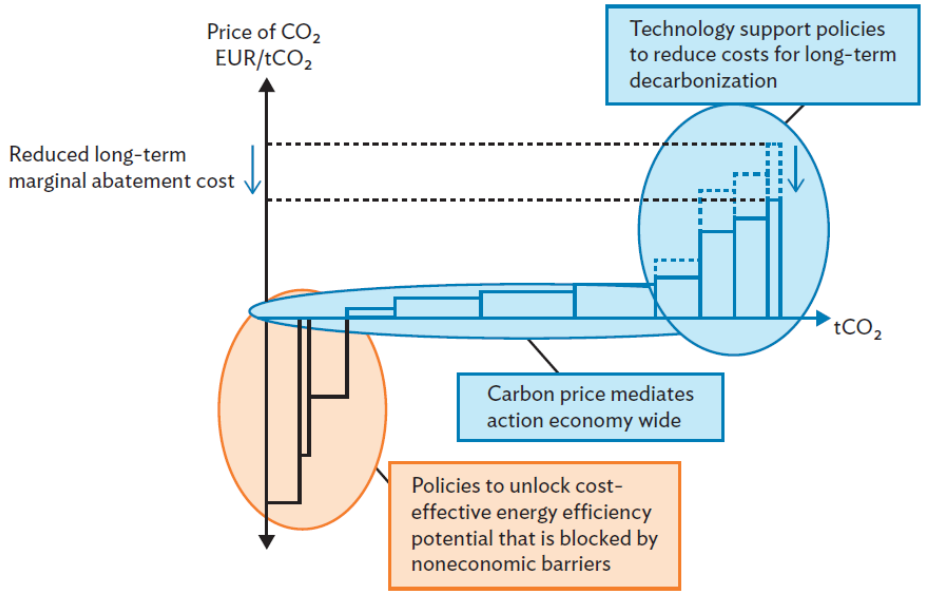
Chapter 3: Unlocking the Voluntary Carbon Market in ASEAN: Emerging Importance and Ecosystem Readiness

3.1. Leveraging Carbon Pricing to Drive Decarbonisation Across the Region

Although the region has vast renewable energy potential, including hydro, geothermal, and solar, fossil fuels continue to dominate its energy systems (Fahmi et al., 2023). Association of Southeast Asian Nations (ASEAN) Member States (AMS) have yet to successfully decouple CO_2 emissions from economic growth (Ritchie, 2021). Nevertheless, many countries in the region have expressed strong commitments to achieving net-zero emissions by 2050, as reflected in their policy documents (Net Zero Tracker, n.d.).

To accelerate climate mitigation efforts, ASEAN requires a combination of decarbonisation policies: subsidies and support schemes for clean technologies (non-market-based incentives), and carbon pricing (market-based incentives) designed to influence behaviour in line with national net-zero commitments (Asian Development Bank [ADB], 2022). Figure 3-1 shows how these complementary policies can reduce CO_2 emissions in a cost-effective and long-lasting way.

Figure 3-1. Illustration of How Different Decarbonisation Policies Complement Each Other to Support National Climate Mitigation Efforts



CO_2 = carbon dioxide, EUR = euro, t = tonne.
Source: Hood (2013), as cited in Asian Development Bank (2022).

As countries intensify their decarbonisation efforts, significant progress depends on behavioural change across the entire value chain. The application of the polluter-pays principle through carbon pricing increasingly incentivises firms to reduce emissions, encouraging actors at every stage of the value chain to lower their carbon footprint. In this way, carbon pricing serves as a catalyst for economy-wide action.

Since many countries remain in the early stages of adopting clean technologies, which are often costly and still under development, energy efficiency represents a more practical and immediate priority. To realise these opportunities (orange circle), firms need enabling policies such as building codes, appliance efficiency standards, and public awareness campaigns to unlock latent potential for energy savings.

Over time, as firms accumulate experience and generate revenue from enhanced energy efficiency and carbon credit sales, countries can gradually shift towards developing and deploying cleaner technologies with greater cost-competitiveness and long-term sustainability impacts. As fossil fuels still account for the largest share of ASEAN's greenhouse gas emissions, integrating carbon pricing into national decarbonisation strategies is critical for driving behavioural change and accelerating the uptake of clean technologies such as geothermal and hydrogen, thereby advancing the region's decarbonisation pathway (Lau, 2022).

Across AMS, voluntary carbon markets (VCMs) and indirect carbon pricing form the main components of the regional carbon pricing framework. As of June 2023, only Singapore and Indonesia had introduced an active direct carbon price (The Asia Foundation, 2023). From 2009 to 2024, total credits issued in ASEAN accounted for 7.38% of global issuance (Abatable, 2024). This share remains relatively modest compared with the global VCM, which averaged about 135 million tonnes of carbon dioxide equivalent annually during the same period (Ecosystem Marketplace, 2025).

Table 3-1. Overview of Carbon Credit Activities Across ASEAN Member States, 2004–202

Country	**Direct Carbon Pricing**			**Indirect Carbon Pricing***
	Tax	ETS	Retired in VCM	
Myanmar			85% of total credits issued	
Thailand	In development or under consideration		60% of total credits issued	
Lao PDR			38% of total credits issued	
Viet Nam	In development or under consideration		44% of total credits issued	
Cambodia			34% of total credits issued	
Malaysia	In development or under consideration		100% of total credits issued	
Philippines	In development or under consideration		87% of total credits issued	
Brunei Darussalam	In development or under consideration		-	
Singapore	S$5 per tCO2e (2019–2023)		10% of total credits issued	

Indonesia	Under consideration	Closing Price (1 Dec 2023): IDR58.800 (<US$4) **	50% of total credits issued	

Active
Inactive

*i.e., fossil fuel taxes and related environmental taxes.

ASEAN = Association of Southeast Asian Nations, ETS = emissions trading system, Lao PDR = Lao People's Democratic Republic, tCO_2e = tonnes of carbon dioxide equivalent, VCM = voluntary carbon market.
Source: The Asia Foundation, 2023; ** Wicaksono, 2024.

3.2. Voluntary Carbon Market Ecosystem in ASEAN: Overview and Readiness

An essential factor in establishing an effective carbon market is whether economic incentives are strong enough to stimulate the required low-carbon investments (ADB, 2022). In evaluating the readiness of the VCM in ASEAN, ADB (2022) emphasised the importance of four elements: (i) policy stability and predictability, (ii) longevity and reach, (iii) net cost implications, and (iv) market structure and liquidity.

Adapting ADB's framework (2022), the report assesses ASEAN's VCM readiness by examining four variables and 15 associated indicators, as outlined below:

Table 3-2. Variables and Respective Indicators to Assess Voluntary Carbon Market Readiness in ASEAN

Variable	Indicator
Market structure and liquidity (primary and secondary markets)	• Existence of a national instrument for compliance markets, 1990–2024 • Existence of a national carbon crediting mechanism, 2005–2024 • Existence of a carbon exchange platform • Trading volume (tCO_2e, 2020–2024) • Number of project developers • Percentage of carbon credits retired in the voluntary market
Policy stability and predictability	• Long-term climate policy commitment (net-zero status as of August 2025) • Alignment with long-term climate policy commitment (total primary energy supply by fuel, business-as-usual, (Mtoe, 1990–2050) • Clarity of legal frameworks for carbon market development (status as of 2024)

Market reach	Alignment with Article 6 • Existence of an Article 6 institution as of June 2025 • Existence of tracking arrangements for Article 6.2 as of June 2025
Economic viability and longevity	• Average marginal abatement costs, 2030–2050 • MRV system readiness: (i) existence of a national registry, (ii) alignment with Article 6, (iii) existence of mutual recognition arrangements with international programmes, (iv) Insights of the study on cooperative MRV as a foundation for a potential regional carbon market within ASEAN • SDG Index score (2019–2024) • Number of businesses with validated science-based targets (SBTi, 2015–2025)

ASEAN = Association of Southeast Asian Nations; MRV = monitoring, reporting, and verification; Mtoe = million tonnes of oil equivalent; SBTi = science-based targets initiative; SDG = Sustainable Development Goal; tCO_2e = tonne of carbon dioxide equivalent.
Source: Author.

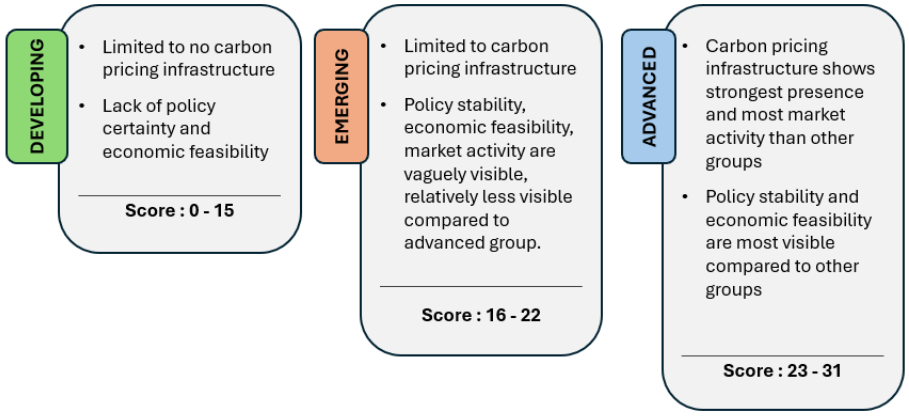
The first variable, market structure and liquidity, assesses the maturity of each VCM ecosystem in ASEAN. The indicator on the existence of a national instrument for compliance markets reflects foundational infrastructure that could support VCM growth by creating tradable credits between compliance and voluntary markets. National carbon crediting mechanisms and carbon exchange platforms further demonstrate institutional readiness for scalable transactions and price discovery. Trading volume and the number of project developers indicate supply-side vibrancy, whilst the percentage of credits retired in the voluntary market reflects market turnover, showing how much of the generated supply is actually used in VCM.

The second variable, policy stability and predictability, is essential for investor confidence and credit demand. Indicators include countries' net-zero commitments, the total primary energy supply trajectory (which determines alignment between policy pledges and actual energy use, the main source of emissions in the region), and legal clarity to ensure enforceability of market rules and reduced regulatory risks.

The third variable, market reach, refers to international links and creditability. It is assessed by the degree of alignment with Article 6, represented by the existence of an Article 6 institution and tracking arrangements for Article 6.2 transactions.

The fourth variable, economic viability and longevity, reflects the cost-effectiveness and robustness of the ecosystem needed to foster high-integrity carbon credits in VCM. Indicators include average MAC; monitoring, reporting, and verification readiness; Sustainable Development Goal Index scores; and the number of businesses with validated science-based targets initiative targets.

Figure 3-2. ASEAN Voluntary Carbon Market Ecosystem: Current State of Readiness



Source: Author.

Based on these variables, Figure 3-3 delineates the scoring process applied to assess VCM readiness in ASEAN. Each indicator was scored from 0 to 3, allowing comparison across AMSs. For instance, if a country had established a national instrument for compliance markets, such as a carbon tax or an emission trading systems, it was awarded a score of 3. If the instrument was under development, the score was 2. If only under consideration, the score was 1. If no data were available or no action had been taken, the score was 0. A similar process was applied to all other indicators. Sub-scores were aggregated for each variable, yielding a total score ranging from 0 to 31.

Figure 3-3. Scoring of Indicators to Assess Voluntary Carbon Market Readiness in ASEAN Member States

Variable I: Market structure and liquidity (primary and secondary market)							
Indicator	Existence of national instrument for compliance market, 1990–2024 (World Bank Group, n.d.) 0: Data unknown/ undecided 1: Under consideration 2: Under development 3: Implemented	Existence of national carbon crediting mechanism, 2005–2024 (World Bank Group, n.d.) 0: Data unknown/ undecided 1: Under consideration 2: Under development 3: Implemented	Existence of carbon exchange platform 0: Data unknown/ undecided 1: Under consideration 2: Under development 3: Implemented	Trading volume (2020–2024, tCO_2e) (Ecosystem Marketplace, n.d.) 0 (data unavailable) 1 (less than 100K) 2 (100K–1000K) 3 (1–10 million) 4 (more than 10 million)	Number of project developer, 2009–2024 (Abatable, 2024) Not started (0): 0 Emerging (1–10): 1 Developing (11–30): 2 Progressive (31–50): 3	Percentage carbon credits retired in voluntary market (The Asia Foundation, 2023) 0: NA 1–50%: 1 51–100%: 2	Sub-score
	0	0	0	0	0	0	0
	0	0	0	4	2	1	7
	3	3	3	4	2	1	16
	0	0	0	2	1	1	4
	2	0	3	1	1	2	9
	0	0	0	2	1	1	4
	0	0	0	3	1	2	6
	3	0	3	0	1	1	8
	1	3	3	3	3	2	15
	2	2	2	2	3	1	12

Variable II: Policy stability and predictability				
Indicator	**Long-term climate policy commitment** "Net zero status" as of August 2025 (Net zero tracker, n.d.) 0: Data unknown/ no net-zero target 1: Proposed/ In discussion 2: Declaration/ Pledge 3: In policy document	**Alignment with long-term climate policy commitment** "Total primary energy supply (TPES) by fuel, business-as-usual (BAU), (Mtoe, 1990–2050)" (ERIA, 2023) 0: Fossils fuels dominate TPES (more than 50%)	Clarity of legal framework in fostering carbon market development, status as of 2024 0: Data unknown/ unavailable 1: legal framework in consideration/ under development 2: Legal framework in place, with limited strategic implementation plan 3: Legal framework in place, active plan in place to support both domestic and international carbon trading	Sub-score
	3	0	1	4
	3	0	1	4
	2	0	3	5
	3	0	2	5
	3	0	3	6
	1	0	1	2
	0	0	1	1
	3	0	3	6
	3	0	2	5
	3	0	1	4

Variable III: Market reach			
Indicator	**Alignment with Article 6** "The existence of Article 6 institution" as of June 2025 (the Article 6 Implementation Partnership, n.d.) 0: Data unknown 1: Focal point for authorization is described	**Alignment with Article 6** "The existence of tracking arrangements for Article 6.2" as of June 2025 (the Article 6 Implementation Partnership, n.d.) 0: Data unknown 1: Under consideration 2: In progress 3: In place	Sub-score
	1	1	2
	1	2	3
	1	2	3
	1	2	3
	0	0	0
	0	0	0
	1	2	3
	1	2	3
	1	3	4
	1	2	3

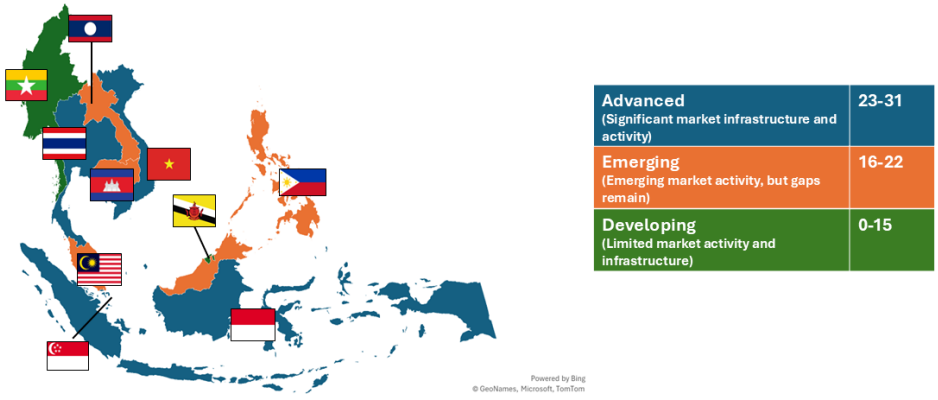
Variable IV: Economic viability and longevity					
Indicator	Average Marginal Abatement Costs (MAC), (USD/tCO_2e), 2030–2050 (ERIA, 2025b) Low (1): 109–140 Medium (2): 141–180 High (3): 181–213	MRV system (UNFCCC, n.d., multiple ASEAN countries) Low (1): Ad-Hoc project-based tracking system exists yet a full MRV system is still under consideration Medium (2): MRV system exists but is limited in scope or coverage (under development) High (3): Full MRV framework across sectors, internationally recognized, digitally integrated	SDG Index Score, 2019–2024 (The Sustainable Development Report, n.d.) 0: Below 50 1: Above 50	Number of businesses that have validated science-based targets or SBTi (2015–2025) (Science Based Targets Initiatives, n.d.) Data unknown: 0 Low (below 10): 1 Medium (11–30): 2 High (31–50): 3	Sub-score
	2	1	1	0	4
	1	1	1	1	4
	1	2	1	3	7
	3	1	1	0	5
	1	1	1	2	5
	2	1	1	1	5
	3	1	1	1	6
	3	2	1	3	9
	1	2	1	2	6
	3	1	1	2	7

All variables					
	Market structure and liquidity (primary and secondary market)	Policy stability and predictability	Market reach	Economic viability and longevity	Total score
	0	4	2	4	10
	7	4	3	4	18
	16	5	3	7	31
	4	5	3	5	17
	9	6	0	5	20
	4	2	0	5	11
	6	1	3	6	16
	8	6	3	9	26
	15	5	4	6	30
	12	4	3	7	26

Source: Author compiled from multiple sources (The Edge Malaysia, 2024 and personal communication, 11 July 2025); Thailand Greenhouse Gas Management Organization, n.d.; Bursa Carbon Exchange, n.d.; Climate Impact X, n.d.; IDXCarbon, n.d.; The Republic of the Union of Myanmar, 2019; World Bank Group,2024; Pichetsatha 2024; KPMG (2024); Ministry of Environment of Cambodia, 2024; Respicio & Co. ,2025; Ministry of Sustainability and the Environment of Singapore, 2023; Brunei Climate Change Secretariat ,2021; Wicaksono, 2025; Multiple ASEAN Countries, n.d.; Muzakki,2025.

Drawing on the total scores, this study clusters AMSs into three groups (Figure 3-4). The first group shows the strongest performance across all variables, especially in market structure and liquidity. These include Thailand, Indonesia, Singapore, and Viet Nam, highlighted in blue. The second group—Malaysia, Cambodia, the Philippines, and Lao PDR—shows emerging activity, reflecting nascent developments in policy frameworks and markets. The third group, comprising Brunei Darussalam and Myanmar, demonstrates limited to no market activity, with modest policy certainty and economic feasibility compared with other AMSs.

Figure 3-4. Voluntary Carbon Market Readiness in ASEAN



Source: Author.

Chapter 4: Stakeholder Analysis

4.1. Overview of Stakeholder Importance in the Voluntary Carbon Market

According to Dufrasne (2023), the lifecycle of a carbon project can be categorised into three main stages: (i) credit creation, (ii) intermediation, and (iii) retirement.

In the credit creation stage, the International Organisation of Securities Commissions (IOSCO) Final Report (2024) explains that the process typically begins with '[...] the following steps: (a) project identification; (b) project validation and registration; (c) project verification; and (d) issuance of carbon credits to a registry'.

Project identification marks the initial phase, in which a project developer selects a carbon crediting programme and determines the appropriate methodology for calculating and monitoring expected greenhouse gas emission reductions or removals. This stage involves choosing the project type and preparing a stakeholder engagement plan.

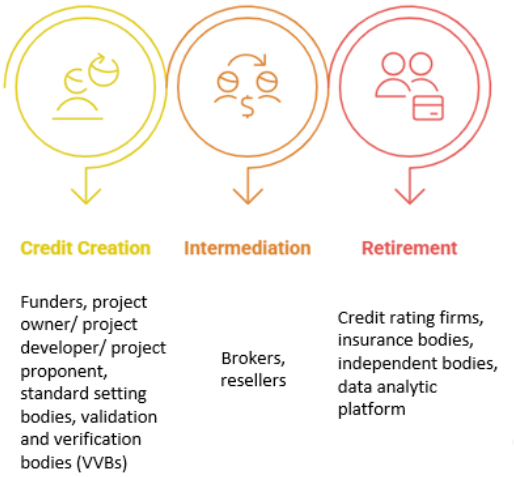
After identification, the project proponent undergoes a validation process by an independent validation and verification body (VVB) based on criteria approved by the chosen carbon crediting programme. Upon successful validation, the project is registered in the programme's official registry. Subsequently, the project's emission reductions or removals are verified by the VVB to ensure compliance with programme standards. If the verification is approved, the corresponding carbon credits are issued.

After issuance, carbon credits may be purchased directly from project developers by end-buyers or traded on the secondary market through intermediaries. These transactions can occur via bilateral agreements, such as over-the-counter deals, or through trading platforms operated by brokers, which include financial institutions, advisory firms, and specialised marketplaces such as Climate Impact X and South Pole.

Within this process, carbon credit rating agencies and insurers also play complementary roles, helping buyers assess the quality of credits and manage associated risks (IOSCO, 2024).

The final stage in a carbon credit's lifecycle is retirement, which is initiated by the credit owner when the credit is used or claimed. This may take place at the point of purchase or at a later date (IOSCO, 2024; Dufrasne, 2023). Below the overview of stakeholders involved in the credit life cycle (Dufrasne, 2023).

Figure 4-1. Overview of Stakeholders Involved



Source: Author, adapted from Dufrasne (2023).

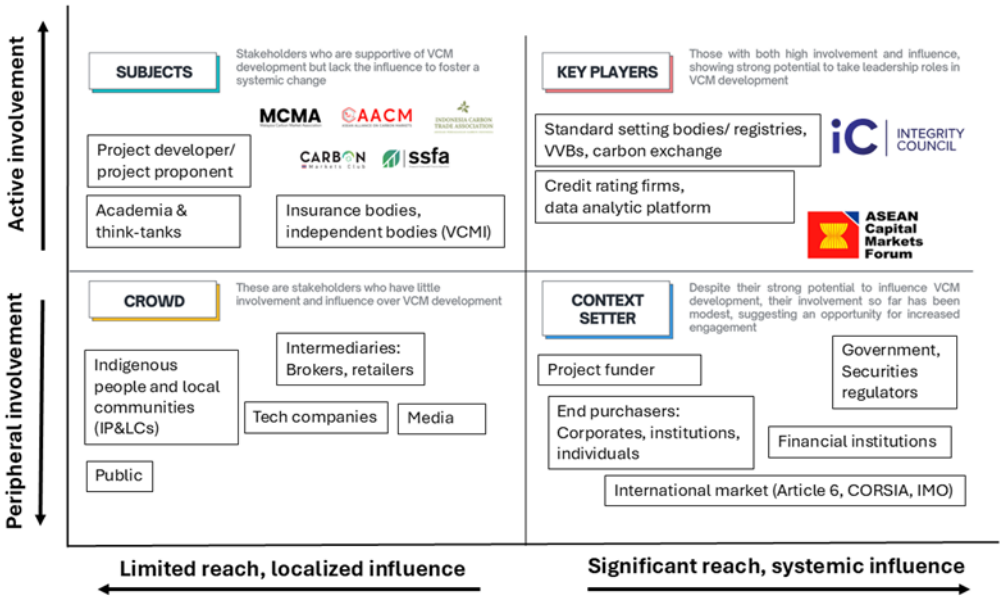
4.2. Stakeholder Identification and Categories

In analysing the interplay between stakeholders, various approaches may be applied, which could be broadly categorised into three groups: (i) normative, (ii) descriptive, and (iii) instrumental (Reed et al., 2009). The normative approach focuses on identifying stakeholders who hold moral or ethical responsibility for specific actions. The descriptive approach aims to illustrate the relationships between stakeholders and particular issues. In contrast, the instrumental approach seeks to understand stakeholders' behaviour in relation to achieving specific goals or outcomes.

This report adopts the instrumental approach due to its recognised practical applicability in understanding stakeholders' behaviour, as reflected through their involvement and influence in achieving a high-integrity and interoperable VCM in ASEAN.

The stakeholder analysis in ASEAN's VCM followed several steps. First, stakeholders were identified through semi-structured interviews and snowball sampling. The former involved interviews with a set of open-ended questions, whilst the latter referred to identifying new stakeholders through participants already engaged in the interviews. The next step was to categorise stakeholders based on their level of involvement and influence within the ASEAN VCM. Lastly, to promote an efficient and transparent market, relationships between stakeholders were mapped through a knowledge mapping process. This mapping identified who holds what information and highlighted areas requiring further understanding within the ecosystem (knowledge gaps). Figure 4-2 shows the stakeholder identification and categorisation in ASEAN VCM, adapted from the analytical categorisation method by Reed et al. (2009).

Figure 4-2. Stakeholder Landscape in ASEAN Voluntary Carbon Market: Overview as of October 2025



MCMA = Malaysia Carbon Market Association, AACM = ASEAN Alliance on Carbon Market, IDCTA = Indonesia Carbon Trade Association, TCMC = Thailand Carbon Markets Club, SSFA = Singapore Sustainable Finance Association, VVB = validation and verification body, CORSIA = Carbon Offsetting and Reduction Scheme for International Aviation, IMO = International Maritime Organization. Source: Author.

This study identified 18 key stakeholders, highlighted through interviews and document analysis, as major players in ASEAN's VCM, each playing a significant role in shaping the regional landscape. These stakeholders were grouped into four categories: subjects, crowd, key players, and context setters.

The subjects are supportive of VCM development in ASEAN and are actively involved in facilitating the creation of high-integrity carbon credits and robust market activity. However, their influence tends to be localised, limiting their overall impact. This group includes project developers or proponents, researchers and think-tanks, the ASEAN Common Carbon Framework, insurance providers, and independent organisations such as the Voluntary Carbon Market Initiative. To increase their influence, it is necessary to establish alliances with right-quadrant stakeholders, particularly the key players.

The crowd represents stakeholders with limited or peripheral involvement in the market. They may be excluded from project consultations despite their proximity to project sites (e.g. Indigenous Peoples), or they may participate only in certain aspects of the market, such as intermediaries handling transactions. This group also includes the public, technology companies, and the media. Although these stakeholders typically have lower influence, two groups—Indigenous Peoples and local communities and the media—deserve more attention. Indigenous communities act as custodians of natural resources, whilst the media shapes public perception of the VCM, ultimately influencing market confidence and demand for carbon credits (Dyck et al., 2023; MSCI, 2024). Strengthening their capacity and engagement is therefore vital.

The key players are those stakeholders who are highly active and possess the potential to generate broad, systemic impact. They can act as market leaders, and it is important to

engage and nurture them through initiatives that advance the growth of the VCM across the region. This group includes standard-setting bodies and registries such as Verra, validation and verification bodies, carbon exchanges, the Integrity Council for the Voluntary Carbon Market, credit rating firms, data analytic platforms, and the ASEAN Capital Markets Forums.

Lastly, the context setters are stakeholders that have significant reach and the capacity to enact systemic change, yet currently show modest involvement. Governments, particularly securities regulators, play a pivotal role in establishing and enforcing rules, thus shaping market integrity and growth. Their active engagement is crucial, and it is important to identify mechanisms to align their policy objectives with the development targets of the VCM.

As the final component of the stakeholder analysis, this study also mapped stakeholder links by examining their respective knowledge domains. This process identified areas where a deeper understanding is needed to bridge information and capacity gaps across the ecosystem.

Table 4-1. Stakeholders and the Knowledge Map in ASEAN's Voluntary Carbon Market

Stakeholder Category	Player	Knowledge Domain	Areas for Further Understanding Predominantly Involving the Player
Subjects	Project developer or project proponent	Project design; implementation; monitoring, reporting, and verification (MRV); benefit sharing	Toolkit to ensure free, prior, and informed consent (FPIC) activities with Indigenous Peoples and local communities (IP&LCs); guaranteed minimum price; clear authorisation process (corresponding adjustment [CA] credits vs non-CA credits).
	Academia and think-tanks	Policy analysis, methodological research, carbon economics	Comprehensive guidance for stakeholders necessary to foster a high-integrity and interoperable VCM (top-down approach)
	Insurance bodies, independent bodies (e.g. the Voluntary Carbon Markets Integrity Initiative)	Risk management, sustainability-related disclosure standards, climate-related financial risks and opportunities	End-to-end risk mitigation frameworks for carbon credits; rules, regulations, and guidance promoting transparency and confidence in credit quality whilst minimising greenwashing and green-hushing risks
	ASEAN Common Carbon Framework	Carbon pricing and market mechanisms	Strategic collaboration to promote an interoperable VCM across ASEAN.
Key players	Standard-setting bodies and registries	Methodology development, credit issuance	Harmonised data at the registry level. The Climate Action Data Trust[a] was cited as a model for similar ASEAN initiatives.

	Validation and verification bodies	MRV validation, auditing, third-party assurance	Mechanisms to ensure consistency and transparency between end-user emissions data and verified carbon credit records
	Carbon exchanges	Secondary market	Application programming interfaces integration with registries to enhance interoperability amongst carbon exchanges.
	Integrity Council for the Voluntary Carbon Market	Credit integrity benchmarking, core carbon principles (CCP)	Close collaboration with developers and registries to guide incremental alignment of ASEAN projects with CCP standards
	ASEAN Capital Markets Forum	Sustainable finance standards, green bond alignment	Collaboration with governments, academia, and think-tanks to increase market appetite by positioning carbon credits as instruments aligned with the ASEAN Taxonomy for Sustainable Finance
	Credit rating firms	Project performance data	Development of investment indices and integrity analysis methodologies
	Data analytics platform	Market intelligence, price integrity	Comprehensive datasets and projections on pricing and volumes to enhance market transparency
Crowd	Intermediaries (brokers, retailers)	Structuring deals, matchmaking between sellers and buyers	Collaboration with registries to develop open-source platforms, reducing price and demand asymmetry, improving transparency and efficiency
	Technology companies	MRV automation, remote sensing, blockchain tracking	Cooperation with credit rating and analytics platforms to strengthen automation and reliability of MRV processes
	Media	Public narratives, knowledge dissemination	Responsible journalism that monitors and reports on carbon market practices (watchdog role)
	IP&LCs	Traditional ecological knowledge, local governance	Collaboration with developers and governments to ensure FPIC compliance and clarify carbon rights and benefit-sharing arrangements.

	Public	Awareness of climate action and greenhouse gas reduction	Capacity-building programmes that improve public understanding of VCM processes and terminology, encouraging behaviour change
Context setters	Project funders	Risk–return expectations, impact metrics	Alignment of funded projects with national priorities and Sustainable Development Goal targets to attract greater investment
	Financial institutions	Carbon asset financing; environmental, social, and governance (ESG) due diligence	Creation of financial products that stimulate VCM participation whilst ensuring credibility through ESG assessment
	Government, securities regulators	Policy, regulation, national registries	Strong and consistent policy signals, including clear rules, regulations, and incentives to promote an interoperable and high-integrity VCM
	International market (Article 6, Carbon Offsetting and Reduction Scheme for International Aviation, International Maritime Organization)	Compliance market frameworks, carbon credit eligibility	Well-defined thresholds and labelling criteria to align voluntary credits with compliance market frameworks
	End purchasers (corporates, institutions, individuals)	Net-zero strategies, offset demand	Clear strategies on credit use, including (i) offsetting residual emissions, (ii) annual compensation for emissions, and (iii) bridging shortfalls in reduction targets

[a] An initiative by the Climate Warehouse, established within the World Bank's Carbon Finance and Economics unit.
Sources: Compiled from interviews conducted by the author (March–July 2025), Ecosystem Marketplace (2025), MSCI (2024), Dyck et al. (2023), Spilker and Nugent (2022), Pham et al. (2015).

To address the areas requiring further understanding amongst stakeholders, it is essential to develop guidance that harmonises emerging VCM frameworks across ASEAN. At the same time, efforts should focus on aligning with international market expectations, promoting interoperability amongst regional carbon markets, and maintaining flexibility to reflect the diverse national priorities and capabilities of AMS. The next chapter elaborates on the rationale for this guidance and outlines its proposed structure.

Chapter 5: ASEAN Voluntary Carbon Market Guidance

5.1. Development of the Guidance

Objective of the guidance

Voluntary carbon markets (VCM) have gained significant traction in the Association of Southeast Asian Nations (ASEAN) region, as carbon credits provide businesses, governments, and other entities with the flexibility to offset their emissions whilst fostering sustainable practices. ASEAN's role in global carbon markets is pivotal, given its diverse economies, which vary considerably in their carbon regulatory frameworks, policies, and developmental priorities.

Study on a High-Quality Voluntary Carbon Market for ASEAN (ASEAN Capital Markets Forum [ACMF], 2024b), found that the absence of harmonised regulations amongst AMSs has resulted in fragmented markets, inconsistent standards, and inefficiencies in cross-border carbon credit trading. This underscores the pressing need for clear, transparent, and consistent guidance to promote equitable access, enhance transparency, and ensure the generation of high-quality carbon credits across the region.

Adopting an interoperable regional approach is critical to enhance the credibility, transparency, and governance of VCM operations within ASEAN. ACMF (2024b) identified the need for harmonisation, as well as for detailed, actionable guidance tailored to ASEAN's unique socio-economic and environmental context. Accordingly, this research aims to fill this gap by developing comprehensive and standardised guidance to support the establishment of a cohesive, efficient, and effective VCM ecosystem across ASEAN.

The ASEAN Voluntary Carbon Market Guidance (hereafter referred to as 'the ASEAN VCM Guidance') aims to establish a transparent, credible, and effective framework for carbon credit generation and trading across the region. It will align with international best practices whilst remaining responsive to ASEAN's unique economic, environmental, and social circumstances. The goal is to create a robust market that supports decarbonisation, enhances investment attractiveness, and promotes sustainable development.

Scope of the guidance

Definition of VCM

For this guidance, VCM refers to a market-based mechanism through which certified carbon credits are voluntarily traded to finance climate mitigation projects. These transactions allow purchasing entities to offset their emissions and meet voluntary climate action commitments, rather than compliance requirements under national, regional, or international carbon reduction regimes. The credits covered under this definition are issued by independent, non-governmental standards bodies.

In recent years, the line between voluntary and compliance carbon markets has become increasingly blurred. Certain governments and regulatory systems have begun allowing voluntary carbon credits to be used for compliance purposes, aligning with the achievement of nationally determined contributions under the Paris Agreement.

This guidance is prepared on the assumption that voluntary credits are used solely for voluntary purposes. However, to acknowledge the evolving landscape, specific notes are included in the guidance wherever particular considerations are necessary when voluntary credits are used for compliance-related purposes.

Target users of the guidance

The ASEAN VCM Guidance is designed to benefit all participants in the VCM, including ASEAN regulators, policymakers, and market participants seeking to support sound and transparent market structures. However, the primary users and buyers targeted by this guidance are corporations, as they represent the main drivers of voluntary carbon credit demand.

The guidance aims to enhance financial integrity and strengthen market governance across the ASEAN VCM. By doing so, it seeks to improve credibility and transparency, thereby increasing market confidence and ultimately boosting the liquidity of voluntary carbon credits within the region.

Methodology for the development of the guidance

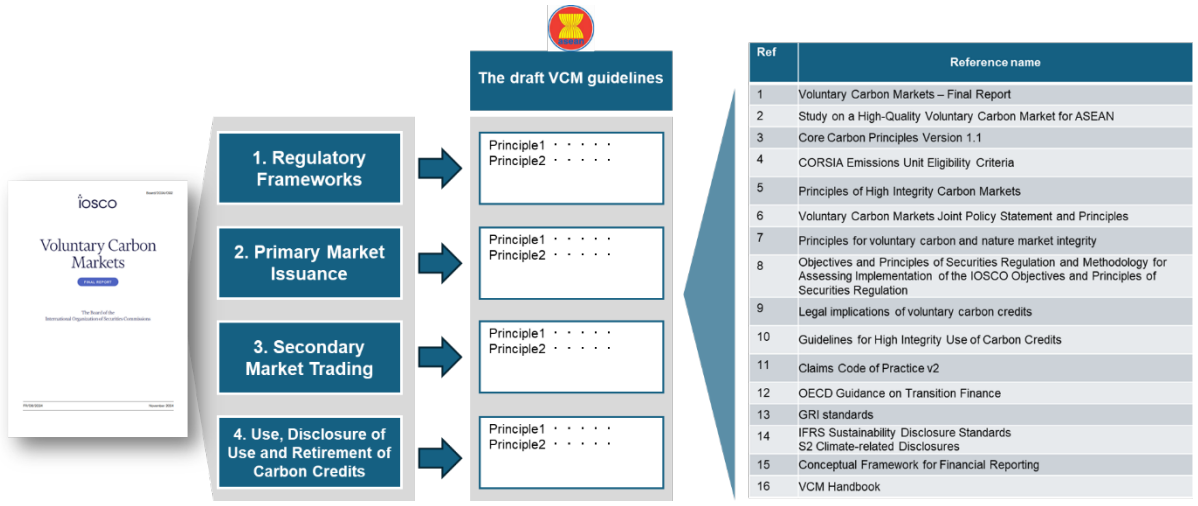
To ensure an effective VCM ecosystem across ASEAN, it is important to develop guidance applicable to the establishment and operation of carbon credit markets in the region.

This research builds on the guidance and existing studies from prominent international literature on voluntary carbon credits, with particular reference to the final report of the International Organization of Securities Commissions (IOSCO) (2024), *Voluntary Carbon Markets*, released in November 2024, and the ACMF VCM Study (2024b), released in December 2024. Based on these studies, the research sought to develop practical and regionally relevant guidance.

IOSCO (2024) outlines 21 good practices intended to promote a sound market structure and financial integrity within the VCM. These practices aim to ensure that carbon markets operate in a fair, orderly, and economically efficient manner, with transparency in pricing and information flows, and with structural resilience. The good practices cover four main areas: regulatory frameworks, primary market issuance, secondary market transactions, and the use and disclosure of carbon credits (IOSCO, 2024).

The research adopted IOSCO's four-segment classification as the basis for structuring the framework, whilst also referring to relevant international literature, existing guidelines, and best practices in each category.

Figure 5-1. Method of Creating the Framework of the Guidance

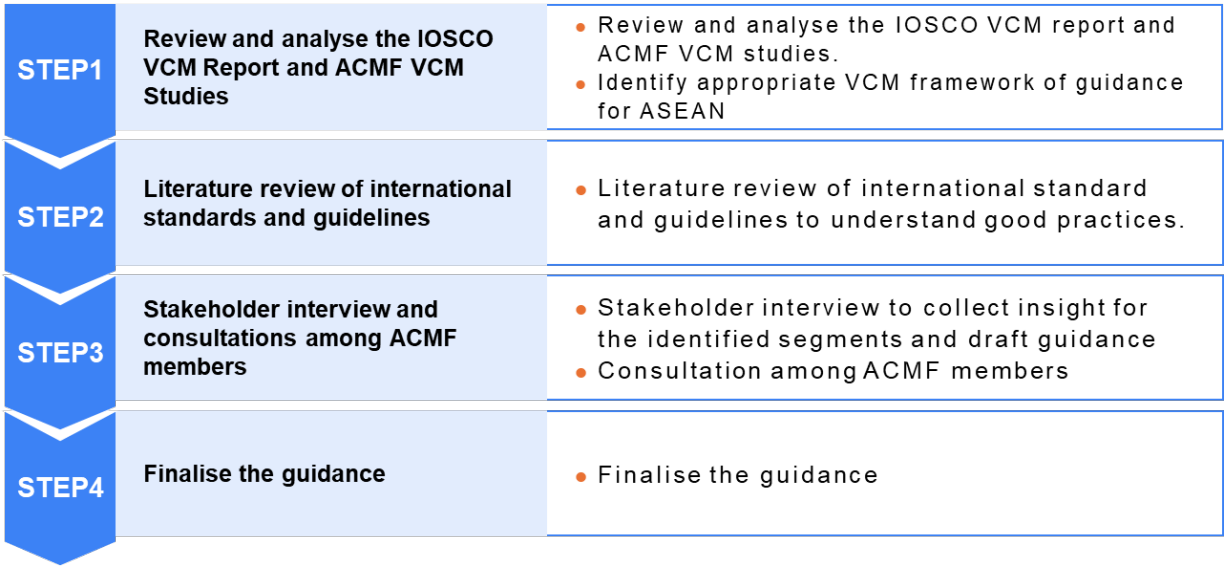


Ref	Reference name
1	Voluntary Carbon Markets – Final Report
2	Study on a High-Quality Voluntary Carbon Market for ASEAN
3	Core Carbon Principles Version 1.1
4	CORSIA Emissions Unit Eligibility Criteria
5	Principles of High Integrity Carbon Markets
6	Voluntary Carbon Markets Joint Policy Statement and Principles
7	Principles for voluntary carbon and nature market integrity
8	Objectives and Principles of Securities Regulation and Methodology for Assessing Implementation of the IOSCO Objectives and Principles of Securities Regulation
9	Legal implications of voluntary carbon credits
10	Guidelines for High Integrity Use of Carbon Credits
11	Claims Code of Practice v2
12	OECD Guidance on Transition Finance
13	GRI standards
14	IFRS Sustainability Disclosure Standards S2 Climate-related Disclosures
15	Conceptual Framework for Financial Reporting
16	VCM Handbook

Source: Author and International Organization of Securities Commissions (2024).

Subject-matter experts were interviewed to ensure that their insights and feedback were incorporated into the development of the guidance. Emphasis was placed on ensuring the guidance's relevance to ASEAN's unique economic, environmental, and social conditions, whilst maintaining alignment with international best practice.

Figure 5-2. Steps for Guidance Development



ACMF = ASEAN Capital Markets Forum, ASEAN = Association of Southeast Asian Nations, IOSCO = International Organisation of Securities Commissions, VCM = voluntary carbon market.
Source: Author.

Design Concept of the Guidance

The guidance comprises four key segments, in line with IOSCO (2024):

I. Regulatory frameworks
II. Primary market issuance
III. Secondary market trading
IV. Use, disclosure of use, and retirement of carbon credits

For each segment, multiple principles requiring practical implementation were identified, together with the criteria necessary to achieve each principle.

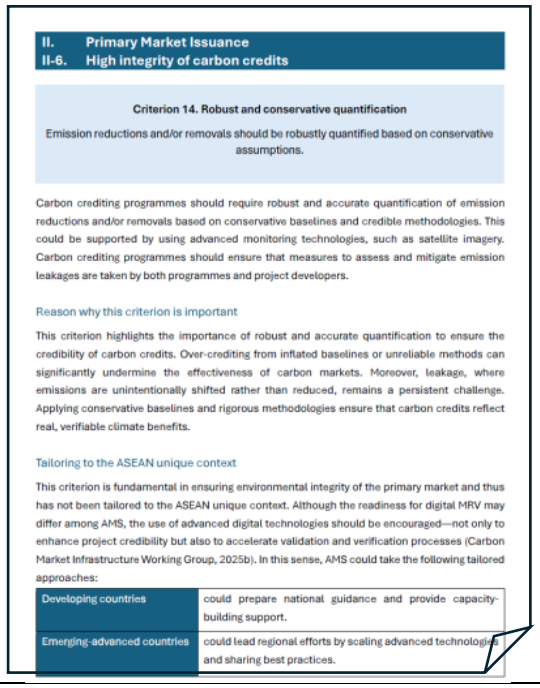
Table 5-1. Structure of the Guidance

Segment	Principle	#	Criterion
I. Regulatory frameworks	1. Governance	1	Regulatory approach and scope
		2	Regulatory treatment
		3	Participants' skill and competence
	2. Regional interoperability	4	Domestic and international interoperability and cooperation
II. Primary market issuance	1. Equity	5	Fair and equitable transactions
	2. Inclusivity	6	Inclusive market participation
	3. Governance	7	Effective governance
	4. Transparency	8	Tracking and identification
		9	Disclosure
	5. Interoperability	10	Standardisation
	6. High integrity of carbon credits	11	Third-party validation and verification
		12	Additionality
		13	Permanence
		14	Robust and conservative quantification
		15	Avoidance of double counting
		16	Consideration of sustainable development benefits and environmental and social safeguards
		17	Support for the transition
III. Secondary market trading	1. Governance	18	Comprehensive governance framework
		19	Effective risk management
		20	Prevention of conflicts of interest
	2. Accessibility	21	Open and fair access
	3. Market credibility	22	Integrity of trading
		23	Avoidance of double counting
		24	Publicity and disclosure
	4. Transaction integrity	25	Robust market infrastructure
		26	Market functions
		27	Enforcement actions
		28	Market surveillance and monitoring of trading
		29	Trading venue resources
	5. Interoperability	30	Standardisation
		31	Data and systems interoperability
IV. Use, disclosure of use, and retirement of carbon credits	1. Credibility	32	Alignment with the Paris Agreement
		33	Credible strategy
	2. Accountability	34	Responsible procurement and use of carbon credits
		35	Transparent disclosure

Source: Author.

The guidance elaborates on the content of each segment, principle, and criterion.

Table 5-2. Example of Description for Each Criterion

<table>
<tr><th>Example of Description for One Criterion</th><th colspan="2">Contents Described in the Guidance</th></tr>
<tr><td rowspan="6">
</td><td colspan="2">Segment</td></tr>
<tr><td colspan="2">Principle</td></tr>
<tr><td>Criterion</td><td>Criterion and detailed description of the criterion</td></tr>
<tr><td>Expected action</td><td>Expected action required to satisfy the criterion</td></tr>
<tr><td>Reason for importance</td><td>Background and justification for the criterion based on literature and expert insights</td></tr>
<tr><td>Tailoring to ASEAN’s unique context</td><td>Explanation of how ASEAN’s unique context is addressed, including distinctions between developing and emerging/advanced countries where relevant</td></tr>
<tr><td>Discussion point</td><td>Key issues to be considered for the criterion and remaining points for discussion</td></tr>
</table>

AMS = ASEAN Member State, ASEAN = Association of Southeast Asian Nations.
Source: Author.

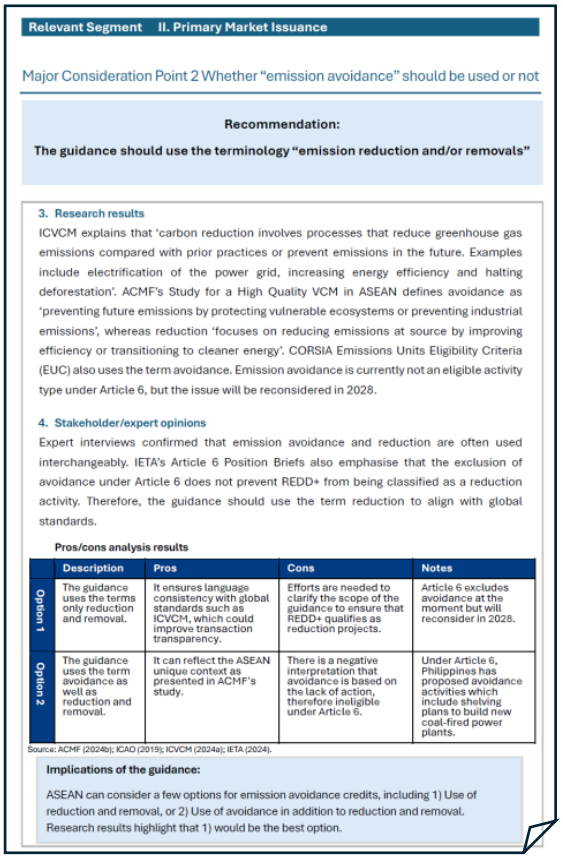
Emphasis on the design concept

In developing the guidance, attention was given to reflecting ASEAN’s unique socio-economic and environmental conditions, whilst maintaining consistency with international best practices. Recognising the varying degrees of VCM readiness amongst the 10 AMSs, the guidance details differentiated approaches where appropriate. Specifically, it provides two tailored approaches for two groups of countries—"developing countries” and “emerging and advanced countries”—based on their levels of VCM readiness if it is appropriate.

This classification was determined through an analysis of the ASEAN VCM ecosystem, which examined four variables and 15 corresponding indicators, as presented in Chapter 3.

The following section presents the detailed guidance for the four segments. Section 5.3 then outlines the major consideration points, describing key issues identified during the development process and explaining how research findings, analysis, and expert insights informed the recommended criteria in Section 5.2.

Table 5-3. Example of Major Consideration Points

Example of Major Consideration Points	Contents in the Major Consideration Points	
	Segment	Relevant segment
	Discussion point	Issue raised during the preparation of the guidance
	Recommendation	Recommended approach described in Section 5.2
	Summary of research results	Research findings supporting the proposed recommendations
	Stakeholder and expert opinions	Stakeholder and expert perspectives collected to substantiate recommendations
	Pros and cons analysis	Analysis of multiple options considered for the discussion point
	Implications for the guidance or action plan	Explanation of how the analysis results were reflected in the final guidance (Section 5.2)

ASEAN = Association of Southeast Asian Nations, CORSIA = Carbon Offsetting and Reduction Scheme for International Aviation, ICVCM = Integrity Council for the Voluntary Carbon Market, IETA = International Emissions Trading Alliance, REDD+ = reducing emissions from deforestation and forest degradation, VCM = voluntary carbon market
Source: Author.

5.2 ASEAN VCM Guidance

The guidance comprises the following four parts:

I. Regulatory Frameworks
II. Primary Market Issuance
III. Secondary Market Trading
IV. Use, Disclosure of Use, and Retirement of Carbon Credits

I. Regulatory Frameworks

I. Regulatory Frameworks
I-1. Governance

Criterion 1. Regulatory approach and scope

To ensure effective oversight of the VCM, all relevant regulators and authorities should be assigned clearly defined roles and responsibilities covering the entire process, including the issuance, trading, utilisation, and retirement of carbon

Relevant regulators and other authorities should, within the scope of their mandates, evaluate the feasibility of adapting existing frameworks or establishing new ones to effectively regulate and oversee VCM. It is essential that regulatory scope of each organization is distinctly defined to prevent overlaps and redundancies. Furthermore, these entities may consider aligning their regulatory approaches with international standards and principles being formulated by multi-stakeholder initiatives, where appropriate and feasible.

Why this criterion is important

The effective operationalisation of the VCM requires coordination amongst multiple regulatory authorities, each with distinct responsibilities and policy objectives. Each authority contributes a unique perspective and set of tools that ensure comprehensive market oversight. However, differing regulatory approaches can lead to inconsistencies and misalignment. Clearly defining institutional objectives and roles is therefore essential to prevent market confusion and mitigate risks such as regulatory gaps or overlaps, which could undermine the integrity and efficiency of carbon markets. At the same time, excessive regulation should be avoided. The regulatory environment must balance oversight with flexibility, efficiency, and innovation, factors that are essential for a well-functioning VCM.

Tailoring the criterion to ASEAN's unique context

Amongst AMSs, regulatory structures vary widely. Generally, environmental authorities oversee the primary markets, financial regulators supervise the secondary markets, and the governance of the use and disclosure of carbon credits is closely tied to industrial policies.
Given the diversity of legislative frameworks across AMSs, the scope of responsibilities assigned to each authority may vary. Box 5-1 shows that many AMSs are still developing comprehensive climate-change laws and regulations. These legal frameworks are expected to establish clearer bases for carbon-pricing instruments, such as emissions trading systems and carbon taxes, whilst also clarifying the oversight roles of authorities responsible for carbon markets.

The table below outlines a proposed approach to regulatory treatment in AMSs, tailored to the maturity of each country's carbon market. AMSs should establish coordination mechanisms amongst all regulators involved in carbon markets to ensure effective oversight, consistency, and accountability.

Below is a possible approach that AMSs may consider:

Developing countries	Assess domestic regulatory approach to carbon credits, including surveillance, supervision, and enforcement, throughout the lifecycle of credit projects.
Emerging and advanced countries	Develop a comprehensive regulatory framework that clearly defines the responsibilities, jurisdictions, and coordination mechanisms of all relevant regulators and authorities.

BOX 5-1. Development Status of Legal and Regulatory Frameworks for Climate Change and Responsible Entities in ASEAN Member States (as of October 2025)

AMS	Policies and Regulations Related to Climate Change and Carbon Credits	Responsible Entity for Climate Change Strategy
Brunei Darussalam	National Climate Change Policy — Pillar No. 6	Brunei National Council on Climate Change
Cambodia	Cambodia's Article 6 Operation Manual	Ministry of Environment
Indonesia	· Presidential Regulation 98/2021 · Presidential Regulation 110/2025 · MoEF Reg. 21/2022 · MEMR Reg. 16/2022 · MoEF Reg. 7/2023 · OJK Reg. 14/2023 · MoMAF Reg.1/2025	Ministry of Environment Environmental Control Agency
Lao PDR	National Decree on Carbon Credits *(under development)*	Ministry of Natural Resources and Environment
Malaysia	· National Guidance on International VCM Mechanism (2021) · VCM Handbook (2023) · National Guidance on Forest Carbon Market (2020) · National Climate Change Act *(draft)* · National Carbon Market Policy (*draft*)	Ministry of Natural Resources and Environmental Sustainability
Myanmar	Myanmar Climate Change Strategy (2018–2030)	Ministry of Natural Resources and Environmental Conservation
Philippines	· House Bill No. 11375 (February 2025) · National Climate Change Action Plan	Climate Change Commission
Singapore	· Carbon Pricing Act (2018) · International Carbon Credits framework	National Climate Change Secretariat
Thailand	· Climate Change Master Plan 2015–2050 · Carbon Credit Management Guideline and Mechanism · Climate Change Act (*draft*)	National Committee on Climate Change Policy
Viet Nam	· Law no 72/2020/QH-14 · Decree 06/2022/ND-CP · Decision 232/QD-TTg	Ministry of Agriculture and Environment

Sources: Chow, M., J. Giouw, and L. Oon (2024); Brunei Climate Change Secretariat (2020); Bursa Malaysia Berhad and MGTC (2023); Ministry of Environment, Cambodia (2024); Prandstetten, C. et al. (2023); GGGI (2025); ICAP (2025); Malaysia KASA (2021); Malaysia KETSA (2020); Malaysia NRES (2024); PwC Indonesia and Indonesia Carbon Trade Association (2024); Philippines Climate Change Commission (2011); Philippines House of Representatives (2025); Singapore MSE (2023); Singapore MSE (2024).

I. Regulatory Frameworks
I-1. Governance

Criterion 2. Regulatory treatment

In line with their respective mandates, regulators and other authorities should seek to provide clear guidance on the legal and regulatory treatment of carbon credits.

Relevant regulators and other authorities should seek to address potential issues related to the legal and regulatory treatment of carbon credits within their jurisdictions, particularly regarding how such credits are defined, characterised, and regulated. They should provide clear guidance to prospective participants and establish mechanisms to resolve uncertainties that may hinder market activity.

Why this criterion is important

Significant uncertainties remain concerning the legal nature and regulatory oversight of carbon markets in most jurisdictions. Such ambiguity undermines the growth of carbon credit trading and constrains the mobilisation of financial resources needed to generate a meaningful impact. Under private law, the legal treatment of carbon credits defines their fundamental nature, whether as contractual rights, intangible property, or digital assets. Such clarification ensures certainty regarding ownership, transferability, collateralisation, and treatment in bankruptcy. It thereby supports stability and predictability for market participants, including those engaged in cross-border transactions.

By contrast, regulatory treatment under public law defines how carbon credits are classified, for example, as securities, commodities, or financial instruments, and identifies the competent authorities responsible for oversight. Clear and coherent rules help to prevent regulatory gaps, strengthen oversight, and enhance confidence and protection for buyers, sellers, and users alike.

Tailoring the criterion to ASEAN's unique context

Legal and regulatory clarity on the treatment of carbon credits is essential to promote market integrity, investor confidence, and interoperability across AMSs. IOSCO (2024) underscores the importance of defining the legal nature and regulatory treatment of carbon credits and highlights that established traded asset markets offer valuable lessons and insights into the features of sound market systems.

Given the diversity of legal and regulatory frameworks amongst AMSs, achieving regional alignment remains challenging. Nevertheless, each AMS should solidify its domestic frameworks to provide clarity and confidence to market participants.

A possible benchmark for defining regulatory treatment of carbon credits in AMSs, according to market maturity, is outlined below.

Developing countries	Assess the legal and regulatory treatment of carbon credits in accordance with domestic laws and regulations.
Emerging and advanced countries	Develop a comprehensive regulatory framework providing clarity on the legal and regulatory treatment of carbon credits, consistent with respective domestic mandates.

Discussion points

International discussions on the legal nature of carbon credits are ongoing under the auspices of the International Institute for the Unification of Private Law (UNIDROIT). These discussions aim to provide guidance on private law issues and enhance confidence in voluntary carbon credits. UNIDROIT emphasises that legal certainty regarding the classification of voluntary carbon credits under private law is critical to supporting participation by private entities, including project developers and investors. It also informs market mechanisms such as transfers during sale, use as collateral, and implications for accounting and taxation.

It is therefore important to closely monitor the progress of UNIDROIT's work, as greater jurisdictional alignment on the legal nature of carbon credits will facilitate cross-border trading and enhance market confidence. Further clarifications will be beneficial to ensure a comprehensive understanding and consistent application of legal and regulatory treatments, whilst respecting the national circumstances of each AMS.

BOX 5-2. Legal and Regulatory Treatment of Carbon Credits

Carbon credits can be examined from two main perspectives: **legal**, which defines their fundamental nature and associated rights, and **regulatory**, which determines how they are classified, supervised, and governed.

Perspective	Focus	Examples	Implications
Legal (private law) *What it is*	Fundamental legal status under private law	Intangible property: a bundle of contractual rights	Determines ownership rights and transferability in transactions
Regulatory (public law) *How it is governed*	Classification and oversight under domestic regulatory regimes	Treated as a commodity, security, or another regulated instrument	Determines regulator, scope of activities (issuance, trading, ratings), and compliance requirements

Sources: Wetterberg, Ellis, and Schneider (2024); International Swaps and Derivatives Association (2022).

I. Regulatory Frameworks
I-1. Governance

Criterion 3. Participants' skill and competence

Regulators and government authorities should promote initiatives that enhance the skills and competence of market participants, as well as improve public understanding of the roles of carbon credits and the benefits and risks associated with the VCM.

To ensure the effective functioning and integrity of the VCM, regulators and government authorities should take the lead in enhancing the knowledge base of market participants through targeted training programmes and consultations. These programmes may address both the technical and business development aspects of VCM participation, tailored to the specific needs of existing and emerging market players. Implementing investor education programmes can help raise awareness about the roles, benefits, and limitations of carbon credits, enabling individuals and institutions to make more informed decisions.

Why this criterion is important

The carbon credit market is complex and rapidly evolving, making it challenging to understand. Consequently, building capacity amongst stakeholders is essential to cultivate knowledge and experience in carbon credits, their characteristics, and trading practices. Financial and investment firms, along with their senior management, must possess the necessary skills and competence to make informed decisions that align with regulatory requirements and market best practices. Enhancing investor education and public awareness is vital to broaden understanding and encourage informed participation. In general, both buyers and sellers must have sufficient knowledge and experience, whilst those providing infrastructure must be well-equipped to ensure the integrity and effective functioning of the carbon credit market ecosystem.

Tailoring the criterion to ASEAN's unique context

As carbon market ecosystems in many AMSs are nascent, the need for capacity building is especially high. Capacity-building initiatives can help bridge the gaps amongst AMSs, ensuring that all markets are adequately prepared for regional integration.

Below is a possible approach that AMSs may consider:

Developing countries	Implement capacity-building sessions to enhance the skills of VCM market participants, along with investor education initiatives to improve public awareness and understanding of carbon credits.

Emerging and advanced countries	Raise awareness of the importance for financial and investment firms to obtain sufficient skills and expertise in VCM, including a thorough understanding of the benefits and risks associated with carbon credit financing and trading. Develop guidance and programmes to help project developers design high-quality projects and assist users in formulating credible transition strategies.

I. Regulatory Frameworks
I-2. Regional interoperability

Criterion 4. Domestic and international interoperability and cooperation

To foster the global development of VCM, regulators and other relevant authorities should aim for interoperability and cooperation, both domestically and internationally, when developing their regulatory approach to VCM.

In alignment with their responsibilities, regulators and authorities should strive to enhance cooperation and consistency. This can be achieved through collaboration with peer regulators and engagement with stakeholders to share best practices and establish aligned standards. They may consider implementing cross-border enforcement cooperation to mitigate the risks associated with suspected fraudulent or manipulative activities involving cross-border elements.

Why this criterion is important

The carbon credit ecosystem comprises a wide range of entities that work together to facilitate market operations. Market regulators should therefore acknowledge the importance of collaboration amongst stakeholders to enhance coherence and interoperability. Examples of such collaboration include partnerships between businesses and financial institutions for support and information exchange, application programming interface (API) connections between trading platforms and registries, and alignment of evaluation methodologies amongst rating agencies and standard-setting organisations. By promoting shared responsibility amongst all parties involved, regulators can help create more efficient market operations whilst maintaining the integrity of the carbon credit market.

When markets are opened for international transactions, the risk of disputes and fraud increases due to inconsistencies in market environments. To address these challenges, several initiatives have been developed to improve the interoperability of credit trading practices globally. Notable examples include the Integrity Council for the Voluntary Carbon Market (ICVCM, which strengthens the supply side by setting standards and assessing credit quality; the Voluntary Carbon Market Integrity Initiative (VCMI), which supports the demand side by guiding credible corporate use and claims; and the International Swaps and Derivatives Association, which contributes to market-making by developing standardised contracts and frameworks to improve transparency and liquidity. Regulators and relevant authorities should actively engage in these initiatives to remain relevant in international discussions and support each other in creating a well-functioning market environment.

Tailoring the criterion to ASEAN's unique context

In many AMSs, carbon market policies are still under development and are expected to evolve significantly in the coming years. Regulators should therefore ensure that domestic

frameworks are regularly updated to maintain consistency and alignment with international standards whilst promoting best practices within the region.

Depending on the stage of market development, AMSs could consider the following actions:

Developing countries	Undertake domestic stakeholder engagement to ensure policy and regulatory alignment and establish arrangements for domestic information sharing and cooperation to the extent possible.
Emerging and advanced countries	Ensure regulatory and policy alignment to maintain a high-integrity VCM ecosystem, including the following: • Conduct assessments of domestic frameworks against international standards. • Enter arrangements for cross-border information sharing and cooperation • Share a common understanding of ASEAN's environmental challenges and consider ways to encourage the use of credits from projects that address these shared issues.

II. Primary Market Issuance

II. Primary Market Issuance
II-1. Equity

Criterion 5. Fair and equitable transactions

The costs and fees of transactions in the primary market should be fair and equitable.

Carbon crediting programmes and other participants in the primary market should promote fairness and equity in their transactions. This can be achieved through the reasonable setting of issuance fees, MRV costs, and/or through equitable revenue distribution amongst project stakeholders.

Why this criterion is important

This criterion highlights the importance of promoting fair and equitable transactions in the primary market to ensure financial sustainability. As summarised in Box 5-3, various costs and fees are associated with credit issuance. Excessive issuance fees and MRV costs can disproportionately burden stakeholders, discouraging access to carbon markets and potentially undermining investor confidence. This, in turn, can have significant implications for market viability. Reasonable cost structures and fair revenue distribution support project development, build trust, and strengthen equity and long-term engagement amongst stakeholders.

Tailoring the criterion to ASEAN's unique context

This criterion is designed to promote fair fee structures and revenue sharing in the primary market, recognising that high costs associated with carbon credit issuance can hinder smaller and newer projects from entering the market. Such barriers limit competition and innovation, a concern highlighted in ACMF (2024b).

In case of compliance use of voluntary carbon credits

When considering the international compliance use of voluntary carbon credits, it must be acknowledged that some host countries have introduced corresponding adjustment fees (Box 5-4). Such opportunity–cost pricing enables countries to deliver additional emission reductions and/or removals to meet their nationally determined contributions (NDC). According to the World Bank et al. (2025), countries may need to charge a corresponding adjustment fee of US$25 per authorised credit. However, excessively high fees would increase the financial burden on buyers and may reduce the attractiveness of authorised credits. Therefore, setting corresponding adjustment fees at reasonable levels is important to support fair and equitable transactions.

BOX 5-3. Costs and Fees Associated with Primary Market Issuance

In the primary market for carbon credits, costs and fees are influenced by several factors, including project type, geographic location, carbon crediting programmes, and market demand. Transaction costs typically include project development and operational expenses, such as feasibility studies, asset acquisition, and local stakeholder consultation, as well as auditing and certification expenses up to issuance. Additional costs may arise from delays in validation or verification, which can extend project timelines and increase administrative overheads. Transaction fees refer to the transfer, retirement, and cancellation fees charged by programmes. Project proponents may incur costs to secure host-country authorisations for international compliance purposes. These cumulative costs and fees can significantly influence transactions in the primary market. The table below summarises the typical fee types and amounts charged by major programmes. It should be noted that these do not include any external costs.

Charged to	Fee type	Verra	Gold Standard	Global Carbon Council
Registry account holder	Account set up/annual maintenance	US$750 for set-up; US$750 for maintenance	US$1,000 for maintenance	US$1,000 for set up; US$500 for maintenance
Project developer and proponent	Project registration	US$3,750	US$2,500	US$3,000
	Verification review	US$5,000	US$2,000	N/A
	Credit issuance	US$0.23 per credit	US$0.25 per credit or share of proceeds (SOP); US$0.15 per credit plus 2% of issuance	US$0.24 per credit
	Credit transfer/retirement/ cancellation	US$0.02 per credit	US$0.02 per credit	US$0.02 per credit
	Article 6 labelling	US$0.05 per credit	US$0.05 per credit	US$0.04 per credit
Validation and verification body	Application review/annual maintenance	US$5,000 for maintenance	US$8,000 for application review; US$2,500 for maintenance	US$7,000 (International Organisation for Standardisation track) for application review; US$2,500 for maintenance

Sources: Global Carbon Council (2025), Gold Standard for the Global Goals (2025), Verra (2024b).

The World Bank's Carbon Markets Infrastructure Working Group (2025a) recommends that programmes adopt neutral and transparent fee structures. By decoupling revenues from credit issuance volumes or market prices, programmes can reduce conflicts of interest and reinforce trust in certification and registry operations. As the market matures and demand for high-integrity credits grows, transparency around cost and fee structures will become increasingly important for both sellers and buyers.

BOX No. 5-4. Corresponding Adjustment Fees

Some host countries have introduced, or plan to introduce, corresponding adjustment fees, as summarised in the table below. The application of a corresponding adjustment involves the international transfer of mitigation outcomes that would otherwise have been used domestically. As such, countries seek to secure enough revenue to finance additional climate actions needed to meet their nationally determined contributions.

For example, Ghana has introduced a corresponding adjustment fee of US$3–US$5 per unit of internationally transferred mitigation outcomes (ITMOs), depending on the scale and type of activities generating the authorised credits. Of this, 90% is allocated to Ghana's Mitigation Ambition Fund to be reinvested in further mitigation activities. Similarly, Kenya has set a fee of US$4 per unit of ITMOs, with 50% allocated to Kenya's Climate Change Fund.

In ASEAN, Cambodia has indicated its intent to introduce a corresponding adjustment fee to cover the opportunity costs related to authorising and transferring ITMOs. The proceeds will be used to raise funds for additional climate actions, although the specific amount has not yet been announced.

Host Country	Purpose	Payer	Timing of Payment	Amount
Ghana	90% of proceeds directed to the Mitigation Ambition Fund to support additional mitigation actions beyond the NDC 10% to cover administrative costs	Activity (i.e. project) developer or acquiring party (i.e. country)	At issuance	US$3–US$5 per credit, depending on scale and type of activities
Kenya	50% of the corresponding adjustment fee allocated to Climate Change Fund	Project proponent	At issuance	US$4 per credit
Cambodia	Charged for the authorisation of each credit to support government efforts to raise mitigation and adaptation ambition	N/A	Before issuance of the letter of positive examination	N/A

Sources: Ghana Carbon Market Office (2022); National Council for Law Reporting (Kenya Law) (2024); Ministry of Environment, Cambodia (2024).

II. Primary Market Issuance
II-2. Inclusivity

Criterion 6. Inclusive market participation

Diverse participants should have access to the primary market.

Carbon crediting programmes and other participants in the primary market should facilitate inclusive participation, including that of project developers in jurisdictions with varying levels of readiness and capacity. This can be achieved by allowing diverse project types and locations.

Why this criterion is important

This criterion highlights the importance of broadening access to the primary market to ensure that underserved regions benefit from climate finance and capacity-building opportunities. Encouraging wider participation promotes equity, supports local development, and helps broaden the global impact of carbon markets.

Tailoring the criterion to ASEAN's unique context

Expanding project diversity and supply potential is essential for the growth of ASEAN's market, considering that credit issuance in the region has primarily focused on nature-based projects, followed by renewable energy. Promoting inclusive participation is equally important, as AMSs vary in their levels of project development and credit issuance. Smaller project developers generally face barriers to participating in the primary market due to limited technical and financial capacity, as well as regulatory uncertainty. To address such challenges, AMSs could consider the following tailored approaches:

Developing countries	Enhance clarity in regulatory procedures and introduce targeted policy incentives to assist project development.
Emerging and advanced countries	Foster knowledge sharing between large-scale and smaller project developers to build local capacity. Consider regional cooperation to facilitate technical assistance and information exchange between AMSs with similar project demographics.

BOX 5-5. Policy Incentives for Project Development

Several Association of Southeast Asian Nations Member States have introduced policy incentives to encourage project development. For instance, Malaysia has implemented a further tax deduction of up to MYR300,000 (US$71,300) for companies to cover costs incurred in project development, including measurement, reporting, and verification expenses. This deduction can be claimed against income derived from carbon credit trading on the Bursa Carbon Exchange (BCX). To qualify, projects must be registered under an international carbon crediting programme approved by BCX, such as Verra and Gold Standard, and all expenditures on project development must be verified by the Malaysian Green Technology and Climate Change Corporation (MGTC). This incentive aligns with Malaysia's goal of achieving net zero by 2050 at the earliest and aims to encourage broader corporate participation in the voluntary carbon market.

Singapore has also introduced the Carbon Project Development Grant, which, whilst specific to Article 6 projects and targeting experienced project developers, supports early-stage project development and financing activities. The grant's objective is to facilitate the generation of high-integrity carbon credits. Projects must comply with Singapore's International Carbon Credit framework and be in countries where Singapore has implementation agreements in place.

Sources: Bursa Malaysia Berhad and MGTC (2023), Singapore Economic Development Board (n.d.).

II. Primary Market Issuance
II-3. Governance

Criterion 7. Effective governance

Carbon crediting programmes should be effectively governed with transparent procedures.

Carbon crediting programmes should establish governance requirements and procedures that ensure transparency, accountability, information security, continuous improvement, long-term administration, and the overall integrity of carbon credits. Key procedures include stakeholder consultations, grievance mechanisms, conflict-of-interest avoidance, know-your-customer (KYC) compliance, and due diligence processes. These procedures should be subject to regular review and continuous enhancement.

Why this criterion is important

This criterion highlights the importance of robust governance in carbon crediting programmes to ensure transparency, accountability, and long-term integrity. Effective governance procedures are essential for maintaining market confidence and preventing fraud, manipulation, and environmental harm. Equally important is the assurance of financial integrity, achieved through strong safeguards against money laundering, bribery, and corruption, supported by measures to uphold data integrity and security. Regular reviews of these governance mechanisms support continuous improvement and adaptability, helping carbon markets function fairly and efficiently whilst aligning with broader sustainability goals.

Tailoring the criterion to ASEAN's unique context

This criterion is fundamental to ensuring the environmental and financial integrity of the primary market and thus has not been tailored to ASEAN's unique context. However, AMSs could adopt tailored approaches to meet this criterion, depending on their respective stages of market development:

Developing countries	Support programmes in establishing basic governance frameworks, including clarification of institutional roles, simple due diligence checklists, and community-based consultations, whilst building capacity for periodic review and improvement.
Emerging and advanced countries	Encourage programmes to adopt comprehensive governance procedures, including third-party grievance systems, conflict-of-interest policies, detailed due diligence procedures, and regular independent reviews.

II. Primary Market Issuance
II-4. Transparency

Criterion 8. Tracking and identification

Information related to the issuance of carbon credits should be accurate and complete.

Carbon crediting programmes should ensure that information related to the issuance of carbon credits is accurate, complete, and transparent. This can be achieved by programmes operating, or making use of, registries that publicly identify and track the attributes, issuance, ownership, retirement, and/or cancellation of carbon credits. Registries should maintain robust operational and data infrastructures, provide adequate user support, and apply reconciliation mechanisms to ensure the accuracy and completeness of records.

Why this criterion is important

This criterion highlights the importance of tracking accurate and complete information on the issuance of carbon credits, which is essential to uphold the integrity of carbon markets. As noted by IOSCO and the World Bank (2024), registries represent a core infrastructure for recording the entire lifecycle of carbon credits, identifying data discrepancies, and preventing issues such as double counting and fraud. Such transparency allows participants in the primary market to trust the legitimacy of carbon credits, thereby fostering confidence and supporting the development of a credible and robust market.

Tailoring the criterion to ASEAN's unique context

This criterion is fundamental to ensuring the environmental and financial integrity of the primary market and thus has not been tailored to the ASEAN context. However, ASEAN registries may face credibility and market access challenges due to limited historical performance data and distinct system interfaces. Criterion 10 (Standardisation) could play a critical role in addressing these challenges.

In case of compliance use of voluntary carbon credits

When considering the international compliance use of carbon credits, carbon crediting programmes should track and clearly identify the status of host-country authorisations and corresponding adjustments.

Discussion points

Each AMS should design its registry to be interoperable, rather than creating a single, centralised registry across ASEAN. Interoperable registries allow seamless data exchange and coordination, thereby enhancing transparency, efficiency, and trust amongst market

participants. This approach also supports integration with international initiatives such as the World Bank's Climate Action Data (CAD) Trust, helping ensure that ASEAN remains connected to the global market.

BOX 5-6. Current Landscape of Carbon Markets in ASEAN

The table below summarises the status of carbon market development across AMSs. National registries are typically overseen by environmental authorities.

AMS	Carbon Crediting Programme/Recognition Framework	Compliance Scheme Allowing Carbon Offsets	National Registry
Brunei Darussalam	-	-	-
Cambodia	In planning	In planning	Cambodia National Carbon Registry
Indonesia	Indonesia Emission Reduction Certificate (Sertifikasi Pengurangan Emisi (SPEI)) Scheme Carbon unit: Emission Reduction Certificate (Sertifikat Pengurangan Emisi–Gas Rumah Kaca [SPE-GRK])	Emission Upper Limit Technical Approval (Persetujuan Teknis Batas Atas Atas Emisi (PTBAE)) for the power plant sub-sector. Allows the use of SPE-GRK in certain activities in the energy sector.	Indonesia National Registry System for Climate Change (Sistem Registrasi Nasional Pengendalian Perubahan Iklim (SRN-PPI))
Lao PDR	In planning (under the Carbon Credit decree); Forest Carbon Credit Initiative	In planning	In planning
Malaysia	Forest Carbon Offset Mechanism (under Malaysia Forest Fund)	Carbon tax (in planning)	National Registry for Climate Change (in planning)
Myanmar	-	-	-
Philippines	In planning	In planning	The Philippines Environmental Registry (under development)
Singapore	International Carbon Credit (ICC) Framework (Article 6.2 cooperation)	Carbon Tax allows use of eligible ICCs up to 5% of taxable emissions	International Carbon Credit Registry (is developed to facilitate Article 6 transactions
Thailand	Standard Thailand Voluntary Emission Reduction Programme (T-VER), Premium T-VER	Thailand Emission Trading System (under development)	Thailand Carbon Credit Registry (managed by Thailand Greenhouse Gas Management Organisation [TGO])
Viet Nam	Under development	Emission Trading System (pilot phase); allows use of carbon credits from recognised mechanisms up to 30%.	Vietnam National Carbon Registry System (under development)

Sources: B&Company (2025); ICAP (n.d.); KAMY (2024); Lao People's Democratic Republic (2025); Maharlika Carbon (n.d.); Malaysia Forest Fund (n.d.); Ministry of Environment, Cambodia (2024, n.d.); Prandstetten, C. et al. (2023); PWC Indonesia (2023); Singapore's Carbon Markets Cooperation (2025); Singh, A. (2025); Susanto, V. (2025); TGO et al. (2024); Visapra, P. (2024); Dasgupta, T. (2025).

II. Primary Market Issuance
II-4. Transparency

Criterion 9. Disclosure

Information related to the issuance of carbon credits should be transparently disclosed.

Carbon crediting programmes should publicly disclose relevant information concerning the development and issuance of carbon credits. Such disclosure should include approved methodologies, validation and verification reports, and details on the vintage and volumes of carbon credits issued, retired, and/or cancelled, as well as the terms and conditions of registries. Sellers and buyers in the primary market should make contracts and pricing information available, as far as practicable, to lower transaction costs.

Why this criterion is important

This criterion highlights the importance of transparent disclosure, including project information to support informed decision-making in the primary market. Public access to data on vintage, applied methodologies, and related information enables buyers to assess whether carbon credits represent recent and genuine mitigation efforts. It also mitigates the risk of greenwashing and reinforces transaction integrity. The availability of transaction data enhances market efficiency and fairness, fostering a more robust and accountable VCM ecosystem.

Tailoring the criterion to ASEAN's unique context

This criterion is fundamental in ensuring the environmental and financial integrity of the primary market and thus has not been tailored to ASEAN's unique context. However, recognising that disclosure readiness may vary depending on the maturity of registries, AMSs could adopt the following tailored approaches:

Developing countries	Support programmes to disclose basic data, such as the status of credits or procedural documents.
Emerging and advanced countries	Encourage programmes to disclose additional data, which could significantly improve transaction transparency, such as the specific purpose for which credits are retired or the name of the entity on whose behalf the retirement is made.

In case of compliance use of voluntary carbon credits

When carbon credits are intended for international compliance use, carbon crediting programmes should also publicly disclose the availability of host country authorisations.

Discussion points

A persistent challenge in the primary market is the lack of pricing transparency, which largely stems from its reliance on over-the-counter (OTC) transactions. The confidential nature of these deals results in limited publicly available pricing data. Whilst some independent services, such as Ecosystem Marketplace, attempt to bridge this gap, their reliance on survey data from market participants often leads to fragmented pricing insights. This challenge is further complicated by the downward pricing pressure that project developers frequently face from buyers, despite the high costs associated with producing high-integrity credits. Therefore, it is important for AMSs to closely examine factors such as market demand, environmental impact, verification standards, and prevailing economic conditions to ensure that carbon credit prices remain fair, transparent, and supportive of effective climate action.

II. Primary Market Issuance
II-5. Interoperability

Criterion 10. Standardisation

Carbon credits should be recognised and accepted across the region whilst ensuring alignment with global standards.

Consistent with their respective mandates, relevant regulators and other authorities should cooperate with carbon crediting programmes, carbon credit rating agencies, and other participants and stakeholders in the primary market to standardise data models, strengthen methodologies, and streamline verification processes in accordance with global standards.

Why this criterion is important

This criterion highlights the importance of standardisation in the primary market to ensure consistency, transparency, and trust. By aligning registry data, methodologies, and verification processes with global standards, stakeholders can reduce fragmentation, improve market efficiency, and enhance the credibility of carbon credits. Initiatives such as the Common Carbon Credit Data Model, developed by the G20 Sustainable Finance Working Group, and the Carbon Data Open Protocol (CDOP) exemplify efforts to create interoperable and transparent systems. Such standardisation is essential for enabling cross-border transactions and scaling climate finance.

Tailoring the criterion to ASEAN's unique context

This criterion recognises the active development of carbon crediting programmes within ASEAN, such as the Indonesia Emission Reduction Certificate (Sertifikasi Pengurangan Emisi) Scheme, the Malaysia Forest Fund (MFF), and the Thailand Voluntary Emission Reduction Programme (T-VER). To attract international buyers and unlock private climate finance opportunities, these domestic programmes should coexist with internationally established programmes such as Verra and the Gold Standard. Achieving this requires interoperability across AMSs by harmonising processes and ensuring global recognition, whilst preserving domestic priorities. A notable example is Indonesia's Mutual Recognition Agreement (MRA) with the Gold Standard (Gold Standard, 2025). Similarly, the Thailand Greenhouse Gas Management Organization (TGO) and the MFF have each established memorandums of understanding with Verra (Verra, 2022, 2024a), demonstrating ASEAN's growing alignment with global standards to enhance credibility and market access.

In case of compliance use of voluntary carbon credits

When considering the domestic and international compliance use of carbon credits, regulators and authorities should ensure that domestic carbon crediting programmes adhere to national regulatory requirements. These requirements may relate to the operations of the programmes themselves, as well as to the specific characteristics of the carbon credits, such as their environmental integrity, when used within a compliance regime.

II. Primary Market Issuance
II-6. High integrity of carbon credits

Criterion 11. Third-party validation and verification

Emission reductions and/or removals should be validated and verified by an independent third party.

Carbon crediting programmes should establish specific requirements and procedures for independent third-party validation and verification. Validation and verification bodies (VVBs) should be accredited in accordance with national or international standards, such as International Organisation for Standardisation (ISO) 14065.

Why this criterion is important

This criterion highlights the importance of independent third-party validation and verification to confirm that projects genuinely deliver the claimed emission reductions and/or removals before carbon credits are issued to the market. Accreditation under recognised standards such as ISO 14065 guarantees that VVBs are impartial, technically competent, and consistently apply rigorous procedures, thereby preventing over-crediting.

Tailoring the criterion to ASEAN's unique context

This criterion allows accreditation based on national standards to ensure alignment with the regulatory frameworks of AMSs. For instance, Indonesia requires VVBs to be accredited by the National Accreditation Committee (Komite Akreditasi Nasional (KAN) in accordance with certain Indonesian National Standards (Standar Nasional Indonesia (SNI)) (Chow, M., J. Giouw, and L. Oon, 2024).

As explained in IOSCO (2024), validation is an ex-ante assessment of the project's design, whilst verification confirms the quantified results. Although the duration of each process varies across carbon crediting programmes, projects registered under Indonesia's National Registry System for Climate Change Control (Sistem Registrasi Nasional Pengendalian Perubahan Iklim (SRN PPI)) typically require 1 month for validation and 6 months for verification (PWC Indonesia, 2023). A common challenge across ASEAN is the lengthy validation and verification process, particularly for multi-site projects or those lacking comprehensive desk studies. Timelines may also be affected by sampling requirements and project complexity. Therefore, it is important to develop competent local VVBs that are well-versed in the specific conditions and circumstances of the ASEAN region.

Discussion points

A common discussion point concerning the high integrity of carbon credits involves the treatment of emission avoidance. Emission avoidance is not covered under Article 6 guidance,

and no formal definition or activity list has been established. However, it is widely recognised that forestry and land-based projects may be classified as reduction or removal activities under Article 6 (International Emissions Trading Association, 2024). Since emission avoidance and emission reduction are often used interchangeably, the ASEAN VCM Guidance could consider using the term 'reduction' to align with global standards, particularly those under ICVCM and Article 6 of the Paris Agreement, whilst continuing to monitor ongoing global discussions on emission avoidance.

BOX 5-7. The Role of Third-party Validation and Verification Bodies

As carbon markets expand, robust third-party validation and verification have become essential safeguards against fraud and misinformation. Recent cases have exposed vulnerabilities that threaten both environmental integrity and investor confidence.

In October 2024, United States (US) regulators, including the Commodity Futures Trading Commission (CFTC), the Department of Justice, and the Securities and Exchange Commission (SEC), prosecuted the project developer CQC Impact Investors for submitting falsified data to registries and third-party verifiers. The fraud led to the issuance of phantom credits for energy-efficiency projects across Africa, Asia, and Central America. Although third-party VVBs were engaged, the scheme exploited weaknesses in oversight, including inadequate sampling and excessive reliance on self-reported data. This case is particularly significant because, whilst the CFTC and SEC typically oversee secondary markets, they intervened due to the misleading nature of the company's disclosures and their impact on investor decision-making.

In March 2025, Verra suspended four VVBs after uncovering serious procedural and quality failures in 37 rice cultivation carbon projects in China. The suspensions followed quality control reviews that revealed major deficiencies, including insufficient demonstration of additionality, improper designation of projects as small-scale, overstated project areas, and inadequate evidence to substantiate baseline and project scenario implementation. This incident underscores the need for independent, high-integrity oversight to ensure transparency, accountability, and trust in carbon credit issuance.

Together, these events highlight a critical lesson: without rigorous and independent third-party validation and verification, the credibility of carbon markets is at risk. Regulators should enforce high standards for VVBs, whilst market participants must demand transparency and accountability to ensure that climate finance delivers real and measurable impact.

Sources: Bracewell (2024), Verra (2025b).

II. Primary Market Issuance
II-6. High integrity of carbon credits

Criterion 12. Additionality

Emission reductions and/or removals should be additional.

Carbon crediting programmes should establish clear requirements and procedures to ensure additionality, which means that credit-generating projects would not have occurred in the absence of incentives created by carbon credit revenues and are not required by laws or regulations.

Why this criterion is important

Ensuring that credited emission reductions or removals are genuinely additional is essential to the integrity and credibility of carbon markets. Awarding carbon credits to projects that are already mandatory or financially viable risks overstating climate progress and undermining confidence in the market. Upholding additionality ensures that carbon credits represent genuine environmental impact and that funding is directed towards projects that truly need financial support.

Tailoring the criterion to ASEAN's unique context

This criterion is fundamental to ensuring the environmental integrity of the primary market and thus has not been tailored to ASEAN's unique context. Nevertheless, it is worth noting that ICVCM (2024b) has excluded existing renewable energy methodologies from eligibility due to concerns over additionality. Similarly, large-scale renewable energy projects are ineligible under (CORSIA) 's first phase (International Civil Aviation Organization, 2024). These exclusions may not fully reflect the diverse energy policy landscape across ASEAN. Globally, renewable energy has become increasingly cost-competitive and supported by strong policy frameworks, reducing its need for climate finance. In contrast, many AMSs continue to face financial, regulatory, and infrastructural barriers that limit renewable energy deployment. To align ASEAN projects with global standards, the region could strengthen the demonstration of additionality by adopting more robust baselines and clearer evidence of dependency on climate finance. Although this transition presents challenges, it would enhance credibility and unlock greater investment in ASEAN's carbon markets.

II. Primary Market Issuance
II-6. High integrity of carbon credits

Criterion 13. Permanence

Emission reductions and/or removals should be permanent. Any reversals should be remediated or compensated.

Carbon crediting programmes should establish procedures to ensure the permanence of emission reductions and/or removals by addressing the risk of reversals. In the event of reversals, programmes should require that both project developers and the programmes themselves undertake remediation or compensation measures, such as through carbon credit buffer pools or third-party insurance mechanisms. Such risk mitigation measures should consider their availability, affordability, and acceptability within each AMS context.

Why this criterion is important

This criterion highlights the importance of ensuring the long-term integrity of emission reductions and/or removals. Carbon stored in natural systems can be released back into the atmosphere due to events such as natural disasters, pests, or diseases. Similarly, carbon stored in artificial reservoirs may be at risk of leakage or containment failure over time. Implementing robust procedures to identify, monitor, and manage these risks ensures that carbon credits continue to deliver lasting and verifiable climate benefits.

Tailoring the criterion to ASEAN's unique context

Some project types suitable for ASEAN, especially nature-based solutions, carry a relatively high risk of reversals due to their reliance on natural processes and vulnerability to environmental disruptions. To encourage investment in such projects whilst protecting market participants, this criterion promotes the adoption of secure and context-specific risk mitigation mechanisms that reflect the availability, affordability, and acceptability conditions within each AMS. This approach balances environmental integrity with practical implementation, helping to strengthen trust and resilience, and confidence in ASEAN's carbon markets.

BOX 5-8. Permanence Risks in ASEAN's Nature-based Projects

Southeast Asia's mangroves, which account for nearly one-third of the global total, offer immense potential for blue carbon credit generation. However, a recent study reveals that 85% of these mangrove areas face permanence risks that threaten the long-term integrity of carbon credits. These risks arise from socio-economic pressures, such as land conversion for oil palm, rice, and aquaculture, as well as climate-related threats, including sea-level rise and intensifying cyclones.

Although blue carbon credits are increasingly used to fund mangrove conservation, financial returns often remain lower than those from competing land uses, making projects vulnerable to reversal. Moreover, revenues from current credit sales typically cover only a portion of total conservation costs, raising concerns about the long-term sustainability of these efforts.

The study emphasises that for carbon credits to deliver lasting climate benefits, risk mitigation strategies must be tailored to local contexts and designed to operate multi-decade timeframes. Such measures are crucial to ensuring that carbon stored in these ecosystems remains securely sequestered over the long term.

Source: Kwan, V. et al. (2025).

II. Primary Market Issuance
II-6. High integrity of carbon credits

Criterion 14. Robust and conservative quantification

Emission reductions and/or removals should be robustly quantified based on conservative assumptions.

Carbon crediting programmes should require robust and accurate quantification of emission reductions and/or removals, underpinned by conservative baselines and credible methodologies. This may be supported through the use of advanced monitoring technologies, such as satellite imagery. Programmes should also ensure that both project developers and the programmes themselves implement measures to assess and mitigate emission leakages.

Why this criterion is important

This criterion highlights the importance of robust and accurate quantification to uphold the credibility of carbon credits. Over-crediting, arising from inflated baselines or unreliable methodologies, can significantly undermine the environmental integrity and effectiveness of carbon markets. Moreover, leakage, where emissions are unintentionally shifted rather than genuinely reduced, remains a persistent challenge. Applying conservative baselines and rigorous quantification methodologies ensures that carbon credits reflect real, verifiable, and lasting climate benefits.

Tailoring the criterion to ASEAN's unique context

This criterion is fundamental to maintaining the environmental integrity of the primary market and thus has not been tailored to ASEAN's unique context. However, recognising that readiness for digital MRV differs amongst AMSs, the use of advanced digital technologies should be strongly encouraged. Such tools not only enhance project credibility but also improve the efficiency and timeliness of validation and verification processes (Carbon Market Infrastructure Working Group, 2025b). AMSs could consider the following tailored approaches:

Developing countries	Prepare national guidance and provide capacity-building support to strengthen quantification systems.
Emerging and advanced countries	Lead regional efforts by scaling up the use of advanced monitoring technologies and sharing best practices.

II. Primary Market Issuance
II-6. High integrity of carbon credits

Criterion 15. Avoidance of double counting

Emission reductions and/or removals should not be double counted.

Carbon crediting programmes should establish procedures to prevent double counting, including the prevention of double registration and issuance, double selling and use, and double claiming.

Why this criterion is important

This criterion highlights the importance of preventing double counting to preserve the environmental integrity and credibility of carbon credits. When the same emission reduction and/or removal is counted more than once, it artificially inflates reported climate progress and undermines trust in carbon markets, leading to misleading claims. It is therefore essential to ensure that each credit corresponds to a unique, verifiable, and traceable climate benefit.

Tailoring the criterion to ASEAN's unique context

This criterion is fundamental to ensuring the environmental and financial integrity of the primary market and thus has not been tailored to ASEAN's unique context. However, efforts to standardise project-level information across carbon crediting programmes can help prevent multiple issuances or sales of the same credit. In this regard, Criterion 10 (Standardisation) promotes consistent data structures and registry alignment, thereby reducing the risk of double counting and strengthening the interoperability of systems across AMSs.

In case of compliance use of voluntary carbon credits

When considering the international compliance use of voluntary carbon credits, carbon crediting programmes should ensure that double counting is avoided, either between multiple countries' nationally determined contributions (NDCs) or between a host country and another entity for other international mitigation purposes, in accordance with Article 6 of the Paris Agreement.

Discussion points

Ongoing discussions concern whether double claiming between a country's NDC and a company's voluntary target should be avoided (ICVCM, n.d.). AMSs could consider developing further guidance on double claiming in the context of interactions between compliance and voluntary markets, drawing from emerging guidance documents in the region. For example,

Singapore has developed draft guidance on the corporate use of voluntary carbon credits, which clearly states that corresponding adjustment requirements do not apply to corporate buyers looking to meet voluntary climate commitments (National Climate Change Secretariat, Singapore, 2025).

II. Primary Market Issuance
II-6. High integrity of carbon credits

Criterion 16. Consideration of sustainable development benefits and environmental and social safeguards

Carbon credits should deliver sustainable development benefits in addition to emission reductions and/or removals. Environmental and social safeguards should be implemented to prevent potential harms.

Carbon crediting programmes should establish procedures to ensure that environmental and social harm is avoided through safeguards put in place by project developers. Credit-generating projects should demonstrate measurable co-benefits, such as regional economic development, biodiversity conservation, or gender equality. Programmes should include project suspension procedures in cases of non-compliance or violation of safeguards. Participants and stakeholders in the primary market should actively identify and prioritise projects that address environmental and social challenges. This can be achieved by utilising third-party co-benefit ratings or by engaging local stakeholders and conducting thorough impact assessments.

Why this criterion is important

This criterion highlights the importance of ensuring that carbon credit projects do not cause adverse impacts whilst contributing to broader sustainability goals. Without proper safeguards, projects risk causing unintended harm to ecosystems or local communities. Promoting co-benefits that go beyond emission reductions and/or removals enhances long-term impact, fosters local engagement, and strengthens community support for climate action.

Tailoring the criterion to ASEAN's unique context

Identifying and prioritising projects that address socio-economic challenges supports the principle of a just transition, an element emphasised in the ASEAN Transition Finance Guidance Version 2 (ACMF, 2024a). Participants in the primary market could use co-benefit ratings provided by independent rating services, such as the Carbon Credit Quality Initiative, to help evaluate projects. Engaging local stakeholders ensures that projects reflect community needs, protect livelihoods, and promote social equity, key pillars of a just transition. ASEAN stakeholders could conduct project assessments based on the ASEAN Taxonomy for Sustainable Finance's Essential Criteria, which require that activities do no significant harm to other environmental objectives and adhere to social safeguards such as human rights and labour standards (ASEAN Taxonomy Board, 2024). This approach helps ensure that climate mitigation actions contribute not only to environmental goals, such as tackling deforestation or reducing fossil fuel emissions, but also to inclusive development and long-term regional resilience.

II. Primary Market Issuance
II-6. High integrity of carbon credits

Criterion 17. Support for the transition

Credit-generating projects should contribute to the low-carbon transition, aligned or aligning with the Paris Agreement.

Carbon crediting programmes should establish requirements to ensure that credit-generating projects contribute to medium- and long-term emission reductions and/or removals that facilitate national and regional transitions towards low-carbon economies. Buyers may also consider purchasing carbon credits generated from projects linked to their respective transition plans.

Why this criterion is important

This criterion highlights the importance of supporting medium- and long-term actions to ensure that credit-generating projects deliver sustained climate benefits beyond short-term improvements, whilst encouraging buyers to reinforce these efforts. The term 'low-carbon transition' refers to the progressive shift towards lower emissions through multiple pathways, not necessarily limited to the 1.5°C trajectory. By adopting this criterion, carbon markets can foster investment in transition-aligned activities that drive meaningful climate ambition and action from both the supply and demand perspectives.

Tailoring the criterion to ASEAN's unique context

This criterion reinforces existing ASEAN efforts in sustainable finance, including the ASEAN Transition Finance Guidance Version 2, which aim to mobilise private finance to support a just and green transition (ACMF, 2024a). It recognises the region's diverse starting points and the varying transition goals across AMSs. The Asia Transition Finance Study Group (2023) has similarly acknowledged that recipients of transition finance may generate carbon credits through the early phaseout of brown assets.

Recognising credits from projects that contribute to broader decarbonisation goals not only enhances the credibility of buyers' climate commitments but also strengthens the overall impact of the carbon markets in supporting an ambitious, credible, and inclusive transition in ASEAN.

Discussion points

ICVCM has adopted the concept of a net-zero transition, defined as the 'objective of achieving net-zero GHG emissions by mid-century' (ICVCM, 2024c). Whilst 'low-carbon transition' refers to the strategic pathway for reducing emissions over time, 'net-zero transition' provides a

definitive end goal of achieving net-zero emissions by 2050, aligned with the 1.5°C scenario. Given that ICVCM has become the global benchmark for high-integrity carbon credits, any inconsistency with its standards could pose reputational risks and deter international buyers. Therefore, an alternative framing of this criterion could be the following:

Criterion 17. Contribution to net-zero transition
Credit-generating projects should contribute to the net-zero transition, aligned with the Paris Agreement.

Carbon crediting programmes should establish requirements to ensure that credit-generating projects avoid locking in carbon-intensive technologies that are inconsistent with regional net-zero transition goals.

BOX 5-9. Transition Credits as a New Class of Carbon Credits

Transition credits represent a newly formalised class of carbon credits designed to incentivise the early retirement of coal-fired power plants and their replacement with renewable energy. The concept was pioneered by the Coal to Clean Credit Initiative, led by the Rockefeller Foundation, and formalised by Verra in May 2025 with the launch of the world's first transition credit methodology. These credits quantify emission reductions based on the counterfactual emissions a coal plant would have produced over its remaining operational lifetime. Verra's framework also includes just transition requirements for affected workers and communities, such as job creation, energy access, and social protections.

Following ongoing efforts to develop a market for high-integrity transition credits. as a scalable financing solution for energy transition, the ICVCM has established a Continuous Improvement Work Programme (CIWP). This CIWP aims to review and compare existing initiatives seeking to generate transition credits based on factors such as additionality, avoidance of double counting, reversal risk, and robust quantification.

For ASEAN, where coal-fired power plants remain relatively young and energy poverty persists, transition credits offer a pragmatic pathway towards decarbonisation. Countries could leverage this mechanism to accelerate coal phase-out whilst ensuring social protections. By aligning financial incentives with climate and equity goals, transition credits can unlock significant climate finance and bolster regional efforts to achieve low-carbon economies, especially in markets where the full deployment of renewable energy remains constrained.

Sources: ICVCM (n.d.), Isherwood (2024), Verra (2025a).

III. Secondary Market Trading

III. Secondary Market Trading
III-1. Governance

Criterion 18. Comprehensive governance framework

A comprehensive governance framework with clearly defined responsibilities and accountabilities for functions and activities should be established in the secondary market.

Relevant regulators and authorities should establish a comprehensive governance framework that ensures that all secondary market participants—such as standard-setting bodies, registries, and registry administrators, marketplaces and exchanges, intermediaries, sellers and buyers (including traders), rating agencies, insurers, third-party entities, and private sector standardisation initiatives—have clearly defined responsibilities and accountabilities for their functions and activities.

Why this criterion is important

As global carbon markets become increasingly decentralised and complex, robust governance is essential to ensure transparency, accountability, and trust, particularly within the secondary market. The carbon credit trading ecosystem comprises a diverse range of actors, including standard-setting bodies, registries and registry administrators, marketplaces and exchanges, intermediaries, sellers and buyers (including traders), rating agencies, insurers, and third-party entities, private sector standardisation initiatives, whose roles and interactions must be clearly defined and effectively coordinated (IOSCO, 2024). To avoid overlaps, conflicts of interest, and accountability gaps, it is critical to establish harmonised procedures, interoperable systems, and independent oversight mechanisms. Effective governance should ensure inclusive stakeholder engagement, particularly from local communities and small and medium-sized enterprises (SMEs), to support a fair, credible, and well-functioning market (ACMF, 2024b).

Tailoring the criterion to ASEAN's unique context

In ASEAN's emerging carbon credit secondary markets, governance should address challenges arising from regulatory divergence, differing levels of market maturity, and varying institutional capacity across AMSs. Given that many market participants are relatively new or inexperienced, robust and adaptive governance frameworks are essential to ensure transparency, trust, and coordination. Moreover, AMSs differ widely in terms of market maturity and institutional readiness, necessitating governance approaches that reflect national contexts whilst aligning with regional and global standards.

Taking these differences into account, AMSs could adopt the following tailored approaches:

Developing countries	Encourage market participants to establish robust governance frameworks by defining clear roles and responsibilities and by building institutional capacity to ensure transparency and accountability.
Emerging and advanced countries	Require market participants to establish and publish robust governance frameworks. Governance procedures should include stakeholder consultations and grievance mechanisms and be subject to regular reviews.

III. Secondary Market Trading
III-1. Governance

Criterion 19. Effective risk management

To address potential operational or technological risks associated with the trading of, or provision of services related to, carbon credits, effective risk management frameworks must be established.

Relevant regulators and other authorities should promote the effective management of risks, including both operational and technological risks, such as fraud, hacking, other criminal activities, and disaster-related risks, to foster the resilience and stability of the secondary market.

Trading platform operators should establish and maintain comprehensive risk management systems that effectively address operational and technological risks, including fraud, cyberattacks, criminal activities, and disaster-related incidents, in connection with the trading or provision of carbon credit-related services.

Why this criterion is important

Trading platforms and intermediaries play a critical role in aggregating diverse orders, providing market information, and facilitating liquidity. Robust risk management practices are therefore vital to maintaining the credibility, security, and long-term stability of the market. Examples of effective risk management measures include emergency procedures, backup facilities, business continuity plans, and disaster recovery plans, which ensure the timely restoration and resumption of operations. Regular testing of backup systems and contingency resources is also vital to sustaining operational reliability (IOSCO, 2024).

Tailoring the criterion to ASEAN's unique context

In the ASEAN context, where market maturity varies and participation is still expanding, it is important to create a secure and accessible environment for all market participants, particularly SMEs. This requires effective management of operational and technological risks, which could otherwise pose significant barriers to entry. SMEs and other emerging participants often lack robust governance systems, leaving them more vulnerable to operational disruptions and cyber threats. ASEAN's high exposure to natural disasters, such as floods, typhoons, and earthquakes, further highlights the need for strong business continuity and disaster recovery plans (Ono, 2020). To build trust and resilience in an increasingly interconnected regional market, trading platform operators should implement enterprise risk management systems; ensure secure, scalable, and resilient infrastructure; appoint qualified risk officers; and align their risk management practices with recognised international standards. Considering differences in regulatory and institutional capacities across AMSs, the following tailored approaches are recommended:

Developing countries	Encourage trading platform operators to establish robust enterprise risk management frameworks and to periodically review and test risk monitoring systems and safeguards.
Emerging and advanced countries	Require trading platform operators to establish and publicly disclose comprehensive risk management frameworks. Risk management programmes should include business continuity plans and disaster recovery plans.

III. Secondary Market Trading
III-1. Governance

Criterion 20. Prevention of conflicts of interests

Potential conflicts of interest should be avoided, eliminated, disclosed, or otherwise properly managed.

Relevant regulators and other authorities should consider whether the laws and regulations under their jurisdiction adequately cover conflicts of interest in the secondary market.
Market participants in the secondary market should be encouraged to identify and mitigate conflicts through measures such as the structural separation of functions and transparent reporting.

Why this criterion is important

Conflicts of interest arise when market participants use their position, authority, or access to information to advance their private interests. As the secondary market ecosystem for carbon credits involves multiple interconnected players, including trading platforms, intermediaries, insurers, rating agencies, registries, buyers, and sellers, there is a high potential for overlapping roles and incentives. For example, risks arise when credit-rating agencies are compensated by the issuer, or when a single entity serves both as the trading platform and as the seller (IOSCO, 2024). To ensure fair and trustworthy transactions, appropriate conflict-of-interest policies and rules must be implemented. These include structural separation, disclosure requirements, and independent oversight (IOSCO, 2017). Compliance with financial and civil laws, as well as alignment with voluntary guidance and industry best practices, is critical to safeguard the interests of all participants.

Tailoring the criterion to ASEAN's unique context

In ASEAN's carbon credit secondary market, market participants should pay attention to managing conflicts of interest, given the region's diverse regulatory environments and the involvement of new or less-experienced participants. Adapting conflict-of-interest policies to local contexts whilst aligning with international best practices is essential to building trust and ensuring market integrity across ASEAN's fragmented markets. AMSs could adopt the following tailored approaches:

Developing countries	Consider requiring trading platforms to establish and disclose general policies to address conflicts of interest.
Emerging and advanced countries	Require trading platforms to establish clear policies and procedures to prevent, address, and mitigate conflicts of interest.

III. Secondary Market Trading
III-2. Accessibility

Criterion 21. Open and fair access

Open, fair, and equitable access to secondary market trading of voluntary carbon credits should be fostered for a wide range of participants.

Relevant regulators and other authorities should set requirements for non-discriminatory entry into the secondary market of voluntary carbon credits to ensure open, fair, and equitable access for all participants, including SMEs.

Trading platform operators should adopt policies that ensure diverse participants have equal opportunities and open access to secondary market trading, thereby enhancing market liquidity.

Why this criterion is important

As carbon credit markets continue to evolve rapidly, their increasing complexity, diversity of credit types, and intangible nature underscore the need for open and fair market structures. Historically dominated by over-the-counter transactions, these markets have often been difficult to access, particularly for new entrants, limiting participation and constraining market growth.

Accordingly, the availability of and accessibility to trading platforms are essential to provide a broader range of market participants with equal opportunities to buy and sell carbon credits, thereby deepening liquidity in the secondary market of voluntary carbon credits. A more diverse pool of participants also enhances competition, which, in turn, helps correct price asymmetries and supports a more efficient and liquid market (IOSCO, 2024). To ensure open, fair, and equitable access to secondary market trading, trading platform operators should set up a fair and transparent fee structure and strive to reduce trading-related costs as far as practicable. By doing so, a broader pool of sellers and buyers, including SMEs, is encouraged to participate in secondary market trading.

Tailoring the criterion to ASEAN's unique context

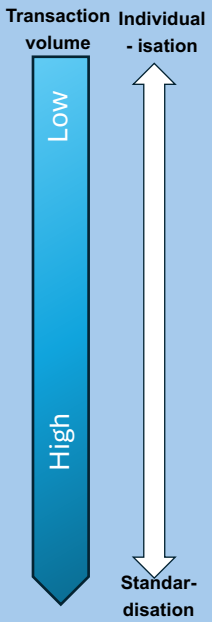
Given the early development stage of the carbon credit market and the wide variation in market readiness and carbon credit demand across AMSs, improving access to secondary market trading requires tailored, context-specific approaches. In certain jurisdictions, capacity building related to carbon credit frameworks may be a necessary precursor to effective market participation. Also, the extent of accessibility to secondary market trading and disclosure of cost information may vary amongst AMSs in accordance with their levels of institutionalisation.

Developing countries	Engage in awareness raising and capacity building for entities participating in secondary market trading through

	collaboration amongst ministries and institutions responsible for operating the carbon credit secondary market. Capacity building may follow a phased approach, starting with larger emitters and financially sound entities to establish credible models, and gradually expanding to smaller players.
Emerging and advanced countries	Promote the development of carbon credit trading platforms that accommodate diverse market structures and sales mechanisms, tailored to the varying needs of carbon credit buyers. In the case of exchange-based platforms, broader market access and participation may be encouraged through the introduction of market makers, short sellers, and institutional investors. Trading platform operators could develop a fair and equitable fee structure to improve accessibility for SMEs.

BOX 5-10. Features of Trading Venues

The features of trading venues are summarised in the table below. In general, the trading volume of credits is highest in exchange-based transactions (exchanges), followed by auction-based transactions (auctions), and then marketplaces. Whilst marketplace models are better suited to transactions that prioritise individual credit types, exchanges are designed for standardised trading. Auctions fall between these two models, offering flexibility to accommodate both types of transactions depending on their structure.



Trading Venue	Features	Introduced Market
Market-place	• Provides a venue for matching sellers and buyers for each project (credit). • Liquidity tends to be low because of the individualised nature of credits.	ACX, CIX, IDX
Auction	• Offers credits for sale in fixed lots; sold to the highest bidder. • Generally not held daily but over a set period and in batches of specified credit volumes.	ACX, BCX, CBL(Xpansiv), CIX, IDX
Exchange	• Provides a venue where credits are continuously bought and sold based on predefined and standardised trading categories. ✓ Call auction method: Buy and sell orders are matched at designated trading times. ✓ Continuous trading method: Trades are executed continuously during trading hours. • Standardisation of credits facilitates liquidity.	ACX, BCX, CBL(Xpansiv), CIX, IDX,

ACX = AirCarbon Exchange, BCX = Bursa Carbon Exchange, CIX = Climate Impact X, IDX = Indonesia Carbon Exchange.
Sources: Climate Impact X (2025b); e-dash (2025); European Energy Exchange AG (2025); IOSCO (2024).

BOX 5-11. Pros and Cons of Trading Venues

	Pros		Cons	
	Market Operators	**Participants**	**Market Operators**	**Participants**
Market-place	• Easy to characterise the market by the credits sold.	• Credits can be sold after reviewing individual project details. • Purchases can be made at any time.	• Determining whether to handle each individual credit and inputting the relevant listing information can be time-consuming.	• Pricing is set for each project, and the price discovery function remains weak.
Auction	• Limited transaction timings reduce administrative costs.	• High-demand projects may achieve higher prices. • Relatively easy trading with project information available.	• The auction format is ineffective except for high-demand credits; if no bids are received, rebidding can cause delays.	• Opportunities to purchase credits are limited to the specific periods when auctions are held. • The price discovery function is relatively low.
Exchange	• Standardised transactions eliminate the need to manage project-specific information. • Credit commoditisation ensures liquidity.	• Enables continuous trading without individual negotiations. • Credits are commoditised, ensuring liquidity and promoting price convergence through an effective price discovery function.	• Continuous management of the exchange is required. • Adequate trading volume must be maintained in terms of both participants and available credits.	• Individual project information is unavailable or difficult to verify.

Sources: Bursa Malaysia Berhad and Malaysian Green Technology and Climate Change Corporation (2023), Climate Impact X (2025b), e-dash (2025), European Energy Exchange AG (2025), IOSCO (2024).

BOX 5-12. Transaction Fees in Existing Carbon Exchanges in ASEAN

Fees	IDXCarbon	BCX	CIX	ACX
Auction (bidder)	0.22%	0.8% (waived until end-2025)	3.5%	–
Auction (supplier)	0.22%	0.8% (waived until end-2025)	1%	–
Regular market (buyer and seller)	0.11%	0.8% (waived until end-2025)	–	–
Off market (negotiated) (buyer and seller)	0.11%	0.8% (waived until end-2025)	–	–
Marketplace (buyer)	0.22%	–	6%–10%	–
Marketplace (seller)	0.22%	–	waived	–
Exchange transaction (trading) fee	–	–	US$0.05/$tCO_2e$	US$3/1,000 tCO_2e
Withdrawal (clear transaction) fee (buyer and seller)	IDR 25,000/ withdrawal	US$0.02/$tCO_2e$	US$0.05/$tCO_2e$ (min. US$75)	–
Carbon credit retirement fee	–	US$0.02/$tCO_2e$	–	–
Minimum account balance fee (below US$5,000)	–	–	–	US$50
Cash handling fee (on profit placed in cash custodian account)	–	0.50%	–	–

ACX = AirCarbon Exchange, ASEAN = Association of Southeast Asian Nations, BCX = Bursa Carbon Exchange, CIX = Climate Impact X, IDXCarbon = Indonesia Carbon Exchange, tCO_2e = tonnes of carbon dioxide equivalent.

Sources: AirCarbon Exchange (2023), Bursa Malaysia (2024), Climate Impact X (2024), Indonesia Stock Exchange (2023), Nomura (2022).

III. Secondary Market Trading
III-3. Market credibility

Criterion 22. Integrity of trading

High standards of integrity and fair dealing should be observed to enhance market credibility and attract a wider range of participants.

Relevant regulators and other authorities should establish or promote clear requirements that ensure that high-quality and environmentally robust carbon credits are eligible for trading.
Trading platform operators are encouraged to ensure that such high-quality and environmentally robust carbon credits are eligible for listing and delivery. This involves setting clear eligibility criteria, rules, policies and procedures for the selection and acceptance of carbon credits.

Why this criterion is important

A secondary market for voluntary carbon credits that upholds the integrity of trading can foster confidence that the credits traded represent genuine emission reductions. Conversely, if the trading of low-quality, expired, or retired credits is identified, it could severely erode trust in the market.
To safeguard the credibility of the secondary market, relevant regulators and other authorities could refer to internationally recognised standards and should ensure that high-quality, verifiable carbon credits are permitted for trading.

Tailoring the criterion to ASEAN's unique context

Whilst carbon credits do not need to conform to global frameworks, doing so is encouraged to improve their marketability. AMSs may endorse trading platforms that adopt eligibility criteria meeting both international expectations of integrity and ASEAN's unique contexts, such as economic conditions, institutional capacities, and environmental priorities. Such an approach can enhance the market's ability to address ASEAN-specific sustainability challenges and ensure that carbon credit trading contributes meaningfully to the region's climate and development goals. High-integrity credits should therefore include those aligned with credible ASEAN frameworks in addition to internationally accepted standards.

III. Secondary Market Trading
III-3. Market credibility

Criterion 23. Avoidance of double counting

Double counting of emission reductions and/or removals should be prevented.

Working together with carbon crediting programmes, trading platform operators should establish procedures or implement measures to prevent double counting of emission reductions and/or removals, thereby ensuring that traded carbon credits represent genuine emission reductions. Specifically, the sale of a single carbon credit to multiple buyers in the secondary market must be prevented. In cases where carbon credits are resold—a recognised practice in the secondary market— it must be ensured that each credit is retired only once.

Why this criterion is important

Avoiding double counting is essential to maintaining the environmental integrity of secondary market trading and ensuring that traded carbon credits represent actual emission reductions. If a single carbon credit is sold, for example, to multiple buyers, it could severely undermine confidence and trust in the secondary market (IOSCO, 2024). Implementing robust procedures or measures to prevent double counting throughout the trading and retirement process is, therefore, crucial to preserving market credibility.

Tailoring the criterion to ASEAN's unique context

This criterion is fundamental to upholding the environmental and financial integrity of secondary market trading globally. Whilst not unique to ASEAN, it remains critical that this principle is consistently applied as trading within the region continues to expand.

In case of compliance use of voluntary carbon credits

Whilst corresponding adjustments are not required for the voluntary use of carbon credits, in cases of compliance use, trading platform operators should ensure that the application of corresponding adjustments, triggered by host country authorisations, is properly tracked. Doing so will ensure that sellers, buyers, and intermediaries are notified of corresponding adjustments, thereby preventing double counting of carbon credits in the context of Article 6 of the Paris Agreement.

III. Secondary Market Trading
III-3. Market credibility

Criterion 24. Publicity and disclosure of trading

Public reports and pre- and post-trade disclosures should be widely accessible to market participants to allow them to track prices and make informed decisions, thereby enhancing transparency and liquidity.

Relevant regulators and other authorities should require trading platform operators or intermediaries to make public reports accessible to all market participants and to disclose both pre- and post-trade information, including transaction prices, trading volumes, and deliveries of carbon credits. Such disclosures allow participants to monitor market trends and make informed trading decisions. Trading platform operators should also be required to disclose their standards for listing and delisting and to implement record-keeping policies that ensure the traceability of trading information.

Relevant regulators and other authorities should establish clear rules requiring trading platform operators or intermediaries to display key carbon credit attributes and essential transaction records. These requirements should be appropriately tailored to the type of market and the sales methods employed by trading platforms, to meet buyers' needs and support market liquidity.

Why this criterion is important

Transparency, supported by the availability of necessary information, mitigates information asymmetry amongst market participants and increases visibility into trading activities. It also contributes to the creation of more efficient markets, allowing participants to trace transaction history and make informed decisions. For instance, market participants can decide whether to accept an offer with confidence based on sufficient information and can set quotes or orders at reasonable prices by referring to recent transaction data and the specific details of carbon credits (IOSCO, 2024).

Tailoring the criterion to ASEAN's unique context

Considering ASEAN's diverse landscape, characterised by varying levels of industrialisation and institutional maturity, several expressions, such as 'required', may be moderated to 'encouraged' where appropriate. Differentiation amongst AMSs could therefore be made as follows:

Developing countries	Encourage trading platform operators to establish disclosure frameworks for trading data, including pre- and post-trade prices, trading volumes, and deliveries of carbon

	credits. Public access to such information should also be ensured.
Emerging and advanced countries	Require trading platform operators to publicly disclose trading data, including pre- and post-trade prices, trading volumes, and deliveries of carbon credits.

Discussion points

Depending on the type of secondary market, such as over-the-counter transactions, marketplaces, or exchanges, the range and detail of information disclosed may vary. For marketplace trading, a wide range of information should be publicly available to meet buyers' demand. This includes project type, vintage, crediting programme, host country, methodology, co-benefits, and any associated certifications or ratings. Several platforms collaborate with rating agencies to provide additional data on credit quality. Some exchanges offer bundled or pooled credit products that group similar credit types to enhance liquidity. In such cases, detailed information on individual underlying credits is not always disclosed upfront, although these products typically adhere to predefined eligibility criteria and quality standards.

Accordingly, the following sentence may be added to the detailed criterion description to align with various market structures and sales mechanisms: "Disclosure requirements and data availability must be appropriately tailored, considering the sales methods employed by trading platforms, to effectively meet buyers' needs and support market liquidity."

BOX 5-13. Disclosed Information by Different Types of Market

Market type	Disclosed Information	Other
Exchange	· Credit type · Transaction fee · Volume · Date of transaction · Order book (bid and ask quotes) · Market trend	Pricing data are generally disclosed daily. Since credits are bundled based on minimum criteria, detailed project information is not available.
Marketplace	· Project information ➢ Vintage ➢ Registry ➢ Region · Price · Rating data	Information on individual projects generating credits is accessible and often accompanied by ratings, as several platforms partner with rating agencies.
Auction	· Date · Auction price and volume · Bid volume · Auction rules and criteria	Daily auction results are available.
OTC	· Generally not publicly disclosed · Pricing transparency is limited	Some brokers provide indicative pricing or benchmarks.

OTC = over the counter.

Sources: Climate Impact X (2025a), e-dash (2025), European Energy Exchange AG (2025), ICE (2025), Japan Exchange Group (2025), Reuss et al (2022), Xpansiv (2024, 2025a, 2025b).

III. Secondary Market Trading
III-4. Transaction integrity

Criterion 25. Robust market infrastructure

To maintain trust, security, and compliance in carbon credit exchanges, it is essential to establish and enforce regulatory protocols such as know your customer (KYC), anti–money laundering (AML), and anti-bribery and anti-corruption (ABAC).

Relevant regulators and other authorities should establish legal and regulatory requirements to ensure that trading platform operators build robust market infrastructure, and enforce compliance with regulatory protocols such as KYC, AML, and ABAC. These measures are critical to preventing fraudulent or manipulative behaviour in the market.

Trading platform operators must, therefore, establish a robust market infrastructure incorporating KYC, AML, and ABAC measures to prevent fraudulent or manipulative behaviour in the market.

Why this criterion is important

Maintaining trust, security, and compliance amongst buyers, sellers, and intermediaries is essential to ensuring the integrity of transactions. Establishing robust market infrastructure, through KYC, AML, and ABAC protocols, helps verify the legitimacy of market participants and contributes to preventing illicit activities.

The roles of these components are as follows (Carbon Markets Infrastructure Working Group, 2025e):

- **KYC.** Verification of participants' identities to prevent fraud and financial crimes, ensuring that only legitimate actors participate in carbon market transactions.
- **AML.** Detection and prevention of the use of carbon markets for committing crimes or legitimising illicit funds.
- **ABAC.** Prevention of bribery, corruption, and fraud across participating organisations.

Tailoring the criterion to ASEAN's unique context

KYC, AML, and ABAC are fundamental regulatory protocols that trading platforms are expected to establish. Whilst specific implementation methods depend on the maturity of national legal and regulatory frameworks and require tailored consideration, AMSs should, wherever feasible, adopt a harmonised framework that also respects national sovereignty. Such an approach would enhance market interoperability and reinforce regional trust and cooperation, as emphasised in Principle III-5.

III. Secondary Market Trading
III-4. Transaction integrity

Criterion 26. Market functions

Fundamental functions in the secondary market trading, including clearing, settlement, credit transfer and retirement, and information protection, should be established for trading platforms.

Trading platform operators should be equipped with fundamental market functions to facilitate efficient market operations, preserve financial integrity, and enhance trust amongst participants. Such market functions may include clearing systems, settlement services, credit transfer and retirement mechanisms, and information security programmes.

Why this criterion is important

Market infrastructure equipped with fundamental functions forms the backbone of efficient operations, transparency, and credibility in the secondary market (Carbon Markets Infrastructure Working Group, 2025c). Trading platforms must therefore be equipped with systems and services such as clearing mechanisms, automated settlement, seamless credit transfer and retirement, and robust information security programmes to improve transactional efficiency and facilitate smooth trading between participants (ACMF, 2024b). These market functions are critical in reducing counterparty risk, ensuring financial security, facilitating compliance, and thereby enhancing trust amongst market participants and maintaining financial integrity in the market (IOSCO, 2024).

Tailoring the criterion to ASEAN's unique context

This criterion establishes the minimum baseline for trading platforms to operate efficiently and credibly in the secondary market. Without fundamental market functions, trust and reliability of the market will be undermined, leading to operational inefficiency and reduced participation. However, the implementation of these functions should consider the availability of advanced system infrastructure for clearing, settlement, credit transfer and retirement, and information security in each country. The specific design of these functions should be adapted to national circumstances. A phased approach could be adopted, whereby platforms initially leverage existing licensed infrastructures within each country and gradually transition to dedicated systems as market maturity advances. Such an approach would enable progressive enhancement of operational capacity whilst maintaining market stability and integrity.

III. Secondary Market Trading
III-4. Transaction integrity

Criterion 27. Enforcement actions

Appropriate and prompt enforcement actions should be taken in cases of fraudulent or abusive practices in the secondary market.

Relevant regulators and other authorities should undertake enforcement actions in cases of fraudulent or abusive practices in the secondary market, including instances involving false or misleading information about carbon credit attributes.

Trading platform operators should implement rule enforcement frameworks, including disciplinary procedures and financial penalties, to address fraudulent or abusive practices in the secondary market, such as the dissemination of false or misleading information about carbon credit attributes.

Why this criterion is important

In fair and orderly markets, mechanisms that protect participants from fraudulent, manipulative, or disruptive conduct are essential (IOSCO, 2024). The VCM should therefore adopt and enforce rules and practices that safeguard market participants and uphold market integrity. This criterion highlights the importance of both regulators and trading platform operators taking prompt and decisive action when fraud or other unlawful activities are identified, to maintain trust and confidence in the market.

Tailoring the criterion to ASEAN's unique context

Given the varying stages of development of trading platforms across ASEAN, the methods and scope of enforcement actions taken in response to abusive practices should be determined in accordance with each country's specific circumstances.

AMSs could adopt the following tailored approaches:

Developing countries	Formulate an action plan aligned with national legal and regulatory frameworks to guide enforcement actions.
Emerging and advanced countries	Take appropriate enforcement actions in cases where fraudulent or abusive practices are detected.

III. Secondary Market Trading
III-4. Transaction integrity

Criterion 28. Market surveillance and monitoring of trading

Abusive or manipulative activities in carbon credit trading should be promptly detected and addressed.

Relevant regulators, other authorities, and trading platforms should consider implementing appropriate market surveillance and trade monitoring mechanisms to detect and investigate fraudulent or manipulative practices.

Why this criterion is important

In fair and orderly markets, mechanisms are established to protect participants from fraudulent, manipulative, or disruptive conduct (IOSCO, 2024). Similarly, the VCM should adopt and enforce rules and practices that protect market participants and uphold market integrity. This criterion highlights the importance of trading platform operators, as market facilitators, in implementing effective market surveillance and trade monitoring systems to detect and deter market abuse.

Tailoring the criterion to ASEAN's unique context

Given the differing stages of development of trading platforms across ASEAN, the specific plans and methods introduced to detect market abuse should be determined in accordance with each country's circumstances and regulatory capacity.
AMSs could adopt the following tailored approaches:

Developing countries	Formulate an action plan aligned with their respective legal and regulatory frameworks for market surveillance and trade monitoring.
Emerging and advanced countries	Conduct comprehensive market surveillance and continuous monitoring of trading activities.

Discussion points

A range of digital tools, including market surveillance systems, real-time monitoring platforms, and blockchain analytics, can be employed to detect fraudulent or manipulative practices in the VCM. The choice of technologies should consider local regulatory and institutional capacity, data infrastructure, and alignment with national systems.

III. Secondary Market Trading
III-4. Transaction integrity

Criterion 29. Trading venue resources

Adequate resources, including personnel dedicated to monitoring, detecting, and investigating fraudulent or manipulative practices, should be ensured for the trading venue.

Relevant regulators and other authorities should require trading platform operators to maintain sufficient resources to identify and investigate fraudulent or manipulative activities. This includes, where appropriate, appointing personnel to fulfil roles such as chief compliance officer and chief regulatory officer.

Trading platform operators should ensure that they have sufficient resources to identify and investigate fraudulent or manipulative activities. This includes, where appropriate, appointing personnel to fulfil the roles of chief compliance officer and chief regulatory officer.

Why this criterion is important

In fair and orderly markets, mechanisms are established to protect participants from fraudulent, manipulative, or disruptive conduct (IOSCO, 2024). Similarly, the VCM should adopt and enforce rules and practices that safeguard market participants and uphold market integrity. This criterion highlights the importance of securing appropriate personnel within organisations as part of both regulatory and market-based approaches.

Tailoring the criterion to ASEAN's unique context

Given the varying stages of development of trading platforms across ASEAN, the determination of what constitutes an adequate level of resources allocated to monitoring and surveillance should be made based on each country's circumstances.

AMSs could adopt the following tailored approaches:

Developing countries	Ensure that trading platforms maintain adequate resources to detect and investigate fraudulent or manipulative practices. This may require coordination amongst relevant government agencies and regulators responsible for carbon credit issuance, environmental oversight, and market supervision.
Emerging and advanced countries	Ensure that trading platforms maintain adequate resources to detect and investigate fraudulent or manipulative practices, including, where appropriate, personnel to perform the functions of chief compliance officer and chief regulatory officer.

III. Secondary Market Trading
III-5. Interoperability

Criterion 30. Standardisation

Transaction rules and procedures are expected to be standardised within ASEAN and aligned with global carbon market practices.

Relevant regulators and other authorities are expected to develop a coordinated strategy to establish standardised transaction rules and procedures for secondary market trading, in alignment with global carbon market standards.

Why this criterion is important

This criterion highlights the importance of standardising or promoting common rules for terminology, transaction procedures, agreements, quality standards, participant requirements, disclosure obligations, and other elements to ensure interoperability within the VCM, as similarly emphasised by the Financial Services Agency, Japan (FSA, Japan, 2025a). Significant differences in national transaction frameworks may hinder cross-border activities and increase the risk of market fragmentation (Carbon Markets Infrastructure Working Group, 2025b). Standardisation would enhance interoperability amongst jurisdictions and make markets more attractive to international investors.

Tailoring the criterion to ASEAN's unique context

AMSs are at varying stages of developing or considering carbon credit markets, including compliance mechanisms, under their respective legal and regulatory frameworks. In addition, some countries have already developed guidance for VCM. Whilst respecting each country's rules and guidance, it is important to develop coherent and harmonised frameworks within ASEAN to create an interoperable market and scale up the ASEAN VCM (Siew, 2025).

Developing countries	Consider referring to global standards when designing their carbon markets, including terminology and trading practices, whilst ensuring interoperability across AMSs.
Emerging and advanced countries	Review existing transaction rules and procedures to ensure consistency with ASEAN and global standards.

III. Secondary Market Trading
III-5. Interoperability

Criterion 31. Data and systems interoperability

Data infrastructures and technical systems are expected to be harmonised to reduce fragmentation across ASEAN jurisdictions and to ensure connectivity with the global carbon market.

Trading platform operators are encouraged to develop data infrastructure and system technologies that facilitate interoperability across ASEAN and enable seamless integration with the global carbon market. Specifically, efforts should focus on data standardisation, API integration, connectivity with global platforms such as the Climate Action Data (CAD) Trust, and strengthening of human resource capabilities. Leveraging solutions from external entities, including third-party technology providers, can also serve as an effective strategy.

Why this criterion is important

This criterion emphasises the critical role of technological developments that enable interoperability between carbon credit markets. These developments foster greater transparency, reduce the risk of double counting, and facilitate effective links with the global carbon market (Carbon Markets Infrastructure Working Group, 2025b). These measures are essential for scaling up the ASEAN market and positioning it as a key platform for voluntary carbon credit transactions.

Tailoring the criterion to ASEAN's unique context

Ensuring technical interoperability requires careful consideration of the varying levels of maturity of voluntary carbon markets, including whether a trading platform has already been established. Requirements and implementation plans should therefore be tailored according to the presence or absence of such platforms.

AMSs could adopt the following tailored approaches:

Developing countries	Leverage support from global platforms such as the CAD Trust, along with technical assistance and partnerships, to effectively facilitate capacity-building and system development.
Emerging and advanced countries	Prioritise the implementation of standardised data formats and protocols to enable full API integration and automated data exchange with regional and global systems, whilst enhancing system security, scalability, and real-time tracking capabilities.

BOX 5-14. Global Initiative

To achieve interoperability of data infrastructures and system technologies, efforts are underway to create standardised data formats and communication interfaces. These initiatives are expected to provide practical technical guidance for AMS.

Climate Action Data (CAD) Trust
The CAD Trust is a global, decentralised metadata platform that links carbon credit registry data from various countries and standards. This initiative was jointly established by the World Bank, the International Emissions Trading Association (IETA), and the Government of Singapore.
The CAD Trust aims to do the following:

- **Enhance transparency** by providing publicly accessible and immutable records of credit issuance, transfer, and retirement across registries.
- **Enable interoperability** by creating a unified metadata layer that supports cross-registry communication.
- **Build trust** in the voluntary carbon market by preventing double counting and improving traceability.

The Carbon Data Open Protocol (CDOP)
The CDOP is a technical initiative that aims to develop a common data scheme and open protocols for carbon credit-related information. This multi-stakeholder initiative, launched by a coalition of more than 30 organisations, led by Sylvera, RMI, S&P Global, and the Global Carbon Market Utility, aims to develop open and interoperable carbon data standards.
The CDOP is designed to do the following:

- **Standardise the structure and flow of carbon data** across platforms and jurisdictions.
- **Facilitate interoperability** between registries, exchanges, and digital monitoring, reporting, and verification systems.
- **Complement systems** such as the CAD Trust by serving as the technical foundation for consistent data formatting and exchange.

Common Carbon Credit Data Model (CCCDM)
The CCCDM is a voluntary framework that promotes interoperability, accessibility, transparency, and scalability in carbon markets. It was developed by the Climate Data Steering Committee at the request of the G20 Sustainable Finance Working Group in 2025. The CCCDM is expected to be voluntarily referenced by a wide range of public and private stakeholders to standardise data across the entire lifecycle of carbon credits.

Sources: Climate Action Data (2023), Carbon Data Open Protocol (2023), Secretariat of the Climate Data Steering Committee (2025).

IV. Use, Disclosure of Use, and Retirement of Carbon Credits

IV. Use, Disclosure of Use, and Retirement of Carbon Credits
IV-1. Credibility

Criterion 32. Alignment with Paris Agreement

Carbon credit users should aim to contribute positively to global decarbonisation initiatives.

Users of voluntary carbon credits should actively support the goals of the Paris Agreement by taking concrete actions that contribute to global decarbonisation efforts. This includes establishing a clear pathway for emissions reduction and setting interim targets tailored to the user's specific circumstances. Users should have a sound understanding of their emissions baseline and the available solutions to mitigate emissions, whilst recognising that the use of credits is supplementary and should not replace more ambitious mitigation measures.

Why this criterion is important

This criterion highlights the importance of demonstrating credible intent when using carbon credits to offset unabated emissions, a concern shared by all participants in the carbon market. As noted in IOSCO (2024), lingering doubts about the credibility of carbon credits could undermine emission reduction efforts, making a more robust and credible approach to decarbonisation essential.

Tailoring the criterion to ASEAN's unique context

Although all AMSs are signatories to the Paris Agreement, each country has adopted unique mitigation and adaptation strategies, as well as transition roadmaps tailored to its specific national circumstances. The specific requirements relating to climate ambitions should align with the commitments of the country or region in which the users are headquartered. The ASEAN Transition Finance Guidance (ATFG) Version 2 (ACMF, 2024a) outlines key principles for assessing credible transition strategies. Businesses operating primarily within ASEAN can refer to the ATFG to evaluate the credibility of their climate goals and strategies, understand their emission profiles, select appropriate transition pathways, and set realistic transition targets. The ATFG identifies several key issues and variables that companies should consider when selecting transition pathways suited to their emission scopes, business activities, and regional contexts (see Box 5-15 for details of the ATFG's approach to assessing transition credibility). Each AMS may use this guidance as a reference whilst progressing in a manner appropriate to its national circumstances, provided its efforts align with the overarching goals of the Paris Agreement.

Discussion points

Credit users should formulate transition pathways consistent with the national strategies of the countries and regions in which they primarily conduct their business operations. This allows flexibility, as each AMS has different nationally determined contribution (NDC) targets and strategies.

BOX 5-15. Overview of the Approach to Assessing Transition Credibility Under the ASEAN Transition Finance Guidance, Version 2 (2024)

A credible transition comprises two main elements: sufficient climate ambition and the robustness of the entity's ability to deliver on that ambition.

Element 1: Climate ambition

• **Current state assessment.** Entities must assess all emissions from environmentally material business activities (Scope 1 and Scope 2, as well as Scope 3 where material), forming a robust foundation for forward-looking progress.

• **Transition pathway.** Entities should identify a reference pathway that informs the required level of decarbonisation consistent with the Paris Agreement, based on the following key characteristics: 1) pathway source, 2) geographical granularity, 3) scope of emissions, 4) emissions metric, and 5) temperature outcome. Entities may, where necessary, augment their selected pathway to better reflect the nature of their business, considering the following key variables.

- **Scope of emissions.** To ensure consistency between the emissions covered by the pathway and those in the entity's reporting framework.
- **Business activities.** To reflect the specific operational and sectoral characteristics of the business, ensuring comprehensive coverage of all material activities.
- **Emissions profile.** To include all material GHGs emitted from the entity's operations.
- **Local nuances and geographical coverage.** To account for regional characteristics and the geographical footprint of the entity's business operations.

• **Transition targets.** Entities should set concrete, time-bound targets consistent with their transition pathway:

- Absolute emissions targets must show a decarbonisation trajectory equivalent to or more ambitious than the reference pathway through to the net-zero year.
- Emission intensity targets must converge with the selected transition pathway by 2050 and, in the interim:
  - Companies starting above the pathway should plan to decarbonise in parallel with, at a minimum, the reference pathway.
  - Companies starting below the pathway should target to remain on or below the pathway.

Element 2: Robustness of ability to deliver

• **Implementation strategy.** Entities must clearly demonstrate how they intend to achieve tangible progress towards their climate ambitions. This includes the following:

- **Action plan.** A detailed roadmap of actions to achieve targets, differentiated by near-, mid-, and long-term milestones.
- **Capital allocation plan.** Identification of financial requirements for executing the action plan and the means of securing such financing.
- **Risk assessment and mitigation measures.** Comprehensive assessment of climate and delivery risks, along with appropriate mitigation strategies.
- **Ongoing monitoring.** Processes to track progress against targets and adapt plans as needed.
- **Governance.** Clear organisational structures and mechanisms to oversee and support the implementation strategy.

• **Disclosure.** Entities should disclose their performance, targets, and progress at least annually, in line with existing climate-related disclosure standards such as IFRS S1 and S2.

• **Independent verification.** Entities are encouraged to obtain third-party verification of their transition credibility, particularly those with lower climate maturity.

•**Just transition considerations.** Entities should assess and account for potential adverse environmental and social impacts arising from their transition plans.

To be considered as credibly transitioning, entities are encouraged to demonstrate all the above characteristics and provide clear justification for any deviations (e.g. where a specific criterion may not apply in their context or to a particular financing instrument).

Source: ASEAN Capital Markets Forum (2024a).

IV. Use, Disclosure of Use, and Retirement of Carbon Credits
IV-1. Credibility

Criterion 33. Credible strategy

Strategies for utilising carbon credits should be well-founded, aligned with sector-specific pathways, and consistent with the user's climate change mitigation efforts.

Before making any purchases, users should establish a comprehensive strategy for the utilisation and eventual retirement of carbon credits. This strategy should detail how the credits will be integrated into their broader sustainable growth plans. Ideally, users should prioritise emission reductions within their supply chains and use carbon credits solely to offset unabated emissions. This approach ensures that carbon credits are not treated as the primary method of achieving emission reduction targets.

To support users in formulating credible strategies, industrial policy regulators can provide sector-specific guidance, such as outlining decarbonisation roadmaps consistent with national strategies and introducing industry best practices.

Why this criterion is important

This criterion highlights the importance of developing a concrete strategy to achieve the climate goals outlined in Criterion 1. Meeting this requirement enhances credibility by demonstrating a commitment to transparent and effective climate actions.

It is crucial to recognise that each sector faces unique challenges in its decarbonisation efforts. This necessitates tailored strategies for the utilisation of carbon credits to ensure that decarbonisation efforts are effective and appropriate to sectoral circumstances. Ultimately, entities using carbon credits must ensure their approaches align with the specific needs and operational contexts of their respective sectors.

Tailoring the criterion to ASEAN's unique context

To maintain credibility and avoid accusations of greenwashing, it is essential for all current and prospective users of carbon credits to justify their strategies. Companies should develop strategies for carbon credit usage based on their size, financial position, and business objectives, whilst ensuring alignment with the NDCs of the countries and regions where they primarily operate. The level of detail required in strategy formulation may vary significantly between sectors and jurisdictions.

In the ASEAN region, many companies participate in global supply chains serving multinational corporations with ambitious climate commitments, which often exert pressure to meet specific sustainability targets. To support ASEAN companies in meeting such targets, expanding their operations, and strengthening their competitiveness within the global supply chain, ASEAN regulators may need to provide tailored guidance and technical support to help

companies design effective strategies. For example, Singapore published *Draft Voluntary Carbon Market Guidance* in June 2025, a collaborative effort by the National Climate Change Secretariat (NCCS), the Ministry of Trade and Industry, and Enterprise Singapore (NCCS, 2025). The guidance offers practical insights into how companies can incorporate carbon credits into credible decarbonisation strategies and assess credit quality, whilst ensuring relevance to local market conditions. Internationally recognised standards such as the VCMI Claims Code of Practice (VCMI, 2025a) can serve as useful references for market participants seeking alignment with global best practices.

Discussion points

This guidance encourages users of carbon credits to develop decarbonisation strategies based on the 'mitigation hierarchy' (Box 5-16). ACMF (2024a) shares this approach, stating that companies should use high-quality carbon credits only as a last resort to offset remaining emissions, after undertaking 'other meaningful and viable decarbonisation activities'.

BOX 5-16. Mitigation Hierarchy

The mitigation hierarchy outlines the sequential steps an organisation should take to effectively address environmental impacts, particularly GHG emissions. It serves as a framework for integrating carbon credits with other decarbonisation efforts.

In the context of GHG emissions, the mitigation hierarchy proposes the following sequential actions:

1. **Avoidance**. Wherever possible, organisations should avoid or prevent emission-generating activities. Avoidance strategies may include minimising land-use change, preserving natural carbon sinks, and adopting sustainable waste management practices. The aim of the avoidance principle is to prioritise sustainable options and reduce the need for further mitigation efforts.

2. **Reduction**. Once avoidance options have been exhausted, the next step is to implement reduction measures. These may include enhancing energy efficiency, transitioning to renewable energy sources, and promoting sustainable production and consumption practices. The objective of this stage is to minimise emissions at their source.

3. **Compensation.** The final step involves compensating or offsetting residual emissions that cannot be fully avoided or reduced. This typically entails implementing or supporting projects that deliver measurable environmental benefits, such as carbon offsetting or nature-based solutions.

It is important to recognise that, whilst compensation can help address remaining emissions, **avoidance and reduction** should always be prioritised. Compensation should not replace proactive mitigation efforts but rather complement them as part of a broader sustainability strategy.

Source: Australia Department of Climate Change, Energy, the Environment and Water (2023).

IV. Use, Disclosure of Use, and Retirement of Carbon Credits
IV-2. Accountability

Criterion 34. Responsible procurement and use of carbon credits

Users should engage in thorough selection and risk management processes to ensure that the carbon credits they use are of high quality and aligned with their strategies.

Users should carefully select high-quality carbon credits that best align with their environmental objectives and sustainability strategies. This includes drawing on internal expertise to assess the nature and characteristics of the credits, specifically by undertaking a careful review of the issuing certification programmes, the applied methodologies, and the underlying projects from which the credits originate.

Why this criterion is important

This criterion emphasises the role of users in safeguarding the integrity of the carbon market. Users should prioritise the purchase of high-quality credits. The ATFG states that credits used to offset residual emissions should meet high-quality standards. 'High-quality' credits generally refer to those issued by well-established and reputable carbon-crediting programmes with recognised third-party quality certifications or labels, such as ICVCM, Carbon Offsetting and Reduction Scheme for International Aviation, or Core Carbon Principles. Increased demand for such credits can foster positive momentum in the market. However, these credits may not always be readily available or suited to the specific needs of all prospective users, which necessitates additional diligence on the user's part to verify credit quality.

In addition, users should be aware that certain risks, such as invalidation or reversal events, may occur and impact the performance of credits after issuance. To address these risks, insurance companies are introducing tailored services that provide financial protection against such contingencies. Meanwhile, rating agencies are developing rating mechanisms to assess and identify underlying risks. As part of the due diligence process, users may consider leveraging these tools to better understand and manage potential risks.

Tailoring the criterion to ASEAN's unique context

In practice, the level of due diligence required will depend on various factors, including the cost of due diligence, the availability and quality of service providers, and the resources and capacity of corporate buyers. In a region as diverse as ASEAN, flexibility is therefore crucial. A phased approach may be appropriate to ensure that requirements evolve in line with market maturity, maintaining market integrity without deterring potential buyers. AMSs could consider the following tailored approaches:

Developing countries	Encourage companies to undertake due diligence and disclose details of their due diligence processes to the extent possible, whilst raising awareness amongst market players about best practices and available tools for assessing credit qualities, such as credit labels and public rating services.
Emerging and advanced countries	Consider, to the extent practicable, gradually introducing due diligence and disclosure requirements as the market matures and participants acquire greater knowledge and capability.

In case of compliance use of voluntary carbon credits

When voluntary carbon credits are used for compliance purposes, users should conduct sufficient due diligence to ensure that the credits meet all eligibility requirements of the compliance market.

Discussion points

The level of due diligence required from users will depend on their specific needs and the maturity of the carbon market in their primary region of operation. ASEAN can encourage users to utilise existing tools to evaluate the quality of the credits they use. These include carbon credit labels, public rating platforms, and tailored services from third-party carbon rating agencies that provide independent assessments to enhance integrity and transparency in buyer decision-making. Such tools play a crucial role in facilitating price discovery by providing buyers with the information needed to assess risks and make informed purchase decisions, especially where internal expertise is limited or project documentation is complex. Whilst higher-rated credits may command premium prices, cost considerations could constrain smaller companies. Ultimately, users remain responsible for adopting the approaches most suited to their individual circumstances.

IV. Use, Disclosure of Use, and Retirement of Carbon Credits
IV-2. Accountability

Criterion 35. Transparent disclosure

All material information concerning the use and retirement of carbon credits should be disclosed transparently following established standards.

Users should provide timely, accurate, and comprehensive disclosures of all material information relevant to the purchase, use, and retirement of carbon credits. This includes the volume of credits, details of the credit-generating projects, the use of third-party assurance where applicable, and any additional information that explains how the use of credits aligns with their sustainable growth strategy and financial position.
To promote market standardisation, financial market regulators should establish disclosure standards and guidelines to assist users in developing their climate-related reporting capabilities.

Why this criterion is important

The VCM operates with limited regulation, making transparent disclosure crucial to building credibility and trust in the use of carbon credits. Investors and other stakeholders depend on accurate information to assess a company's transition strategy, as well as the associated risks and opportunities. Ensuring transparency is essential to confirm that corporate users are making meaningful contributions to climate initiatives. Sound reporting practices enable stakeholders to comprehend and validate the authenticity of the data provided, facilitating informed decision-making and enhancing confidence in market integrity.

Tailoring the criterion to ASEAN's unique context

Each AMS retains flexibility in developing disclosure requirements aligned with domestic laws and regulatory frameworks. However, convergence with global norms is essential for long-term credibility and investor confidence. This guidance recommends that ASEAN market participants work progressively towards international alignment by adopting the International Sustainability Standards Board (ISSB)'s International Financial Reporting Standards (IFRS) S2 Climate-related Disclosure Standards through a phased approach. Gradual adoption will help reduce the short-term reporting burden whilst facilitating a smoother transition.

Developing countries	Encourage voluntary disclosure whilst raising awareness and building institutional capacity to meet ISSB standards.

Emerging and advanced countries	Consider gradually moving towards ISSB standards adoption, starting with listed companies and later extending to other market participants.

This approach is consistent with the disclosure principles of the ATFG, which state that disclosure should be made in accordance with the IFRS S1 Conceptual Foundations. At the entity level, companies are encouraged to align their practices with IFRS S2 Climate-related Disclosures where feasible. The ATFG acknowledges that IFRS S2 has gained widespread recognition amongst investors and other stakeholders as a global benchmark for sustainability reporting. Some AMSs are actively pursuing alignment with IFRS S2 as part of efforts to establish comprehensive sustainability disclosure standards (see Box 5-17 for the status in several AMSs). Evidence suggests that sustainability information disclosure requirements in AMSs are progressively converging with ISSB IFRS S2, which mandates transparent reporting on various aspects of carbon credit use. Key disclosures include the intended purpose of carbon credits for offsetting emissions, the degree to which climate targets rely on these credits, the third-party schemes involved in their verification or certification, the specific types of credits utilised, and any other relevant details (IFRS Foundation, 2023).

In case of compliance use of voluntary carbon credits

When voluntary carbon credits are used for compliance purposes, users should follow the specific disclosure rules established by their jurisdiction to facilitate the tracking and verification of the credits, thereby preventing double claiming.

Discussion points

Many countries and regions are progressively considering the adoption of third-party assurance requirements for sustainability reports (see Box 5-17 for the status of assurance mandates in several AMSs). The ATFG also emphasises the importance of independent verification to maintain credibility in transition efforts. Independent assurance may include confirming the accuracy of disclosed information on carbon credit use. However, challenges such as cost burdens and limited assurance capacity hinder implementation across ASEAN. Each AMS may therefore need to consider adopting third-party assurance requirements in a phased or flexible manner, consistent with its national context. In preparation, AMSs could strengthen the carbon market ecosystem by raising awareness amongst corporate users about the importance of assurance, and enhancing the quality, capacity, and accessibility of assurance service providers.

BOX 5-17. Adoption of Sustainability Disclosure Standards in Selected ASEAN Member States

AMS	Status of Sustainability Disclosure Standards	Implementation Schedule	Assurance Requirement
Indonesia	In December 2024, the Sustainability Standards Board of Indonesia Institute of Chartered Accountants (DSK IAI) issued its roadmap for adopting sustainability disclosure standards (DE PSPK 1 and 2).	Effective 1 January 2027 (early implementation proposed)	Under consideration
Malaysia	In 2024, the Securities Commission of Malaysia (SC) issued the National Sustainability Reporting Framework (NSRF) as the baseline sustainability disclosure standard for Malaysian companies. The NSRF addresses greenhouse gas (GHG) accounting and reporting in accordance with International Sustainability Standards Board (ISSB), especially International Financial Reporting Standards S2 Climate-related Disclosures.	Phased approach from 2025, with annual reporting beginning: - 1 January 2025 (Group 1) - 1 January 2026 (Group 2) - 1 January 2027 (Group 3)	Limited assurance (subject to public consultation)
Singapore	Singapore is adopting a phased approach to incorporating the ISSB climate requirements into its regulatory framework for listed issuers and large non-listed companies. The Singapore Exchange Regulation (SGX RegCo) has amended its listing rules to phase in these requirements for reporting periods commencing on or after 1 January 2025 (FY2025).	*Listed issuers:* • Scope 1 and Scope 2 GHG emissions mandatory from FY2025. • Scope 3 GHG emissions mandatory for Straits Times Index (STI) constituents from FY2026. Other ISSB-based disclosures (beyond Scope 1, Scope 2, and Scope 3 GHG emissions) phased in by market size: - STI constituents from FY2025 - Non-STI issuers ≥SGD 1 billion market cap from FY 2028 - Non-STI issuers <SGD1 billion market cap from FY2030 *Large non-listed companies* (annual revenue ≥SGD1 billion and total assets ≥SGD0.5 billion) - Report ISSB-based climate-related disclosure (including Scope 1 and 2 GHG emissions) from FY 2030. - Scope 3 GHG emissions reporting voluntary until further notice.	Limited assurance for Scope 1 and Scope 2 GHG emissions from FY 2029 for listed issuers and FY 2032 for large non-listed companies

BOX 5-17. Adoption of Sustainability Disclosure Standards in Selected ASEAN Member States *(continued)*

AMS	Status of Sustainability Disclosure Standards	Implementation Schedule	Assurance Requirement
Thailand	The Securities and Exchange Commission (Thailand) closed its public consultation on the Principle of Thailand Sustainability Disclosure Roadmap regarding International Sustainability Standards (ISSB Roadmap) on 19 December 2024 and is reviewing feedback	From 2027 for companies in the Stock Exchange of Thailand (SET)50 Index, from 2028 for SET100 companies, and from 2030 for all other listed companies	Limited assurance (subject to public consultation)

Source: International Financial Reporting Standards Foundation (n.d.).

5.3 Major Consideration Points

This section outlines the major points considered during the development of the ASEAN VCM Guidance. In formulating the guidance and the expected actions under each principle and criterion, key issues were identified and carefully examined. The process of consideration, including how these issues were addressed and what recommendations were reached, is presented below. The results of the literature review, expert interviews, and the pros and cons analysis that support the recommendations described in this guidance are also presented.

Major Consideration Point 1. Providing clarity on the legal and regulatory approach

Recommendation:

The authorities should clarify the legal and regulatory treatment in each jurisdiction.

1. Research results

A clear legal treatment of carbon credits facilitates their recognition as corporate assets and enables smoother financing through collateralisation, thereby enhancing market liquidity and funding opportunities. However, many countries have yet to establish a definitive legal treatment for carbon credits due to the complex nature of environmental assets, variations in national legal systems, and ongoing international negotiations. It is equally important to preserve flexibility and allow individual countries sufficient discretion in how they define and regulate carbon credits, considering their specific legal and institutional contexts.

2. Stakeholder and expert opinions

Some experts emphasised that standardisation is important to ensure interoperability across jurisdictions. However, given the differences in legal systems across AMSs, expecting a fully uniform approach is not realistic.

Pros and Cons Analysis Results

	Description	Pros	Cons
Option 1	Encourage relevant authorities to clarify the legal and regulatory treatment of carbon credits within their jurisdiction ***without prescribing a specific approach.***	• Allows each jurisdiction to tailor its regulatory clarification according to its legal system, policy priorities, and institutional readiness. • By avoiding prescriptive methods, this approach may prompt quicker action by authorities without waiting for regional consensus or formal guidelines.	• Without a common approach, jurisdictions may adopt divergent interpretations and frameworks, leading to regulatory fragmentation. • The absence of specific guidance may undermine future efforts to achieve harmonisation or interoperability across the ASEAN VCM.
Option 2	Encourage the promotion of a coordinated regional effort to **establish a harmonised legal and regulatory foundation.**	A harmonised framework would enhance transparency, credibility, and legal certainty across the ASEAN VCM, fostering investor confidence and attracting both regional and international capital into carbon-related projects.	• AMSs exhibit varying levels of readiness and capacity in developing their VCMs. Imposing a uniform standard may be impractical for AMSs lacking foundational legal and technical infrastructure. • Harmonisation may constrain individual countries' ability to tailor VCM to their specific development goals and climate strategies.

Implications of the guidance

ASEAN may consider several options for the legal and regulatory treatment of carbon credits, including 1) encouraging the relevant authorities to clarify the legal and regulatory framework within their jurisdiction, or 2) establishing a harmonised regional foundation. The research results indicate that the first option would be the most suitable approach.

Major Consideration Point 2. Whether the term 'emission avoidance' should be used

Recommendation:

The guidance should use the term 'emission reductions and/or removals'.

1. Research results

ICVCM explains that 'carbon reduction involves processes that reduce greenhouse gas emissions compared with prior practices or prevent emissions in the future. Examples include electrification of the power grid, increasing energy efficiency and halting deforestation' (ICVCM, 2024a). The ACMF (2024b) defines 'avoidance' as 'preventing future emissions by protecting vulnerable ecosystems or preventing industrial emissions' (ACMF, 2024b: 25), whilst 'reduction' 'focuses on reducing emissions at source by improving efficiency or transitioning to cleaner energy' (ACMF, 2024b: 25). Similarly, the Carbon Offsetting and Reduction Scheme for International Aviation Emissions Unit Eligibility Criteria also uses the term 'avoidance' (International Civil Aviation Organization, 2019). However, 'emission avoidance' is not currently recognised as an eligible activity type under Article 6, although this issue is scheduled for reconsideration in 2028 (International Emissions Trading Association [IETA], 2024b).

2. Stakeholder and expert opinions

Expert interviews confirmed that 'emission avoidance' and 'emission reduction' are often used interchangeably. IETA (2024b) also emphasises that the exclusion of 'avoidance' under Article 6 does not preclude reducing emissions from deforestation and forest degradation (REDD+) from being classified as a 'reduction' activity. Therefore, the guidance should use the term 'reduction' to align with global standards.

Pros and Cons Analysis Results

	Description	Pros	Cons	Notes
Option 1	The guidance uses only 'reductions' and 'removals'.	Ensures consistency with global standards such as ICVCM, improving transparency and credibility of transactions.	Requires clarifying the scope of the guidance to confirm that REDD+ qualifies as a 'reduction' project.	Article 6 currently excludes 'avoidance' but will reconsider in 2028.
Option 2	The guidance uses 'avoidance' as well as 'reductions' and 'removals'.	Reflects ASEAN's unique context, as presented in the ACMF study.	There is a negative interpretation that activities based on inaction are considered as 'avoidance' and therefore ineligible under Article 6.	Under Article 6, the Philippines has proposed 'avoidance' activities such as shelving plans to build new coal-fired power plants.

Sources: ACMF (2024b), International Civil Aviation Organization (2019), ICVCM (2024c), IETA (2024b).

Implications of the guidance

ASEAN may consider two options regarding the treatment of 'emission avoidance' credits: 1) use only 'reductions' and 'removals', or 2) use 'avoidance' in addition to 'reductions' and 'removals'. Research results indicate that the first option, using only 'reductions' and 'removals', is preferable.

Major Consideration Point 3. Centralised registry or interoperable registries

Recommendation:

Each AMS's registry should be designed to be interoperable.

1. Research results

Several AMSs have either established or are in the process of establishing a national registry (Box 5-6). Independent registries such as those of Verra or Gold Standard are also in use. Indonesia has entered a mutual recognition agreement with foreign registries (Gold Standard, 2025), which helps streamline project development and facilitate trading. For Article 6.2 activities, countries may utilise or connect to the international registry currently under development by the United Nations Framework Convention on Climate Change (World Bank et al., 2025). One notable initiative is the World Bank's Climate Action Data (CAD) Trust, a decentralised, blockchain-based platform that links major carbon registry data to enhance transparency and accounting in line with Article 6 of the Paris Agreement (CAD Trust, 2023).

2. Stakeholder and expert opinions

Experts recommended that ASEAN use existing platforms such as the CAD Trust instead of creating a new registry from scratch. Standardising datasets through the CAD Trust ensures interoperability without requiring a centralised registry, thereby avoiding political complexities. Aligning with international transparency efforts also helps prevent duplication and confusion. An open and interoperable system across ASEAN would enhance market reach and credibility whilst supporting future integration with the global carbon market.

Pros and Cons Analysis Results

	Description	Pros	Cons	Notes
Option 1	ASEAN creates a centralised registry.	Enables unified ownership, tracking, and prevention of double counting; simplifies management through consolidated transaction logs.	Requires strong legal and technical capacity as well as extensive political coordination.	One expert noted that the European Union (EU) emission trading system transitioned to a unified registry to simplify operations. This may have been facilitated by the EU's supranational structure, unlike ASEAN, which comprises 10 sovereign nations.
Option 2	Each AMS's registry is designed to be interoperable.	Facilitates robust data sharing as the primary market evolves, whilst allowing each country to address its specific needs.	Requires standardisation of operations and data formats to ensure seamless integration.	Most experts advised leveraging existing technical infrastructure such as the CAD Trust to enhance transparency and market credibility.

Implications of the guidance

ASEAN can consider two options for registry development: 1) create a centralised registry or 2) design registries to be interoperable. Research results indicate that the second option is preferable.

Major Consideration Point 4. 'Net-zero transition' or 'low-carbon transition'

Recommendation:

The guidance should include 'support for the transition' as a criterion for the high integrity of carbon credits.

1. Research results

The ICVCM's CCPs, which have become a benchmark for high-integrity carbon credits within the VCM, include a principle related to the net-zero transition (ICVCM, 2024a). Although the methodology principles under Article 6.4 do not explicitly mention net zero, they require alignment with countries' nationally determined contributions and the long-term goals of the Paris Agreement (Article 6.4 Supervisory Body, 2024). In contrast, Carbon Offsetting and Reduction Scheme for International Aviation's Emissions Unit Eligibility Criteria lack a principle for transition, possibly because the scheme's timeframe ends in 2035, before 2050, the global target year for achieving net zero. ACMF (2024b) notes that projects should facilitate the transition towards a low-carbon economy.

2. Stakeholder and expert opinions

Stakeholders and experts suggested that the guidance should align with global standards, whilst recognising that the term 'low-carbon transition' may be more suitable given the varying stages of development and regional coherence amongst AMSs. Whilst the term 'net-zero transition' provides an end-state goal, 'low-carbon transition' conveys the strategic pathway for achieving significant emission reductions.

Pros and Cons Analysis Results

	Description	Pros	Cons	Notes
Option 1	The guidance should include a criterion for 'net-zero transition'.	It aligns with ICVCM, which would attract international buyers. ICVCM CCP-eligible credits are expected to command higher transaction prices.	It does not consider ASEAN's unique context and does not align with the ATFG's approach, which better reflects climate ambitions across ASEAN.	Other global standards (Article 6.4, Carbon Offsetting and Reduction Scheme for International Aviation) do not include a specific criterion for net-zero transition.
Option 2	The guidance should include a criterion for 'low-carbon transition'.	It accommodates the differing circumstances and realities amongst AMSs and allows flexible approaches to driving regional efforts.	It does not strictly align with the global goal of achieving net zero by 2050, which may affect international demand for ASEAN credits.	

Sources: ACMF (2024b), Article 6.4 Supervisory Body (2024), International Civil Aviation Organization (2019), ICVCM (2024c), Singapore's Carbon Markets Cooperation (2025).

Implications of the guidance

ASEAN can consider two options for supporting the transition: 1) include a criterion for 'net-zero transition' or 2) include a criterion for 'low-carbon transition'. Research results indicate that Option 2 would be the most appropriate choice.

Major Consideration Point 5. Centralised market or interoperable market

Recommendation:

ASEAN's secondary market should be designed to be interoperable rather than established as a single centralised market.

1. Research results

Avoiding market fragmentation and enhancing connectivity and liquidity are key considerations for the ASEAN VCM. However, since each AMS is advancing its own regulatory frameworks and emission reduction strategies, establishing a centralised ASEAN VCM may not be practical. A more realistic approach would be to respect the national sovereignty of each AMS whilst encouraging them to design and operate domestic markets in an interoperable manner. Stakeholders and experts indicate that, given the fragmented nature of regulatory frameworks and systems across ASEAN,

2. Stakeholder and expert opinions

Stakeholders and experts indicate that, given the fragmented nature of regulatory frameworks and systems across ASEAN, building a centralised market would be challenging. However, they also emphasised that designing carbon credit markets to be interoperable, both within ASEAN and with global markets, could strengthen cross-border trade, enhance market liquidity, and improve investment attractiveness.

Pros and Cons Analysis Results

	Description	Pros	Cons
Option 1	The secondary market should be designed to be centralised.	The establishment of a unified, large-scale market would significantly enhance liquidity.	Establishing a centralised market would require substantial system implementation and harmonisation of rules and regulations.
Option 2	The secondary market should be designed to be interoperable.	It enables connection with the global carbon credit market whilst accommodating each AMS's systems and regulatory frameworks.	It may hinder standardisation efforts and maintain a degree of market disintegration.

Implications of the guidance

ASEAN can consider two options for the secondary carbon credit market: 1) create a centralised market or 2) design markets to be interoperable. Research results and expert opinions indicate that Option 2 would be the most suitable choice.

Major Consideration Point 6. Disclosure requirements for trading platforms

Recommendation:

Public disclosure requirements for trading platforms should consider their market type and sales mechanism.

1. Research results

Depending on the method of carbon credit sale structured by trading platforms to accommodate buyers' needs, the range of information available and accessible to market participants varies significantly. For example, marketplaces disclose a variety of credit information, including project type, vintage, crediting standard, host country, and any associated ratings. On the other hand, exchanges offer bundled or pooled credit products that group similar types of carbon credits to enhance liquidity. In such cases, detailed information about the individual underlying credits is not always disclosed upfront, but these credit products typically adhere to predefined eligibility criteria or quality standards.

2. Stakeholder and expert opinions

Some exchanges address the issue of low liquidity in carbon markets by bundling credits with similar attributes and selling them as a single product. In that case, the identities of buyers and sellers are kept anonymous, and details of credit information are not publicly disclosed. The reasoning behind this approach is that carbon credit trading should be based solely on prices and units, thereby simplifying market transactions and enhancing liquidity.

Pros and Cons Analysis Results

	Description	Pros	Cons	Note
Option 1	Public disclosure requirements that consider market types and sales methods.	Enabling flexible transaction formats, such as bundled or pooled credits, helps enhance liquidity by meeting diverse buyers' needs.	The criterion may be interpreted in a favourable way, which could weaken its enforceability.	The scope and requirements for information disclosure in existing carbon markets vary across different types of markets and jurisdictions.
Option 2	Uniform public disclosure requirements for trading platforms, including information on individual credits.	The enforceability of the criterion is strengthened, and the requirement for disclosing essential information can be more clearly conveyed.	A uniform disclosure requirement could hinder bundled sales, which are a key mechanism for enhancing liquidity in the VCM.	

Implications of the guidance

ASEAN can consider implementing information disclosure requirement to trading platform operators in two ways: 1) by reflecting the different types of market; or 2) by imposing a uniform requirement, which would be stricter and more enforceable. Research results indicate that Option 1 would be the more appropriate choice.

Major Consideration Point 7. Requirement of 'net zero' as a corporate target

Recommendation:

ASEAN should require all existing and prospective carbon credit users to set emission reduction targets consistent with national circumstances.

1. Research results

Existing international guidelines and standards for the use of carbon credits generally include alignment with net zero as a requirement. The International Emissions Trading Association (2024a) 'Guidelines for High Integrity Use of Carbon Credits' explicitly states that organisations must establish a decarbonisation pathway aligned with net zero. To qualify for VCMI claims, a carbon credit user must meet all foundational criteria, including setting and disclosing reduction targets aimed at achieving net zero by 2050 (VCMI, 2025a).

2. Stakeholder and expert opinions

Expert interviews reveal that the primary purchasers of voluntary carbon credits are large corporations that have committed to achieving net-zero emissions. However, to expand demand for carbon credits, greater participation from small and medium-sized enterprises (SMEs) is expected. To support this, SMEs should be encouraged to establish emission reduction targets and develop strategies tailored to their specific contexts.

Pros and Cons Analysis Results

	Description	Pros	Cons	Notes
Option 1	Credit users should establish and publicly announce their net-zero goals.	Having clear net-zero goals would substantiate the claimed use of carbon credits, thereby reducing the risks of greenwashing accusations.	Adding this requirement may impose an extra burden on prospective buyers and deter their participation in the market.	The largest voluntary carbon credit buyers are multinational corporations with clear net-zero targets.
Option 2	Credit users should formulate transition pathways consistent with the national strategies of the countries and regions in which they primarily conduct their business operations.	This option allows greater flexibility, as each AMS has different nationally determined contribution targets and strategies.	Allowing varying levels of effort may undermine the effectiveness of standardisation.	

Implications of the guidance

AMSs should prioritise raising awareness amongst corporations about the importance of establishing effective emission reduction targets and strategies, particularly for those that have not done so. ASEAN can assist corporate entities in setting these targets by issuing guidelines, sharing best practices, and conducting capacity-building activities.

Major Consideration Point 8. The level of due diligence for carbon credits

Recommendation:

The level of due diligence required from users should correspond to the maturity of the carbon markets.

1. Research results

Initial research indicates that the extent of corporate users' efforts in conducting due diligence on carbon credits remains unclear. This suggests that many companies do not disclose the full details of their due diligence processes. Although a few corporations publish materials outlining their approaches to emission reductions, including their strategies, criteria, and due diligence processes, these cases are exceptions rather than the norm.

2. Stakeholder and expert opinions

Findings from stakeholder engagement reveal that the expected level of due diligence may vary depending on the stage of market development. Ideally, the due diligence required from carbon credit users should align with practices in the primary market. However, in less developed ecosystems, third-party services may be scarce or costly, leading corporate buyers to rely on publicly available information for their internal due diligence. Smaller companies, with limited resources, may struggle to conduct comprehensive due diligence.

Pros and Cons Analysis Results

	Description	Pros	Cons	Notes
Option 1	Companies are required to conduct and disclose details of their internal due diligence.	This option enhances quality control and provides an extra layer of protection for users against market risks.	It may impose additional costs and administrative burdens on users and is suitable only for markets with proven demand.	Some voluntary carbon credit buyers and users can conduct internal due diligence, but these are typically large corporations with extensive experience. Most companies lack such resources.
Option 2	Companies are encouraged to conduct and disclose details of their internal due diligence.	This option allows greater flexibility, allowing companies to allocate resources for due diligence according to their own capacity and priorities.	Allowing varying levels of effort may undermine the effectiveness of standardisation.	

Implications of the guidance

To broader market participation, including that of SMEs, ASEAN should implement a phased approach to ensure that due diligence requirements correspond to the market's maturity. Before strengthening such requirements, ASEAN should consider implementing capacity-building initiatives to equip market participants with sufficient knowledge and capabilities.

Major Consideration Point 9. Requirement for mandatory third-party assurance

Recommendation:

ASEAN should work towards mandating third-party assurance for sustainability reports.

1. Research results

Globally, many countries and regions are increasingly adopting third-party assurance mandates for sustainability reports to enhance the reliability of disclosed information. Several AMSs also acknowledge the importance of assurance in facilitating effective communication with stakeholders regarding sustainability performance.

2. Stakeholder and expert opinions

Whilst third-party assurance can significantly enhance transparency and credibility in sustainability reporting, it comes with notable challenges. The cost of obtaining third-party assurance is often high, posing a barrier for many organisations, especially smaller ones. Additionally, the limited number of qualified assurance providers can make it difficult for companies to access these services.

Pros and Cons Analysis Results

	Description	Pros	Cons	Notes
Option 1	Each AMS should decide on the necessity of assurance services based on its own circumstances.	This option allows greater flexibility, recognising that carbon market ecosystems across ASEAN are at different stages of development.	Allowing varying levels of effort may undermine the effectiveness of standardisation.	Stakeholder interviews indicate that assurance services are costly and could burden market operations. A third-party assurance mandate may therefore be more suitable for mature markets.
Option 2	AMSs should work towards implementing a third-party assurance mandate as the carbon market matures.	This would align ASEAN market participants with global standards and help position the ASEAN carbon market as a high-integrity market.	Currently, assurance services are both costly and limited in availability. If ASEAN introduces such a mandate, steps must be taken to expand the supply and enhance the quality of assurance services.	

Implications of the guidance

Given the differences in cost structures and service availability, each AMS should decide on the necessity of assurance services based on its own circumstances. Nevertheless, to align with emerging global practices, AMSs should consider introducing a third-party assurance mandate in the future, once their carbon markets have matured. In preparation, regulators should develop strategies to strengthen the carbon market ecosystem, including raising awareness amongst corporate users and expanding the availability of qualified assurance service providers.

Chapter 6: Key Highlights and Considerations

- **Voluntary carbon market's role in ASEAN decarbonisation**

Reducing GHG emissions through domestic efforts alone can be burdensome for Association of Southeast Asian Nations Member States (AMSs), particularly in certain sectors. The existence of voluntary carbon markets (VCMs) can offer a complementary pathway for these sectors to meet emission reduction targets in at least two ways.

First, through the mechanism of offsetting, sectors can fulfil part of their decarbonisation commitments by purchasing and using carbon credits from the VCM. Ideally, the price of carbon credits should be comparable to the sector's marginal abatement cost (MAC) to ensure economic efficiency. In practice, ASEAN's VCMs offer a range of credits across different prices and project types, from the relatively low-cost credits from renewable energy and waste management projects to premium-priced credits from industrial or chemical processing projects. Hard-to-abate sectors in ASEAN may therefore pursue offsetting using credits priced comparably to their MACs.

Second, through carbon project development, sectors can generate revenues that support investments in GHG abatement technologies. Potential projects include renewable energy generation, energy efficiency improvements, and the production of sustainable aviation fuel, green ammonia, and green hydrogen.

To optimise the role of VCMs in supporting ASEAN's decarbonisation agenda, entities, especially those in high-emitting or hard-to-abate sectors, are required to strengthen their commitment to decarbonisation. On the one hand, promoting an optimal and fair offsetting mechanism amongst these entities can serve as an alternative means to achieve emission targets. On the other hand, developing carbon projects within these sectors should be encouraged to create revenues that enable future investments in abatement technologies, thereby enhancing their capacity to reduce emissions independently over time.

- **Voluntary carbon market landscape in ASEAN**

Overall, AMS remain in the early phases of developing their carbon market ecosystems, especially when compared with more mature systems like the European Union Emissions Trading System. To evaluate the region's VCM readiness, based on carbon pricing infrastructure, policy strength, and market activity, a framework was developed comprising four variables and 15 indicators:

1. **Market structure and liquidity (primary and secondary market)**:
    - Existence of national compliance instruments (1990–2024)
    - Existence of national carbon crediting mechanisms (2005–2024)
    - Existence of carbon exchange platforms
    - Trading volume (tonnes of carbon dioxide equivalent, 2020–2024)
    - Number of project developers
    - Percentage of carbon credits retired in voluntary markets
2. **Policy stability and predictability:**
    - Long-term climate policy commitment ('net-zero status' as of August 2025)
    - Alignment of total primary energy supply by fuel, business-as-usual, 1990–2050 (million tonnes of oil equivalent)
    - Clarity of legal frameworks supporting carbon market development (as of 2024)

3. **Market reach:**
    - Existence of Article 6 institutions (as of June 2025)
    - Existence of tracking arrangements for Article 6.2 (as of June 2025)
4. **Economic viability and longevity:**
    - Average MAC (2030–2050)
    - Readiness of monitoring, reporting, and verification (MRV) systems
    - Sustainable Development Goal Index score (2019–2024)
    - Number of businesses with validated science-based targets (2015–2025).

Based on the total scores, countries were grouped as follows:

- Developing (scores 0–15): Myanmar and Brunei Darussalam
- Emerging (scores 16–22): Malaysia, the Philippines, Lao People's Democratic Republic, and Cambodia
- Advanced (scores 23–31) Indonesia, Singapore, Viet Nam, and Thailand.

To establish a robust, high-integrity, and interoperable ASEAN VCM, countries should take three key actions. First, countries need to harmonise the definition and scope of voluntary markets in line with national priorities. Second, AMSs need to develop pathways for 'developing' and 'emerging' countries to incrementally strengthen their market readiness and transition to 'advanced' status. Lastly, countries can make collective adjustments to align with benchmark markets, such as Japan and the Republic of Korea, where most ASEAN carbon credits exports are directed.

- **Diverse stakeholder roles**

The ASEAN VCM ecosystem comprises a diverse set of stakeholders, classified into four categories based on their level of involvement and influence: subject, crowd, key players, and context setter, each possessing distinct knowledge domains and facing different capacity gaps.

Critical knowledge areas needing further understanding include robust MRV systems; effective free, prior, and informed consent (FPIC) implementation; benefit-sharing mechanisms for Indigenous Peoples and local communities (IP&LCs); transparent pricing; and clear national regulatory processes for aligning voluntary credits with compliance market requirements (e.g. corresponding adjustment (CA) versus non-CA credits).

Intermediaries and enablers, such as brokers, technology companies, and data analytics platforms, play catalytic roles in addressing information asymmetries, enhancing transparency, and automating MRV processes, which are essential to boosting market efficiency and trust.

To optimise stakeholder roles and bridge knowledge gaps, it is crucial for ASEAN to develop an inclusive and transparent governance framework to manage the complexity of ASEAN's VCM landscape. This framework should define clear roles and responsibilities, close critical knowledge gaps (e.g. MRV, FPIC, pricing data), empower intermediaries to enhance trust and efficiency, and safeguard the rights and participation of IP&LCs. Such a framework will promote a robust, interoperable, and high-integrity carbon market aligned with both national priorities and international expectations.

- **Call for greater alignment and harmonisation**

There is a clear need for enhanced alignment and harmonisation across multiple dimensions, such as registry data (e.g. the Climate Action Data Trust), credit integrity principles (e.g. Core Carbon Principles of the ICVCM, and sustainable finance frameworks (e.g. ASEAN Taxonomy for Sustainable Finance). To meet this need, ASEAN should develop a strategic work plan that enables a phased and coordinated harmonisation process, from foundational data inventories to high-level regulatory frameworks. Stakeholders must adopt a coordinated approach that supports the interoperability of infrastructure, carbon credits, and regulatory procedures.

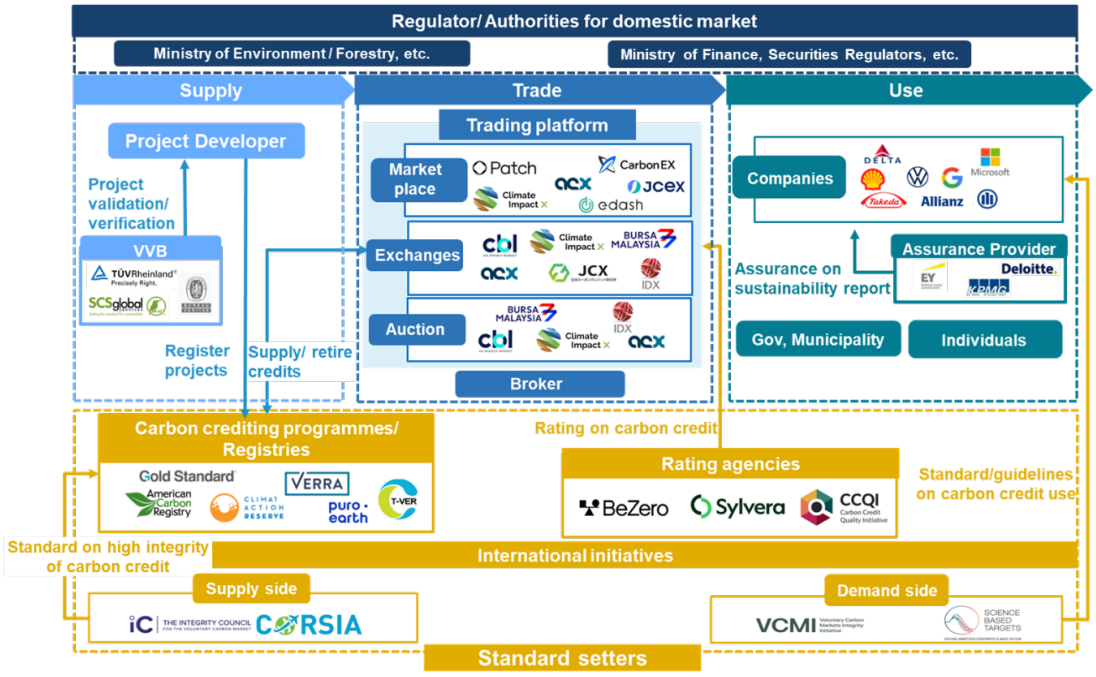
Embedding shared integrity benchmarks such as the ICVCM's Core Carbon Principles, whilst aligning with regional frameworks like the ASEAN Taxonomy for Sustainable Finance, will enhance transparency, reduce regulatory friction, and boost investor confidence. At the same time, the framework must remain flexible to accommodate differing national capacities, ensuring inclusive participation and laying the groundwork for eventual regional market linkage and global integration.

- **Implementation of the guidance**

The guidance introduced in Chapter 5, developed from the ASEAN Capital Markets Forums (ACMF)'s perspective, aims to make ASEAN's VCM more transparent, effective, and credible. Although reflecting the ACMF's institutional viewpoint, it is intended for all stakeholders within the VCM ecosystem, outlining principles and good practices to support its sound and sustainable development.

Operationalising this guidance, however, poses notable challenges. The VCM involves a wide range of stakeholders across the value chain, from credit generation and issuance to trading, use, and retirement, as illustrated in Figure 6-1. Effective implementation will therefore depend on sustained engagement with all relevant actors.

Figure 6-1. Stakeholders Across the Voluntary Carbon Market



Source: Author.

The following section highlights the key implementation issues across these segments, with particular emphasis on strengthening stakeholder engagement to ensure that the guidance is both practical and impactful.

1. Regulatory Frameworks

The regulatory frameworks section focuses on the legal and regulatory treatment of carbon credits, providing insights into how these are addressed within domestic legal and supervisory systems. In many AMSs, legislation on climate change remains under development, and the legal and regulatory status of carbon credits is still unclear. The VCM involves a wide range of stakeholders across the value chain (Figure 6-1). Consequently, supervisory responsibilities are often distributed amongst multiple ministries and agencies. However, in the absence of clear regulatory treatment, identifying the relevant authorities within each jurisdiction becomes difficult, undermining the fair and orderly functioning of the VCM.

Clarifying the legal status of carbon credit ownership is also a critical foundation for building investor confidence and stimulating market activity. Whilst the guidance leaves the specific definition of legal status, mandate, and regulatory reach to the discretion of individual AMSs, it emphasises the importance of ensuring legal clarity. Although it does not propose specific policy directions, it encourages countries to take into account international discussions and the approaches adopted by other AMSs when considering the legal and regulatory treatment of carbon credits, with a view to promoting a more harmonised framework.

Although the guidance presents these desired practices, translating them into concrete actions will require close cooperation not only with the ACMF and relevant financial agencies, but also with other ministries, such as national environment ministries responsible for climate change policy and carbon credits.

2. Primary Market Issuance

The primary market issuance segment addresses the generation and initial sale of carbon credits, which form the foundation of both environmental and financial integrity. Its objective is to strengthen transaction transparency in the primary market by offering guidance to improve the quality and accessibility of information related to carbon credit issuance. Rather than defining ASEAN-specific standards for high integrity of carbon credits, this segment recommends strategic alignment with globally recognised frameworks such as ICVCM and Carbon Offsetting and Reduction Scheme for International Aviation, whilst considering the diverse regulatory and developmental contexts of AMSs.

As highlighted in Section 1: Regulatory Frameworks, each AMS should clearly designate an environmental authority to oversee the issuance of carbon credits. In its role as a capital market regulator, ACMF can facilitate coordination between financial and environmental authorities to promote investor confidence and support the development of high-integrity carbon markets that attract both domestic and international stakeholders. The ACMF's involvement also helps ensure that carbon credit generation is underpinned by transparency, credibility, and alignment with market expectations.

When AMSs choose to establish national registries or adopt programme-specific registries under voluntary carbon crediting programmes, it is essential to ensure strong governance, efficient management, and the reliability of environmental attributes. Whilst oversight of these registries should remain the responsibility of environmental authorities, the ACMF can add value by promoting integration between registries and financial market infrastructure (e.g. exchanges). Supporting interoperability would allow carbon credits issued in the primary market to be seamlessly integrated into the financial ecosystem. The ACMF can also advocate

for the adoption of common data models and digital infrastructure to strengthen transparency across the region.

This guidance further highlights the importance of developing local VVBs that are technically competent and well-versed in ASEAN-specific conditions, an essential step in scaling the supply of credible carbon credits. The ACMF can support this by collaborating with relevant institutions to promote capacity-building initiatives such as regional workshops and technical training. Through these actions, ASEAN can lay the groundwork for a robust and trusted primary market aligned with international standards whilst remaining responsive to regional priorities.

3. Secondary Market Trading

The secondary market encompasses the trading of carbon credits following their issuance in the primary market. This segment provides guidance for ensuring a fair, efficient, credible, and transparent market where a wide range of participants interact through trading, brokering, and related transactions. Historically, carbon credits have been traded primarily through over-the-counter arrangements, resulting in limited price transparency and low liquidity. In response, several AMSs have established exchanges and other trading platforms to enhance market integrity through robust governance frameworks and relevant regulatory oversight within such trading platforms to help mitigate risks associated with fraud, and enhance transparency, accessibility, and efficiency. While these initiatives are underway, platform-based trading remains limited relative to over-the-counter arrangements and fragmented, thereby constraining the overall development and impact of regional carbon markets.

A key challenge underpinning this fragmentation is the limited demand for carbon credits. Compliance demand remains weak, as emissions trading systems are still in their early stages in most AMSs. At the same time, voluntary demand is insufficient due to a lack of strong commercial drivers to encourage companies to purchase carbon credits and ongoing concerns about credit quality, particularly fears of greenwashing. Addressing these constraints is critical to fostering a more active VCM in ASEAN.

To stimulate demand, this guidance emphasises the role of the secondary market in maintaining the high integrity of carbon credits and enhancing price transparency, both of which are essential elements of a well-functioning market. However, more fundamental demand constraints, such as limited regulatory requirements and weak commercial drivers of corporate actions, cannot be addressed by the secondary market alone and will require coordination with stakeholders across other segments. In its role as a capital market regulator, ACMF can facilitate such coordination between relevant stakeholders in efforts to promote more active voluntary carbon markets.

Several measures should be undertaken to clarify the rationale behind companies' use of carbon credits. These include creating compliance demand and strengthening commercial drivers of corporate actions by promoting clear use cases for carbon credits and improving disclosure for investors. To increase demand, it is essential to provide guidance that clearly defines which types of credits may be used for specific purposes, thereby fostering a standardised demand for fungible and tradable credits, a particularly important factor for exchange-based trading.

Furthermore, to build a credible and transparent carbon market in ASEAN and attract international buyers, it is crucial to ensure the quality of carbon credits traded within the market. Implementing these actions requires active engagement and coordination amongst stakeholders across the VCM ecosystem, including those involved in the primary market and in the use and disclosure of carbon credits.

In addition to broader stakeholder engagement, capacity-building amongst financial institutions is essential. Although some trading platforms, including exchanges, have already been established, the treatment of carbon credits within the financial sector remains relatively new, and understanding amongst financial actors in AMS is still limited. Strengthening capacity within the financial sector is therefore essential to improve understanding of the carbon credit process, including generation, validation and verification by accredited validation and verification bodies, environmental integrity, credit ratings, and trading mechanisms.

4. Use, Disclosure of Use, and Retirement of Carbon Credits

The final section, on the use, disclosure of use, and retirement of carbon credits, underscores the crucial role of buyers in upholding carbon market integrity. To ensure the credible use of carbon credits, both current and prospective users should be encouraged to develop clear strategies for credit utilisation and retirement, integrated into broader transition plans in support of the Paris Agreement. Users are expected to adopt responsible procurement practices and provide transparent disclosures.

Given the varied levels of carbon market maturity amongst AMSs, it is more effective to provide context-sensitive guidance tailored to users' specific circumstances, rather than imposing uniform benchmarks or regulatory requirements. This approach should incorporate relevant international practices and regional trends. Initial harmonisation efforts could focus on disclosure requirements, as most AMSs already recognise the importance of transparent information in building trust and consistency in carbon markets. Many are moving towards the phased adoption of International Financial Reporting Standards S2 for sustainability reporting, although timelines differ across countries. Looking ahead, further collaboration within ASEAN will be necessary to align best practices and establish a strong foundation for market integrity.

Regarding the issue of credit quality, the responsibility for ensuring the integrity of carbon credits currently lies primarily with regulators and suppliers. To strengthen credibility, corporate users should use carbon credits in accordance with the mitigation hierarchy, resorting to offsetting only after exhausting feasible options to avoid or reduce emissions. As the carbon market ecosystem evolves, however, users, particularly corporate buyers, are expected to play a more active role in safeguarding credit quality.

To advance regional harmonisation of quality standards, dialogue amongst relevant authorities, including the ministries of environment in each AMS, will be essential. The next critical step is to stimulate demand for high-quality credits by raising corporate awareness and strengthening institutional capacity. Companies must understand how high-quality carbon credits, especially those aligned with globally accepted standards such as ICVCM and Carbon Offsetting and Reduction Scheme for International Aviation, can effectively support climate goals, contribute to international initiatives, and be used appropriately within established boundaries.

Once corporate actors recognise the strategic importance of credit quality, they can be encouraged to invest in supporting activities such as verification, monitoring, and assurance. As corporate understanding deepens, governments may gradually implement mandatory requirements to enhance accountability whilst fostering inclusive participation across the carbon market.

Study Limitations and Future Studies

This study drew primarily on a limited set of publicly available literature. Interview participants were identified through snowball sampling, where initial informants referred others within their networks, introducing potential selection bias. As a result, the research may have overlooked relevant documents or excluded key informants who could have provided complementary or contrasting insights. Consequently, certain nuances, particularly those relating to subnational perspectives or jurisdictional complexities, may not be fully reflected, potentially affecting the breadth and representativeness of the study's findings.

In view of these limitations, future research should expand the scope of data sources by incorporating a more diverse selection of literature, including non-English materials that may offer additional insights into voluntary carbon markets. Moreover, employing a more systematic and inclusive sampling strategy, such as stratified sampling, could help capture a broader spectrum of stakeholder perspectives, including those of subnational governments, Indigenous Peoples and local communities, and underrepresented sectors. Doing so would enhance the depth, balance, and representativeness of findings, providing a more comprehensive understanding of jurisdictional challenges and on-the-ground implementation dynamics across different ASEAN contexts.

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