

# Chapter 11

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## Voluntary Carbon Markets and Mechanisms in Lao PDR's Energy Sector

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# 1. Introduction

Lao People's Democratic Republic (Lao PDR) has established its unconditional nationally determined contribution (NDC) target, aiming for a 60% reduction in emissions compared to the 2000 baseline scenario, equivalent to approximately 62 million tonnes of carbon dioxide equivalent (tCO<sub>2e</sub>) (Government of Lao PDR, 2021). In addition to the unconditional mitigation targets, Lao PDR also set forth more ambitious conditional targets, which will be achieved with voluntary international cooperation or external financial support, with a total financing need estimated at US\$2,980 million. With support from the international community, Lao PDR aims to achieve net-zero emissions by 2050.

One of the criteria of Article 6 under the Paris Agreement is the provision of additionality, whereby a project leads to emissions reductions that would not otherwise occur. Therefore, all conditional mitigation measures of the NDC are eligible to utilise Article 6 in achieving the targets. As shown in Table 11.1, these measures include the deployment of non-hydro renewable energy, electric vehicles (EVs), biofuels in the transport sector, and reduction of final energy consumption. Thus, Lao PDR may consider the potential of international cooperation through Article 6. For instance, potential projects could involve increasing installed capacity from renewable energy to replace thermal power plants, which currently account for 14% of the generation mix by 2030; establishing low-carbon EV-charging stations to accelerate the share of EVs in the national vehicle mix; and implementing carbon capture, utilisation, and storage in coal-fired power plants and cement production.

**Table 11.1. Lao PDR's Nationally Determined Contribution Mitigation Targets for Energy-related Measures**

Unconditional Mitigation Targets		Average Abatement, 2020–2030 (tCO <sub>2e</sub> /year)
Hydropower	13 GW total hydropower capacity (domestic and export use)	2.5 million
Energy efficiency	Introduction of 50,000 energy-efficient cookstoves	50,000
Transport	New bus rapid transit system in Vientiane and associated non-motorised transport	25,000
	Laos–China Railway	300,000

Conditional Mitigation Targets		Average Abatement, 2020–2030 (tCO <sub>2e</sub> /year)	Financing Needs (US\$ million)
RE other than hydropower	Solar and wind: 1 GW total installed capacity	100,000	1,500
	Biomass: 300 MW total installed capacity	84,000	720
Transport	30% EV penetration in national vehicle mix	30,000	500
	Biofuels to meet 10% of transport fuels	29,000	230
Energy efficiency	10% reduction of final energy consumption compared to business-as-usual scenario	280,000	30

EV = electric vehicle, GW = gigawatt, Lao PDR = Lao People's Democratic Republic, MW = megawatt, tCO<sub>2e</sub> = tonne of carbon dioxide equivalent.

Source: Government of Lao PDR (2021).

Lao PDR has expressed its interest in the internationally transferred mitigation outcomes (ITMOs) approach for achieving its mitigation objectives in its NDC (Government of Lao PDR, 2021). Consequently, the Ministry of Natural Resources and Environment (MNRE) is developing carbon markets in the country, which focus on the forest sector. This chapter discusses the development of voluntary carbon markets (VCMs) in Lao PDR, particularly regarding Article 6, with a focus on the energy sector. It addresses the challenges, policy directions, and implications for the next NDC.

VCMs are platforms or marketplaces where entities – typically corporations, governments, or individuals – voluntarily engage in the purchase and trade of carbon offsets. A carbon-crediting mechanism is an initiative that issues tradable credits to entities voluntarily undertaking emissions reduction activities. The relationship between VCMs and carbon-crediting mechanisms rests on the fact that VCMs provide the marketplace for trading carbon credits generated through emissions reduction or removal projects. Entities that voluntarily undertake such projects can earn carbon credits, which they can then sell on VCMs to buyers looking to offset their own emissions or to demonstrate their commitment to sustainability. In this way, carbon-crediting mechanisms provide the framework for generating tradable assets (i.e. carbon credits), while VCMs facilitate the exchange of these credits amongst participants in the market. There are three approaches to managing this crediting mechanism:

- (i) **Domestic (or regional) crediting mechanisms.** Credits are issued through mechanisms established by the government(s), which set regulations and criteria for credit generation.
- (ii) **International crediting mechanisms.** Governed by international institutions, examples include the Clean Development Mechanism (CDM) and Joint Implementation under the Kyoto Protocol, or Article 6 under the Paris Agreement.
- (iii) **Independent crediting mechanisms.** These are administered by private and independent third-party organisations, such as the Gold Standard and Verified Carbon Standard (World Bank, 2021a).

In some instances, a carbon tax or cap-and-trade programme allows regulated entities to utilise 'carbon credits' from voluntary market programmes to meet a share of – or offset – their compliance requirements. However, it is essential to ensure that the crediting mechanism's scope excludes entities, gases, or activities covered by carbon-pricing instruments – or other mandatory emissions reduction regulations – to prevent overlaps and potential double-counting of emissions reductions (World Bank, 2021a).

The World Bank views mandatory carbon-pricing instruments (i.e. carbon taxes or cap-and-trade programmes) as more effective tools for driving reductions across the entire economy compared to voluntary carbon crediting (World Bank, 2021a). An earlier investigation by Down to Earth and the Centre for Science and Environment found that VCM projects may not actually benefit people nor the climate (Crook, 2023). Nevertheless, carbon crediting does offer its own set of benefits. For instance, credits can be used by regulated entities to fulfil compliance requirements within a carbon tax or emissions trading scheme (ETS), thereby adding flexibility in compliance. Additionally, a crediting mechanism can serve as an alternative to carbon-pricing instruments in cases of legal barriers or political resistance.

## 2. Voluntary Cooperation under Article 6 of the Paris Agreement

Article 6 of the Paris Agreement permits countries to engage in voluntary collaboration to achieve emissions reduction targets specified in their NDCs. In essence, this provision allows a country or a group of countries to transfer carbon credits earned through emissions reductions to assist other countries in meeting their climate goals. Sub-sections of Article 6 that outline the cooperation through emissions trading are Article 6.2: ITMOs and Article 6.4: International Carbon-Crediting Mechanism. These provisions aim to foster international cooperation and innovative solutions to combat climate change while addressing the diverse needs and preferences of participating countries. Joint research carried out by the International Emissions Trading Association and the University of Maryland suggested that governments – by working together to implement NDCs through Article 6 as opposed to isolated efforts – could lead to governments saving more than US\$300 billion per year by 2030 (Edmonds, Yu, Steponaviciute, 2022).

### 2.1. Cooperative Approach through Article 6.2

Article 6.2 suggests that countries work together to establish 'cooperative approaches' for trading ITMOs between different jurisdictions. This can be achieved by reducing emissions in a host country and generating ITMOs that can then be transferred to a partnering country to help it meet its NDC or to other stakeholders for international mitigation purposes. However, ITMO implementation is subject to revisions and updates over time based on new international guidance by the Conference of the Parties, updated

NDCs of the host and buying governments, and potential future bilateral and multilateral agreements with other countries or development partners.<sup>1</sup> The following is the ITMO implementation framework as of this writing.

- (i) **Definition of ITMOs.** ITMOs must be real, verified, and additional; generated from emissions reductions and removal activities undertaken from 2021 onward (Table 11.2); measured in tCO<sub>2e</sub> or in other non-greenhouse gas metrics determined by parties that are consistent with their NDCs; authorised for utilisation within an NDC or authorised for use in other international mitigation objectives beyond NDCs (e.g. Carbon Offsetting and Reduction Scheme for International Aviation [CORSIA]); and encompass emissions reductions issued under Article 6.4 arrangements<sup>2</sup> (Moosman et al., 2022; CMI, 2021; UNFCCC, 2022).

**Table 11.2. Examples of Emissions Reduction and Removal Activities**

Activity	Technology-based	Nature-based
Emissions reduction	Energy-efficiency projects Renewable energy production Low-carbon transport Clean aviation fuels Waste management	Agroforestry practices Land-use optimisation
Emissions removal	Direct air capture with carbon storage (DACCS) <sup>a</sup> Bioenergy with carbon capture and storage (BECCS) <sup>b</sup> Carbon capture, utilisation, and storage (CCUS) <sup>c</sup>	Reforestation and afforestation Tree planting Restoring mangroves Algae-based carbon sequestration Enhanced mineralisation/carbon dioxide mineralisation <sup>d</sup>

<sup>a</sup> DACCS is a technology that uses chemical processes to capture and separate carbon dioxide (CO<sub>2</sub>) directly from ambient air. The CO<sub>2</sub> is then separated from the chemicals and captured so that it can be injected into geological reservoirs or used to make long-lasting products. The chemicals are then reused to capture more CO<sub>2</sub>.

<sup>b</sup> BECCS involves capturing and permanently storing CO<sub>2</sub> from processes where biomass is converted into fuels or directly burned to generate energy. Because plants absorb CO<sub>2</sub> as they grow, this is a way of removing CO<sub>2</sub> from the atmosphere.

<sup>c</sup> CCUS involves the capture of CO<sub>2</sub>, generally from large point sources like power generation or industrial facilities that use either fossil fuels or biomass as fuel. If not being used onsite, the captured CO<sub>2</sub> is compressed and transported by pipelines, ships, rail, or trucks to be used in a range of applications or injected into deep geological formations such as depleted oil and gas reservoirs or saline aquifers.

<sup>d</sup> Enhanced mineralisation accelerates the natural processes by which various minerals absorb CO<sub>2</sub> from the atmosphere. This natural weathering process converts about 1 billion tonnes/year of atmospheric CO<sub>2</sub>. One proposal for implementation would involve grinding rocks (olivine or basalt) into powder and spreading the powder over soil, where it reacts with the air to form carbonate minerals that provide reliable, long-term carbon storage.

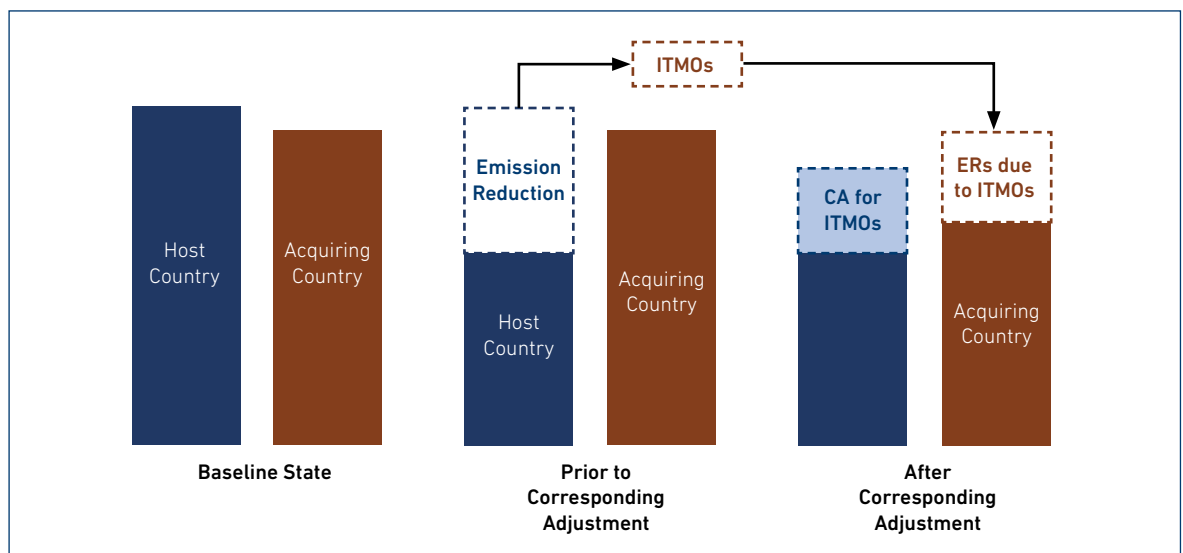
Sources: Institute for Carbon Removal Law and Policy (2018a; 2018b), IEA, Bioenergy with Carbon Capture and Storage, <https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage/bioenergy-with-carbon-capture-and-storage>; IEA, Carbon Capture, Utilisation and Storage, <https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage>; author.

<sup>1</sup> UNDP, Platform for Voluntary Bilateral Cooperation, <https://carboncooperation.undp.org/>

<sup>2</sup> While Article 6.4 emissions reductions can serve as ITMOs, it is important to note that not all ITMOs comply with Article 6.4 requirements.

- (ii) **Participation.** Each participating country must ensure that it is a party to the Paris Agreement; has prepared, communicated, and is maintaining an NDC; has arrangements in place for authorising the use of ITMOs towards achievement of NDCs; has provided the most recent national inventory report; and ensures that its participation contributes to the implementation of its NDC, long-term low-emissions development strategy, and long-term goals of the Paris Agreement (Moosman et al., 2022; CMI, 2021; UNFCCC, 2022).
- (iii) **Application of corresponding adjustments.** In the accounting framework established under Article 6.2, when two countries engage in the transfer of carbon market units, they must apply 'corresponding adjustments' for ITMOs. Specifically, the country selling ITMOs – representing emissions reductions or removals achieved within its borders – adds this amount to its recorded emissions level. Conversely, the country acquiring the ITMOs deducts this amount from its emissions inventory (Figure 11.1). Subsequently, both countries compare this adjusted balance with their respective target levels to determine if they have successfully met their emissions reduction goals. This approach ensures that only the purchasing country can apply the transferred emissions reductions, effectively preventing any instances of double-counting (Moosman et al., 2022; CMI, 2021; UNFCCC, 2022). The framework further specifies that only units supported by corresponding adjustments are eligible for fulfilling NDCs or for international compliance, as exemplified by the CORSIA overseen by the International Civil Aviation Organization (ICAO). Carbon credits without corresponding adjustments may find application in other contexts, such as within domestic emissions trading systems. Additionally, Article 6.2 mandates the application of corresponding adjustments, irrespective of whether the emissions reductions fall under the NDC of the selling country (e.g. in the case of methane emissions reductions in a country whose NDC exclusively addresses carbon dioxide emissions).

**Figure 11.1. Illustration of Corresponding Adjustment**

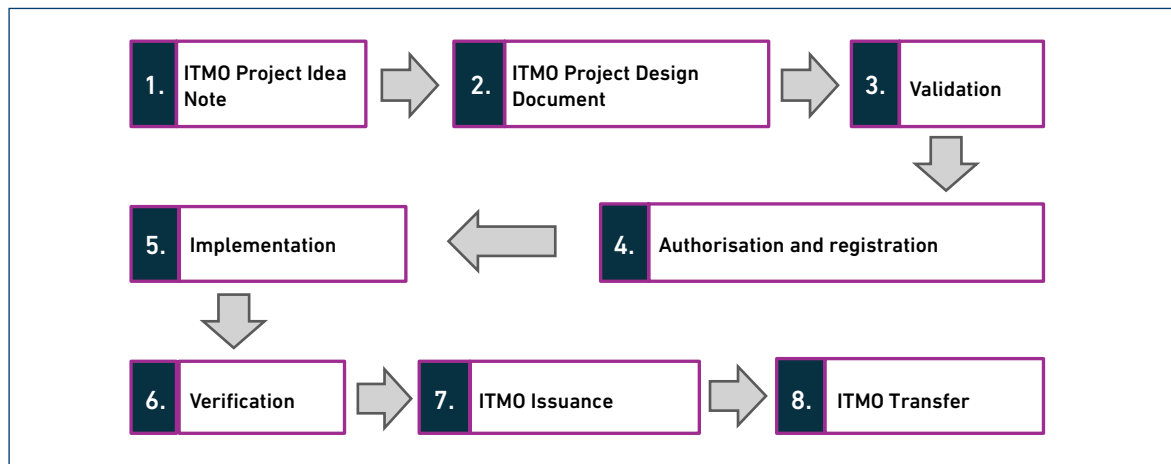


CA = corresponding adjustment, ER = emissions reduction, ITMO = internationally transferred mitigation outcome.

Source: ADB (2021).

- (iv) **Time periods and units.** One significant challenge in implementing carbon market approaches stems from the fact that many countries establish their emissions targets for a single year, such as 2030, rather than for multi-year periods, which is the typical framework for carbon market compliance. To address this issue, regulations offer two distinct methods for accounting for single-year targets. Countries have the option to adopt multi-year trajectories for accounting purposes, allowing them to spread the emissions reductions or ITMOs transactions over several years to align with their single-year targets. Alternatively, countries can employ an averaging approach, wherein they account for the average amount of ITMOs bought or sold over a multi-year period in the target year. Additionally, the rules established during the 2021 United Nations Climate Change Conference (COP26) mandate that all accounting must be conducted in greenhouse gas emission metrics, expressed in tCO<sub>2</sub>e. While there is some flexibility to consider other metrics, such as hectares of land afforested, countries must still quantify the impact within the context of a greenhouse gas emissions balance. Furthermore, the accounting rules explicitly disallow the carry-over of carbon market units from one NDC period to the subsequent period. This measure is in place to prevent situations in which countries accumulate substantial quantities of carbon market units that lack genuine emissions reductions behind them, and then employ these units to meet forthcoming climate targets, a practice that was observed during the implementation of the Kyoto Protocol (Moosmann, et al. 2022).
- (v) **Safeguards and limits.** Article 6.2 cooperative approaches must contribute to global mitigation, ensure accountability and transparency, and promote sustainable development. These approaches must result in an overall reduction in global emissions, ensuring that there is no net increase in emissions amongst participating countries. This necessitates the incorporation of appropriate safeguards and limits. The approaches must guarantee transparency, accuracy, consistency, completeness, and comparability in monitoring the implementation of these approaches and tracking progress towards achieving NDCs. Finally, activities undertaken within these approaches must elucidate how they will support the sustainable development goals of the participating parties. It is imperative that countries respect, promote, and consider their respective obligations concerning human rights; the right to health; rights of indigenous peoples, local communities, migrants, children, persons with disabilities, and individuals in vulnerable situations; as well as the right to development. Additionally, they should be attentive to principles of gender equality, the empowerment of women, and intergenerational equity (CMI, 2021; UNFCCC, 2022).
- (vi) **Project development process.** Project development consists of eight steps, from the ITMO project idea note (i.e. proposal) to the ITMO transfer (Figure 11.2 and Table 11.3).

Figure 11.2. ITMO Project Development Process



ITMO = internationally transferred mitigation outcome.

Source: UNDP, Platform for Voluntary Bilateral Cooperation, <https://carboncooperation.undp.org/>

Table 11.3. Steps of ITMO Project Development Process

No.	Step	Details
1	ITMO Project Idea Note	The developer outlines the mitigation strategy, underlying rationale for generating the ITMOs, monitoring approach, governance framework, contribution to sustainable development, and financial needs.
2	ITMO Project Design Document	The developer drafts the document by employing the recommended emissions baseline and monitoring methodology.
3	Validation	Validation of the developer's mitigation project is carried out by independent auditors, followed by assessments by ministries, national entities, and agencies, and the approval of the validation report by the Article 6 Secretariat.
4	Authorisation and Registration	The host and buying country governments grant authorisation for the ITMO project, and the Article 6 Secretariat registers and publishes it.
5	Implementation	The developer carries out implementation and commences monitoring in accordance with the approved monitoring plan.
6	Verification	The Article 6 Secretariat publishes the results of an independent auditor's verification, confirming that the emissions reductions, as asserted, align with the approved monitoring plan.
7	ITMO Issuance	Following the signing of the certificate by the Article 6 Secretariat, administrative checks are conducted, and serialised ITMOs are generated in the holding account of the buying entity.
8	ITMO Transfer	A portion of the proceeds are deducted for administrative purposes, and the ITMOs are transferred and recorded in the national registry of the transferring country.

ITMO = internationally transferred mitigation outcome.

Source: UNDP, Platform for Voluntary Bilateral Cooperation, <https://carboncooperation.undp.org/>



(vii) **Existing international cooperation.** As of this writing, there are nine countries actively seeking cooperation with developing countries to acquire ITMOs: Australia, Japan, Republic of Korea, Monaco, Norway, Singapore, Sweden, Switzerland, and the United Arab Emirates (Table 11.3). As of 25 March 2024, the United Nations Environment Programme (UNEP) Copenhagen Centre recorded a total of 141 pilot projects under these cooperation frameworks, with 119 belonging to the Joint Crediting Mechanism (JCM).<sup>3</sup> (UNEP, 2024). These projects are predominantly related to energy efficiency and solar industries. However, only five projects have authorisation statements, which are all under Switzerland's cooperation framework (Table 11.4).

**Table 11.4. Existing International Cooperation Frameworks Similar to the ITMO Mechanism**

International Cooperation Framework	Acquiring Countries	Since	Number of Partner Countries	Host Countries from ASEAN
Joint Crediting Mechanism	Japan	2013	29	Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Thailand, Viet Nam
Procurement Programme for International Carbon Offsets	Switzerland (Foundation for Climate Protection and Carbon Offset, KliK)	2018	16	Thailand
Norwegian Carbon Credit Procurement Programme through the Global Green Growth Institute	Norway	2023	3	Indonesia
Indo-Pacific Carbon Offsets Scheme	Australia	2021	2	None
Bilateral cooperation under the Paris Agreement	Monaco	2024	1	None
	United Arab Emirates	2023	1	None
	Singapore	2022	20	Cambodia, Indonesia, Thailand, Viet Nam
	Sweden (Swedish Energy Agency)	2021	3	None
	Republic of Korea	2020	6	Lao PDR, Viet Nam

ITMO = internationally transferred mitigation outcome, Lao PDR = Lao People's Democratic Republic.

Note: As of 25 March 2024.

Source: UNEP, Copenhagen Climate Centre, Article 6 Pipeline, <https://unepccc.org/article-6-pipeline/> [accessed 30 March 2024]

<sup>3</sup> UNEP Copenhagen Climate Centre, Article 6 Pipeline, <https://unepccc.org/article-6-pipeline/> [accessed 30 March 2024]

**Table 11.5. Projects with Authorisation Statements under the Cooperation Framework of Article 6.2**

Project	ITMO-acquiring Country	Host Country	Authorised Reductions (tCO <sub>2e</sub> )
Promotion of climate-smart agriculture practices for sustainable rice cultivation	Switzerland	Ghana	1,126,000
E-bus programme	Switzerland	Thailand	500,000
Electrification of inhabited islands through Solar Power ITMO Programme	Switzerland	Vanuatu	97,000
Integrated waste recycling and composting for methane reduction	Switzerland	Ghana	1,589,000
Transformative cookstove activity in rural areas	Switzerland	Ghana	3,231,000

ITMO = internationally transferred mitigation outcome, tCO<sub>2e</sub> = tonne of carbon dioxide equivalent.

Note: As of 24 March 2024.

Source: UNEP Copenhagen Climate Centre, Article 6 Pipeline, <https://unepccc.org/article-6-pipeline/> [accessed 30 March 2024]

## 2.2. New International Carbon Crediting Mechanism under Article 6.4

Article 6.4 introduces a global trading platform, overseen by the United Nations Framework Convention on Climate Change (UNFCCC), which facilitates the trading of emissions reductions amongst all countries. Often referred to as the Sustainable Development Mechanism, this new market is set to replace the CDM, which was previously in operation under the Kyoto Protocol (and succeeded by the Paris Agreement as of 2020). Compared to the CDM, this new mechanism imposes more rigorous regulations. Notably, it introduces new principles for demonstrating the additional nature of mitigation activities, mandates the application of robust environmental and social safeguards, and establishes a grievance mechanism that allows for appeals against decisions (Moosman, et al., 2022). The Article 6.4 mechanism will be administered by the A6.4 Secretariat (housed in the UNFCCC Secretariat) and overseen by the A6.4 Supervisory Body made up of 12 representatives from parties to the UNFCCC, including two from each of the five United Nations regional groups, one from a least-developed country, and one from a small island developing state. The elected members will serve 2-year terms. The A6.4 Supervisory Body is responsible for establishing the requirements and processes for operation of the mechanism (CMI, 2021; UNFCCC, 2022). The Article 6.4 mechanism is not expected to be operational until the end of 2024 at the earliest (GGGI, 2023).

Activities implemented under Article 6.4 mechanism must (i) ensure overall reduction in global emissions, preventing any net increase; (ii) achieve mitigation of emissions that is additional, including reducing emissions and increasing removals and mitigation co-benefits of adaptation actions and/or economic diversification plans; (iii) apply Article 6.4-approved methodologies that ensure real, transparent, conservative, credible, and below business-as-usual emissions reductions; (iv) minimise risk of non-permanence and leakage while avoiding adverse social and environmental consequences; (v) have been approved by the A6.4 Supervisory Body, including updated methods transitioned from the CDM or those developed by countries or other non-party stakeholders; (vi) engage in consultation with local and sub-national stakeholders, as appropriate, including local communities and indigenous peoples; and (vii) obtain approval from a host country that is a party to the Paris Agreement, has an NDC in place, and possess a designated national authority responsible for overseeing Article 6.4 activities (CMI, 2021; UNFCCC, 2022).

Emissions reduction units (A6.4ERs) are generated from emissions reductions and removal activities and exclude activities occurring before 2021. Crediting periods vary; for reductions, they are 5 years, renewable twice, or for a single non-renewable period of 10 years. For removals, they are 15 years, renewable twice if deemed appropriate and subject to approval by the A6.4 Supervisory Body. A6.4ERs are housed in an Article 6.4 registry, which will be developed and operated in accordance with the guidance provided by the A6.4 Supervisory Body. The A6.4 Secretariat will serve as the registry administrator and operator. A6.4ERs are authorised and undertake corresponding adjustments for utilisation within an NDC or for other international mitigation purposes beyond NDCs (e.g. CORSIA) (CMI, 2021; UNFCCC, 2022)

To prevent any instances of double-counting, parties must implement corresponding adjustments for both A6.4ERs authorised for NDCs and those authorised for international mitigation purposes. Moreover, Article 6.4 mandates a minimum of 2% of the issued A6.4ERs to the account for cancellation for delivering overall mitigation in global emissions. Additionally, 5% of the A6.4ERs must be allocated to the Adaptation Fund as a share of a proceeds levy (UNFCCC, 2022). Consequently, the corresponding adjustment process must encompass these units that are earmarked for the fund (CMI, 2021; UNFCCC, 2022). This specific requirement applies exclusively to Article 6.4 and not to Article 6.2.

The COP27 extended A6.4ERs into two distinct categories:

- (i) **Authorised emissions reductions.** A6.4ERs that are authorised for use towards achievement of NDCs and/or for other international mitigation purposes pursuant to paragraph 42<sup>4</sup> of the rules, modalities, and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement (UNFCCC, 2022).

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<sup>4</sup> 'The host Party shall provide a statement to the Supervisory Body specifying whether it authorises A6.4ERs issued for the activity for use towards achievement of NDCs and/or for other international mitigation purposes as defined in decision 2/CMA.3. If the host Party authorises any such uses, the Party may provide relevant information on the authorization, such as any applicable terms and provisions. If the host Party authorises A6.4ERs for use for other international mitigation purposes, it shall specify how it defines "first transfer" consistently with paragraph 2(b) of the annex to decision 2/CMA.3'.

- (ii) **Mitigation contribution units.** A6.4ERs that are not specified as authorised for use towards achievement of NDCs and/or for other international mitigation purposes may be used for results-based climate finance, domestic mitigation pricing schemes, or domestic price-based measures to contribute to the reduction of emissions levels in the host party (UNFCCC, 2023a). Mitigation contribution units are not required for a corresponding adjustment. Although their use emphasises domestic application, their eligibility for the international voluntary offset market remains uncertain, which raises concerns about the potential for private companies to engage in 'greenwashing' by making offset claims using non-authorised units.<sup>5</sup> To prevent misuse, it is imperative that mitigation contribution units serve as a legitimate measure for companies to provide climate finance, supporting mitigation efforts in developing countries, rather than solely as a means for claiming voluntary credits to meet net-zero emissions targets.

Carbon Emission Reductions (CERs) issued under the CDM may be utilised to meet a NDC requirement, but with certain conditions. Specifically, these CERs can only be used if the associated project was registered after 2012 during the Kyoto Protocol's second commitment period. In such cases, these CERs will be transferred from the CDM registry to the Article 6.4 mechanism registry and classified as pre-2021 emissions reductions. These pre-2021 CERs can only contribute to the achievement of a first NDC, and no corresponding adjustment or share of proceeds levy is required for their transfer or use. The CDM no longer registered, extended crediting periods, or issued CERs for emissions reduction activities after 2020. However, existing CDM-registered activities have the opportunity to transition to and register under the Article 6.4 mechanism.

To transition existing CDM activities, project participants had to submit their requests to the Article 6.4 Secretariat and the CDM host country no later than 31 December 2023. The approval of these requests must be conveyed to the Article 6.4 Supervisory Body by the CDM host country by 31 December 2025. During this transition period, CDM activities may continue to use the currently approved CDM methodology until either their current crediting period expires or until 31 December 2025, whichever comes first. Afterward, they must adopt an approved Article 6.4 methodology (CMI, 2021; UNFCCC, 2022).

In addition to the transition of CDM activities, financial resources from the CDM Trust Fund will be allocated for various purposes, including (i) US\$30 million to support the expedited establishment of the Article 6.4 mechanism, (ii) US\$10 million to aid capacity building for the Article 6.4 mechanism in developing countries and to facilitate the transition of eligible CDM activities to Article 6.4, and (iii) US\$20 million to contribute to the Adaptation Fund.<sup>6</sup>

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<sup>5</sup> For instance, consider a company in Country A that claims to offset its emissions through voluntary credits from Country B. Such claims would not count towards Country A's national emissions commitment.

<sup>6</sup> IEA, Bioenergy with Carbon Capture and Storage, <https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage/bioenergy-with-carbon-capture-and-storage>; IEA, Carbon Capture, Utilisation and Storage, <https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage>

## 2.3. Pending Matters of Article 6

The regulations outlined in Article 6 represented the concluding element of the Paris Agreement upon their approval at the COP26. However, further deliberations are still necessary to establish the requisite guidance for their implementation. Although there was a tendency amongst parties to converge on various operational matters during the COP28, the final draft did not garner adequate consensus (UNFCCC, 2024). Consequently, these unresolved issues will be revisited during the 60th session of the UNFCCC Subsidiary Body for Scientific and Technological Advice in June 2024 and the COP29 in November 2024. The following are summaries of pending matters pertaining to Articles 6.2 and 6.4.

Regarding Article 6.2, guidance concerning the authorisation of ITMOs remains unsettled, with ongoing discussions on the potential for revocation of authorisation in cases such as human rights violations, a point contested by some parties due to concerns about double-counting (Krishnamurthy and Dev, 2024; Marcos, 2023; Crook, 2023). Additionally, there is an absence of concrete measures within Article 6.2 to protect the rights of indigenous peoples and local communities (Johnstone and Reséndiz, 2024, Pairojmahakij and Ganz, 2023). Deliberations will also extend to the establishment of an international registry, particularly in terms of its interface with the registry specified in Article 6.4 (Marcos, 2023). Furthermore, discussions will involve the reporting of transactions, including the scope of information and format for annual carbon-trading reports, with particular attention to issues of confidentiality.

Regarding Article 6.4, the centralised nature of the mechanism in Article 6 has led to slower development and uptake compared to cooperative approaches, with expected operationalisation not occurring before 2025 (Johnstone and Reséndiz, 2024). Ongoing discussions amongst parties focus on negotiating guidance and standards for calculating emissions reductions and removals from projects, with consideration of the definition of removals (Marcos, 2023; Johnstone and Reséndiz, 2024; Latham & Watkins, 2023; UNFCCC, 2023b). While the A6.4 Supervisory Body defines removals as outcomes of processes that remove greenhouse gases from the atmosphere through anthropogenic activities and then destroy or store them, concerns have been raised about the lack of specificity, particularly regarding the duration and permanence of carbon storage. This ambiguity could lead to projects that only temporarily store carbon being classified as removals, without ensuring long-term mitigation of emissions (Krishnamurthy and Dev, 2024).

Furthermore, debates persist regarding the treatment of REDD+<sup>7</sup> activities under Article 6.4. Some argue that REDD+ activities should be considered as emissions reduction, removal, or possibly a distinct category under Article 6.4. The lack of clarity on this issue has prompted a request for the A6.4 Supervisory Body to consider whether REDD+ activities should be included under Article 6.4 until 2028 (Latham & Watkins, 2023). Additionally, emissions avoidance is not currently permitted as a method for issuing carbon credits under Article 6, although negotiators have been tasked with reassessing this at the COP28. Stakeholders are growing impatient with the centralised United Nations mechanism, with delays potentially driving more projects towards the more advanced Article 6.2 (Krishnamurthy and Dev, 2024; Latham & Watkins, 2023). This delay has spurred interest in regional initiatives like an Association of Southeast Asian Nations (ASEAN) regional carbon market (Pairojmahakij and Ganz, 2023).

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<sup>7</sup> REDD stands for reducing emissions from deforestation and forest degradation in developing countries, while the '+' indicates additional forest-related activities that protect the climate, such as sustainable management of forests and the conservation and enhancement of forest carbon stocks.

### 3. Development of Voluntary Carbon Markets in ASEAN

All ASEAN Member States (AMS), with the exception of Brunei Darussalam, have experience with market-based mechanisms through CDM projects under the Kyoto Mechanism and JCM projects through bilateral collaborations with Japan. This experience has played a crucial role in familiarising these countries with carbon-crediting mechanisms, facilitating the development of some VCMs in the region.

AMS are actively exploring opportunities, considering benefits, and evaluating how participation in carbon markets could assist in achieving their NDCs. Except for Malaysia, all other AMS either welcome or maintain a neutral stance towards international cooperation through VCMs under Article 6. As of March 2024, five countries – Japan, Republic of Korea, Norway, Singapore, and Switzerland – have signed bilateral agreements with some AMS regarding carbon markets. For Japan, collaborations involve almost all AMS except Brunei Darussalam, Malaysia, and Singapore. Norway recently signed a bilateral agreement with Indonesia (GGGI, 2023). After signing a bilateral agreement with Viet Nam, the Republic of Korea also began approaching other potential partners such as Cambodia, Lao PDR, Myanmar, Philippines, and Thailand. Although Thailand is the only AMS with which Switzerland currently collaborates, the partnership on the E-Bus Programme is the first authorised Article 6 programme in Asia (South Pole, 2023; World Bank, 2023).

Key developments of VCMs in AMS are summarised in Table 11.5. Detailed information on VCMs in ASEAN is included in the Annex.

**Table 11.6. Voluntary Carbon Markets in ASEAN**

	Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Experience with CDM (number of registered projects)	0	10	156	24	157	3	77	5	155	260
Experience with JCM projects (number of active projects)	0	5	36	4	0	8	6	0	42	30
Trading platform for voluntary carbon market	0	0	IDXCarbon	0	BCX	0	0	CIX	FTIX	By 2025

	Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
MOU partners for cooperation under Article 6 (or equivalent)	0	Japan, Singapore, Korea	Japan, Singapore, Norway	Japan, Korea	0	Japan, Korea	Japan, Korea	As a buyer	Japan, Singapore, Switzerland, Korea	Japan, Singapore, Korea

BCX = Bursa Carbon Exchange, CDM = Clean Development Mechanism, CIX = Climate Impact X, FTIX = Federation of Thai Industries Exchange, IDXCarbon = Indonesia Carbon Exchange, JCM = Joint Crediting Mechanism, Lao PDR = Lao People's Democratic Republic, MOU = memorandum of understanding.

Notes:

1. As of 31 March 2024.
2. Although the review found no records of official MOUs between these countries and the Republic of Korea, the cited references revealed that the cooperation is either in the process of negotiation or has been implemented.

Source: Author.

## 4. Challenges for Carbon Market Initiatives in the Lao PDR Energy Sector

Lao PDR has gained familiarity with carbon markets through its involvement in projects such as the CDM and JCM (Latham & Watkins, 2023; UNFCCC, 2023). Yet participation has primarily been by the private sector, with limited direct engagement from the government, specifically the Ministry of Agriculture and Forestry. This ministry, however, has been involved in the REDD+ project supported by the World Bank under the Forest Carbon Partnership Facility (Saysanavong, 2023b; World Bank, 2021b). The government is cautious about establishing a new mechanism, whether for compliance or VCMs, due to perceived complexities (Saysanavong, 2023a). This section explores the potential challenges that Lao PDR may face in developing a carbon market and carbon-crediting mechanism for energy-related projects.

## 4.1. Regulatory Framework

MNRE is currently drafting a decree on the National Climate Change Committee and a decree on carbon credit-trading management (Vientiane Times, 2024; Saysanavong, 2023b). However, the latter decree only applies to carbon credits generated by Lao PDR forests for sale on international markets. As of this writing, these decrees have yet to be launched, so it remains unclear to what extent mitigation efforts from the energy sector will be covered. For instance, it is uncertain whether energy-related projects will be subject to the same regulatory framework for participation in carbon trading under the Paris Agreement or if there will be a separate management system for registration, database maintenance, monitoring, verification, and reporting (MRV). The lack of robust policies or regulations pertaining to energy-related carbon crediting may hinder the energy sector's ability to participate in VCMs.

## 4.2. Technical Expertise and Institutional Capacity

A challenge for Lao PDR lies in its limited capacity to access carbon markets, which is accentuated by its reliance on foreign experts for project documentation. Another issue is the limited institutional capacities and cross-sectoral coordination for mainstreaming climate-change mitigation into development plans (Saysanavong, 2023b).

## 4.3. Effective Measurement, Reporting, and Verification System

While Lao PDR has a basic greenhouse gas inventory system in place, it is not sufficient for tracking project implementation for carbon trading or crediting. Establishing reliable baselines for emissions reduction projects, along with an effective MRV system for emissions, is foundational for participating in carbon markets and crediting mechanisms.

## 5. Policy Direction and Recommendations

The following outline policy directions and recommendations for the development of carbon market initiatives in Lao PDR's energy sector.



## 5.1. Align Policy Objectives of Carbon Market Initiatives

Policymakers must establish objectives and prioritise the roles of carbon markets and crediting in the context of Lao PDR. This step is crucial in shaping the ecosystem of the carbon market as well as the country's participation in international VCMs. Policy objectives for Lao PDR should include:

- (i) **Reduce emissions and contribute to meeting NDC targets.** A domestic crediting mechanism would assist in emissions abatement as well as contribute to achieving Lao PDR's NDC targets. However, international cooperation under Article 6 approaches may not provide substantial benefits in meeting a Lao PDR's NDC targets, as mitigation outcomes from the project will need corresponding adjustments. Under the Article 6.2 approach, the sharing ratio of mitigation outcomes will depend on the agreement between Lao PDR (the host country) and the acquiring countries (e.g. Japan shared at least 80% of issued credits for most JCM projects). Similarly, with international carbon trading through Article 6.4 or independent crediting mechanisms, participating countries must adjust their national emissions inventories accordingly based on the traded credits. For instance, if Lao PDR, as the host country, sells credits to a buying country, the emissions that are equivalent to the traded credits are accounted for in Lao PDR's emissions inventory.
- (ii) **Generate government revenue and capitalise debt swaps with creditors.** *The 9th National Socio-Economic Development Plan Financing Strategy (2023–2025)* acknowledges that ETSs could generate a significant amount of revenue for Lao PDR (Government of Lao PDR, 2023). Implementing such schemes will require the development of guidelines, procedures, systems, and capacity building to be cost-effective. Mandating carbon or emissions trading projects to register and to trade under the administration of a national registry will generate revenue for the government, irrespective of whether it is a mandatory ETS or a VCM. Additionally, the strategy considers debt-for-nature swaps as an innovative fiscal policy. This concept can be applied to the Article 6.2 approach by cooperating with creditor countries. For instance, using generated credits for interest repayments can be integrated into negotiation strategies to alleviate the debt burden. This may be more suitable for nature-based activities due to lower costs compared to energy-related activities.
- (iii) **Mobilise green investment and measure the benefits.** VCMs and crediting mechanisms can channel private or foreign investments into climate-change mitigation activities in Lao PDR. Foreign investors can invest in specific projects to obtain carbon credits through Article 6 approaches or independent crediting mechanisms. Additionally, the methodologies used in crediting mechanisms can be utilised by the government and private investors to estimate the emissions reduction value of a particular measure or to understand the emissions reduction impact of a financial investment. This approach is used in results-based climate finance, which relies on the ability to measure, in a cost-effective way, the actual emissions reduction performance of a specific investment. Consequently, it provides a tangible investment opportunity that can attract investments from a broad range of financial players. As issued carbon credits are used as a metric of performance for results-based climate finance – but not for meeting the financial providers' NDCs – these credits are defined as mitigation contribution units under Article 6.4 and are not obliged to corresponding adjustments.

- (iv) **Promote low-carbon development and local environmental benefits.** In many developing countries like Lao PDR, prioritising the development of emerging economic sectors or addressing local environmental issues often takes precedence over emissions mitigation. Carbon-crediting mechanisms, however, offer the potential to generate additional benefits beyond simply reducing emissions. They can serve as a financial incentive for businesses to adopt cleaner technologies, thereby facilitating climate-change mitigation alongside other objectives such as enhancing air quality, safeguarding water resources, and promoting soil health and biodiversity. Additionally, there are social and economic advantages, including improved energy access, job creation through the implementation of new technologies, enhanced livelihoods, and support for the early commercialisation of emissions reduction technologies or products. Furthermore, while Article 6 may not be the primary approach for meeting a host country's NDCs, activities undertaken within its framework must ensure environmental integrity and promote sustainable development, thus yielding environmental benefits.
- (v) **Gauge the market response toward carbon-pricing signals.** According to the *9th National Socio-Economic Development Plan Financing Strategy (2023-2025)*, Lao PDR is undertaking the study of the feasibility of environmental fiscal reform, including introducing a carbon tax (Government of Lao PDR, 2023). In this context, a crediting mechanism could be an option if there are barriers, such as legal hurdles or political resistance, to implementing a mandatory ETS or carbon tax. Thus, a crediting mechanism may serve as a good starting point to send a carbon-pricing signal and build familiarity with market mechanisms. Furthermore, by assessing the market sensitivity to carbon-pricing signals, Lao PDR can evaluate whether there will be sufficient supply and demand for credits before embarking on a mandatory or voluntary domestic ETS.
- (vi) **Provide offset options for corporate climate objectives and compliance obligations.** VCMs and crediting mechanisms can facilitate stronger voluntary commitments to emissions abatement, particularly where mandatory carbon pricing is absent or for entities not subject to mandatory policies or emissions constraints. These approaches provide a source of credible emissions reductions that businesses and other organisations can use to voluntarily offset their emissions. As Lao PDR is considering a carbon tax for financing environmental and climate priorities, VCMs and crediting mechanisms can offer additional flexibility to compliance options by allowing offsets in addition to tax payments. Yet to ensure that there is sufficient supply for the domestic carbon market, jurisdictions may limit the domestic carbon credits to trade in international markets. Most jurisdictions that allow the use of offsets limit them to either credits from domestic carbon markets or carbon trading that apply corresponding adjustments to ensure that the outcomes contribute to achieving their NDCs.<sup>8</sup> In contrast, internationally transferred carbon credits that do not undergo corresponding adjustments should not be used to meet NDCs.

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<sup>8</sup> For example, Singapore is the first country to implement a carbon tax with an offsetting mechanism that aligns with the requirements of Article 6 under the Paris Agreement (NCCS, 2023). By setting offsetting criteria compliant with Article 6, all emissions offset through international platforms contribute to national emissions reduction. These carbon credits are compulsory for corresponding adjustments, making them eligible for claiming emissions reductions towards meeting NDCs.

## 5.2. Enhance the Regulatory Framework and Market Infrastructure

As the national focal point for climate change, MNRE is working towards Lao PDR's participation in VCMs, including the introduction of regulatory frameworks and market infrastructure for carbon trading and the development of governance frameworks for Article 6 (Saysanavong, 2023a). These efforts are focussed on nature-based activities. If Lao PDR plans to explore the potential of carbon trading beyond forest contributions, however, the regulatory framework must be expanded. Establishing clear guidelines for project approval and MRV is crucial to ensure effective governance of carbon trading. Additionally, Lao PDR should consider setting a threshold to limit international carbon trading from domestic mitigation activities to ensure that mitigation actions contribute to achieving NDC targets by 2030 and net-zero emissions by 2050.

## 5.3. Strengthen the Measurement, Reporting, and Verification System

Establishing a comprehensive MRV structure to generate accurate and reliable data is fundamental for any carbon-pricing instrument. Reliable baselines for emissions reduction projects under VCMs and crediting mechanisms are essential for determining additionality and accurately quantifying emissions reductions. Defining baselines for these projects can be complex and may require extensive data collection and analysis.

Most importantly, regardless of whether the energy sector is included in the carbon trading framework, an MRV system is helpful for policymakers in shaping climate-change mitigation policy and measures. Establishing standard guidelines for MRV should be a priority for Lao PDR. Doing so will bring advantages such as developing databases for carbon-crediting mechanisms, accounting for national emissions inventory for UNFCCC reporting, tracking progress towards NDC and net-zero emissions targets, evaluating the effectiveness of climate-change mitigation policies and measures, and assessing the potential for carbon-pricing compliance.

## 5.4. Enhance International Cooperation

Collaborating with international partners, including neighbouring countries and international organisations, to align Lao PDR's carbon market initiatives with global standards and best practices will enhance its credibility and facilitate access to international markets. Indeed, the Government of Lao PDR, Government of Australia, and Global Green Growth Institute are partnering to support the development of a carbon market in Lao PDR, aligning with the principles outlined in Article 6 of the Paris Agreement (GGGI, 2023b). Moreover, in an effort to bolster knowledge and capacity, the Government of

Lao PDR and Government of the Republic of Korea conducted a knowledge-sharing workshop focussed on creating a master plan to implement a carbon-trading system in Lao PDR; it marked a starting point for emissions trading between Korea and Lao PDR in the future (Vientiane Times, 2023). Lao PDR should also encourage public and private sectors to explore potential collaborations with Japan through the JCM by disseminating information on JCM's crediting mechanism and benefits gained from previous JCM projects (Saysanavong, 2023b).

In addition to bilateral cooperation, Lao PDR could capitalise on opportunities for capacity building and regional policy frameworks under ASEAN, such as participating in the development of guidelines and standards that benefit both Lao PDR and the region. These guidelines and standards can be adopted according to the local context, which is not only more cost-effective but also crucial in ensuring that Lao PDR remains competitive in the ASEAN energy market.

For example, harmonised regional standards of minimum energy performance standards for air conditioners are relevant to Lao PDR (ACE, 2020). These standards help lower the cost of energy systems, improve the uptake of more efficient equipment, reduce energy consumption and emissions, increase efficiency, and facilitate ease in trading. Another example pertains to the taxonomy for green investment. One of the identified issues under the *9th National Socio-Economic Development Plan Financing Strategy (2023–2025)* is to have a clearer taxonomy for green investment (Government of Lao PDR, 2023; 2024). Lao PDR may refer to the ASEAN Taxonomy for Sustainable Finance while developing and adopting its own taxonomy. All this information can be transformed into capacity knowledge and integrated into negotiation strategies when establishing cooperation with international partners (ASEAN Taxonomy Board, 2024).

Lao PDR can also leverage its ASEAN chairpersonship by expressing interest in seeking regional collaboration in specific areas to address capacity or policy gaps, such as advocating for the development of regional harmonised standards or guidelines on energy-related emissions MRV, as well as methodologies for quantifying the impacts of mitigation actions in terms of tCO<sub>2e</sub>.

## 5.5. Mainstream Climate Change and Strengthen Cross-Sectoral Coordination

Lao PDR has set a long-term goal to achieve net-zero emissions by 2050. Mainstreaming the idea of climate change will reinforce the integration of climate-change considerations across different sectors. Policy coordination across sectors is crucial to ensure policy effectiveness, a just transition, and inclusivity. This coordination is particularly important for policies shaping carbon market initiatives and crediting mechanisms.

As mentioned previously, carbon market initiatives in Lao PDR focus on nature-based activities and are governed by MNRE. *The 9th National Socio-Economic Development Plan Financing Strategy (2023–2025)* does not mention carbon trading and crediting beyond nature-based activities. While the common objective is to incentivise climate-change mitigation activities, the role of a carbon-crediting policy in the forest sector may differ from that in the energy sector. Under the Article 6 approach, carbon credits generated from forests may raise revenue for the government; in the energy sector, projects could facilitate low-carbon development through knowledge or technology transfer.

The UNEP Copenhagen Centre has recorded projects under Article 6.2 that dominate the energy-efficiency industry and solar sectors. In Lao PDR, there were five JCM projects in the energy sector between 2017 and 2022, with total expected emissions reduction of 19,751 tCO<sub>2e</sub> per year. This indicates the potential for energy-related projects and trading mitigation outcomes under the Article 6.2 approach; this potential should be acknowledged when shaping policies.

The decree on the National Climate Change Committee will be crucial in ensuring effective cross-sectoral coordination. Additionally, engaging stakeholders – including local communities, indigenous groups, and civil society organisations – in the design and implementation of carbon market initiatives is vital for ensuring social and environmental integrity and maximising co-benefits.

## 5.6. Enhance Capacity-Building Programmes

Building technical expertise and institutional capacity within government agencies, private sector entities, and civil society organisations to understand, implement, and monitor carbon market initiatives is key. Capacity-building programmes can be conducted with international cooperation. For example, Lao PDR may seek support from organisations like the Global Green Growth Institute or Asian Development Bank in developing carbon markets aligned with Article 6. Potential areas requiring capacity building in Lao PDR include identification of appropriate mitigation activities for trading under Article 6, governance of ITMO authorisation and corresponding adjustments, and development of climate-change mitigation activity design documents.

In addition to technical aspects, strengthening institutional capacity in negotiation strategies will maximise benefits from a carbon market, such as integrating debt swaps, human rights, health, and environmental safeguards into negotiations. These capacity-building programmes should involve all relevant stakeholders across sectors, particularly for mitigation measures that potentially generate carbon credits.

Furthermore, conducting MRV capacity building for corresponding agencies and reporting entities, as well as capacity building for competent accredited bodies and verifiers (e.g. ISO 14065), is crucial. This will streamline the carbon-trading process and prepare Lao PDR for reporting biennial transparency reports under the Paris Agreement. Moreover, active participation in reviewing other country reports submitted to the UNFCCC can enhance capacity in MRV and policy development. Lao PDR, through its roster of experts,<sup>9</sup> can learn from other countries' best practices and lessons.

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<sup>9</sup> Experts who are nominated by their respective governments through the national focal points of the Parties under the UNFCCC.

## 6. Policy Implication for the Next Nationally Determined Contribution

Under the Paris Agreement, parties are required to submit their NDCs every 5 years; 2025 is the next year, including for Lao PDR, that second NDCs must be submitted. It is crucial to plan now and to implement innovative and efficient approaches to align country priorities with targeted expertise, finance, and technical assistance.

Lao PDR intends to use the Article 6 approach to meet its NDC targets, although there is no explicit direction from the government regarding the inclusion of energy-related measures in this approach. Drawing from the discussions on carbon market development in this chapter, the following are key recommendations for Lao PDR to consider when formulating its next NDC, particularly concerning conditional targets:

- (i) **Consider utilising the Article 6 approach for implementing energy-related measures.** Despite the absence of carbon market initiatives in the energy sector in the *9th National Socio-Economic Development Plan Financing Strategy (2023–2025)*, there is significant potential, especially through cooperation such as the JCM, on energy efficiency and renewable energy projects.
- (ii) **Define the roles of carbon market initiatives in the energy sector.** Prioritise the objectives of carbon market initiatives, considering financing needs and long-term benefits for low-carbon development.
- (iii) **Revise energy-related NDC targets to incorporate carbon market and crediting approaches.** Despite the absence of carbon market initiatives in the energy sector in the current national socio-economic development plan, there is significant potential, especially through cooperation such as the JCM, on energy efficiency and renewable energy projects.
- (iv) **Formulate conditional NDC targets with estimated contributions to global emissions reduction.** Formulate conditional targets in plans and strategies, explicitly describing quantifiable mitigation impacts as global emissions reductions instead of domestic emissions reductions, due to the consequence of corresponding adjustments if conditional targets are achieved through Article 6 approaches.

MNRE and the Ministry of Energy and Mines must coordinate when preparing the next NDC. It is anticipated that the National Climate Change Committee will facilitate cross-sectoral coordination. By including carbon market initiatives in the next NDC, the development of regulatory and governance frameworks for carbon trading in energy-related activities will follow. Additionally, this will open doors for international investors to collaborate with Lao PDR's energy sector through Article 6 approaches.

## Annex: Carbon Markets across ASEAN

**Brunei Darussalam.** Brunei Darussalam lacks prior experience in carbon markets, including the Clean Development Mechanism (CDM) or Joint Credit Mechanism (JCM) (UNFCCC, 2022). Despite this, the nation is actively working towards establishing a carbon-trading mechanism under the Brunei Darussalam National Climate Change Policy. Currently, the Brunei Climate Change Secretariat is exploring opportunities to meet nationally determined contributions (NDCs) through voluntary carbon markets (VCMs) (ACE, 2022).

**Cambodia.** The implementation of Cambodia's NDC is projected to require US\$7.8 billion by 2030. To achieve the 2050 target, there is a need for both public and private investments to increase from US\$500 million annually to US\$2.5 billion. This financial commitment encompasses the execution of *Cambodia's Action and Investment Plan for the National REDD+ Strategy*, aimed at achieving ambitious emissions reductions in the forest sector at an estimated cost of US\$185.7 million by 2031 (UNDP, 2022). During 2016–2020, the country generated US\$12 million from trading in VCMs with international companies (UNDP, 2022). Furthermore, at the 2022 United Nations Climate Change Conference (COP27), Cambodia committed to entering contracts with international corporate buyers for around 15 million tonnes of carbon credits from REDD+ projects (Chandara, 2022). Drawing from past experiences, including CDM projects, Cambodia is actively exploring engagement in Article 6 and a VCM (UNFCCC, 2022). This exploration is conducted with support from the United Nations Development Programme and the Global Green Growth Institute (GGGI), with a focus on identifying fast-track and high-integrity actions to finance its NDC implementation (UNDP, 2022; GGGI, 2023). Prior to the Paris Agreement, Cambodia collaborated with the Korea Forest Service through the REDD+ project, resembling the mechanisms outlined in Article 6. Under this collaboration, a portion of generated forest carbon credits was shared between the Republic of Korea and Cambodia, while the remaining credits were traded in VCMs to support forest-dependent communities in enhancing their livelihoods through incentives from the sale (Clarke, 2023). Additionally, Singapore has entered into a bilateral agreement with Cambodia to cooperate on the implementation of Article 6, adding to existing partnerships with the Republic of Korea and Japan's JCM projects (MOTI, 2023).

**Indonesia.** Indonesia draws on extensive experience in carbon markets, notably through initiatives such as the CDM and JCM (UNFCCC, 2022).<sup>10</sup> Leveraging these past endeavours positions Indonesia well in the establishment of its national crediting mechanism. The regulatory framework for carbon crediting was articulated within the scope of a 2021 presidential regulation on carbon pricing (World Bank, 2021a). In line with these guidelines, the Indonesian Carbon Exchange (IDXCarbon) was officially inaugurated in September 2023, operating under the regulatory framework outlined in the Financial Services Authority (OJK) Regulation No. 14 of 2023 (OJK, 2023). IDXCarbon provides a transparent, orderly, fair, and efficient trading system, functioning as a platform for various trading mechanisms, including auctions, regular

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<sup>10</sup> GEC, Projects/Studies, The Joint Crediting Mechanism (JCM), <https://gec.jp/jcm/projects/> [accessed 20 November 2023]

trading, negotiated trading, and marketplace activities (IDXCcarbon, 2023). Beyond its collaboration with Japan through the JCM, Indonesia has a bilateral agreement with Singapore. This agreement aims to explore opportunities within the framework of Article 6 of the Paris Agreement, showcasing Indonesia's commitment to international cooperation and engagement in the evolving landscape of carbon markets (NCCS, 2022).

**Lao People's Democratic Republic (Lao PDR).** Lao PDR has gained familiarity with carbon markets through its involvement in projects like the CDM and JCM (UNFCCC, 2022). However, the private sector has primarily constituted the participants, with the government's (specifically, the Ministry of Agriculture and Forestry) direct engagement limited to the REDD+ project, supported by the World Bank under the Forest Carbon Partnership Facility (Saysanavong, 2023; World Bank, 2021). A challenge lies in the country's limited capacity to access carbon markets, accentuated by a reliance on foreign experts for project documentation. Consequently, the government is cautious about establishing a new mechanism, whether for compliance or VCMs, due to perceived complexities (Saysanavong, 2023). Complicating matters further, there is a notable absence of existing policies or regulations pertaining to carbon credits within Lao PDR. Recognising these challenges, a collaborative effort has been initiated by the Government of Lao PDR, Government of Australia, and GGGI (GGGI, 2023b). This partnership aims to provide support for the development of a carbon market in Lao PDR, aligning with the principles outlined in Article 6 of the Paris Agreement. Moreover, in an effort to bolster knowledge and capacity, the Government of Lao PDR and Government of the Republic of Korea conducted a knowledge-sharing workshop that signifies a starting point for the potential revitalisation of carbon trading between the Republic of Korea and Lao PDR (*Vientiane Times*, 2023).

**Malaysia.** Malaysia has engaged in the CDM without establishing any bilateral agreements with other nations (UNFCCC, 2022). However, a significant development occurred when the Malaysian stock exchange introduced the Bursa Carbon Exchange (BCX) in December 2022, marking the world's first shariah-compliant VCM (Bursa Malaysia, 2023a). On 16 March 2023, the BCX successfully conducted Malaysia's inaugural carbon credit auction, drawing interest from 15 local buyers, particularly prominent in the financial sector. This resulted in the purchase of 150,000 Verra-registered carbon credits. The Government of Malaysia has also allocated a seed fund of around US\$2.2 million to bolster carbon credits generated within the country (Bursa Malaysia, 2023a). The BCX commenced trading and facilitation of off-market transactions of carbon credits in September 2023. By the close of its second day of trading, 10 companies from various industries transacted a total of 16,500 Verra-registered carbon credits (Bursa Malaysia, 2023d). Entities, both foreign and local, meeting eligibility criteria, can register and participate in trading activities on the BCX (Bursa Malaysia, 2023b). Additionally, the launch of the VCM handbook in October 2023 signifies a pivotal step (Bursa Malaysia, 2023c). This comprehensive project development toolkit outlines the VCM concept, VCM mechanism specific to Malaysia, eligible project types, guidance on formulating a VCM project along with its methodologies, and case studies. The creation of this VCM ecosystem underscores Bursa Malaysia's objective of attracting international project developers and investors. The goal is to foster the development of high-quality carbon projects in Malaysia, thereby facilitating the exchange of knowledge, skills, and capital crucial for the rapid scaling up of carbon initiatives in the country. Apart from the federal initiatives, the state of Sarawak recently passed the Environment (Reduction of Greenhouse Gases Emission) Bill, which covers forests and land within Sarawak's boundaries, governing activities such as afforestation and reforestation, the utilisation of land for carbon sink and storage, and related matters concerning financial benefits derived from these initiatives (Jee, 2023). The bill aims to establish a robust system for project verification and validation, overseen by appointed carbon standards administrators, ensuring the integrity and credibility of carbon credits issued in Sarawak (Lee, 2023). This measure positions Sarawak to actively participate and benefit from carbon markets.



**Myanmar.** Myanmar has gained experience in carbon-market mechanisms through projects like the CDM and JCM, but the number of initiatives remains limited. Additionally, there is a scarcity of public information concerning carbon market development in the country. The absence of transparent rules for allocating forest carbon rights to local communities and project developers poses a significant obstacle to implementing forest carbon projects for both voluntary and regulatory markets. For instance, a key challenge faced by the Myanmar REDD+ Programme is the design of a fair and equitable system for allocating results-based payments (R.P. Myanmar, 2017). In response to these challenges, GGGI has collaborated with the government to develop an investment case for coastal landscape mangrove restoration, initially focussing on the Ayeyarwady Region. This collaboration involves creating a supportive policy environment, analysing potential natural capital value chain returns, assessing benefit-sharing considerations, and identifying financing needs (R.P. Myanmar, 2017). Concurrently, Vlinder, a climate tech company, has partnered with the Worldview International Foundation for the Vlinder Myanmar Blue Carbon project, which aims to restore degraded mangrove areas in the Ayeyarwady Region, benefiting vulnerable communities.<sup>11</sup> Yet despite capacity building through GGGI's support programme, carbon credits from the project are still operated by a reseller in an opaque and unregulated market (Hodgson, 2022). The credits were reportedly controlled by a reseller and sold at nearly three times the price initially agreed upon with Worldview International Foundation. This highlights the need for a robust domestic VCM framework and a solid regulatory foundation to attract investors for collaboration under Article 6 of the Paris Agreement. In a positive development, Myanmar is one of the countries that the Republic of Korea is considering for bilateral collaboration under Article 6 (Korea Energy Agency, 2023). The Republic of Korea has further pledged financial and technical support for the Korea–Myanmar REDD+ Joint Project (*Global New Light of Myanmar*, 2023). Consequently, the Republic of Korea could emerge as a potential partner for international cooperation with Myanmar in participating in VCMs.

**Philippines.** The Philippines has garnered experience in carbon-market mechanisms through CDM and JCM projects. Apart from the ongoing collaboration with the Government of Japan for the JCM, a Japanese startup specialising in rice cultivation projects has entered into an agreement with the Government of the Philippines for a 45-million-tonne carbon reduction initiative (KLiK, 2023). This project aims to generate carbon credits by sequestering carbon in forests, reducing methane through paddy field management, and implementing changes in agricultural practices. The company is contemplating registering this project under the JCM. Except with Japan under the JCM, the Philippines has not yet entered into bilateral agreements with other countries to cooperate in a VCM under Article 6 of the Paris Agreement. Nevertheless, the Republic of Korea may soon approach the Philippines for such cooperation (Desk and Laos, 2022; Korea Energy Agency, 2023).

**Singapore.** Due to physical space limitations, high cloud cover, and urban shading, the scalability of renewable energy in Singapore is restricted. This constraint on domestic carbon abatement options has led Singapore to engage in international cooperation through carbon credits. This approach has become an integral part of the country's measures to achieve its decarbonisation goals, complementing its domestic mitigation efforts. It also positions Singapore as a carbon services and trading hub, aligned with Singapore's Green Plan (NEA, 2022). This vision involves creating a space where businesses can acquire high-quality carbon credits from Asia and beyond to offset their emissions. In May 2021, Climate Impact X (CIX) was established by DBS Bank, Singapore Exchange, Standard Chartered, and Temasek

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<sup>11</sup> Vlinder Austria, Vlinder Myanmar Blue Carbon, <https://vlinderclimate.com/vlinder-myanmar-blue-carbon>

(Climate Impact X, 2021a). CIX operates as a marketplace, auction house, and exchange for trusted carbon credits, with the goal of scaling the VCM. The CIX Marketplace offers a curated selection of nature- and technology-based projects aligned with corporate sustainability objectives. CIX Auctions provides a specialised platform for determining the value of unique and desirable projects, newly issued credits, and customised project portfolios. Meanwhile, the CIX Exchange facilitates two-way spot trading, enabling the sale of large-scale, high-quality carbon credits through standardised contracts and individually listed carbon credit projects, primarily catering to multi-national corporations and institutional investors. The CIX's pilot auction, CIX Marketplace, and the CIX Exchange were launched on 21 November 2022, 16 March 2022, and 8 June 2023, respectively (Climate Impact X, 2021b; 2022; 2023). In addition to the CIX Exchange, ACX emerged as another regulated carbon trading platform in Singapore in 2022. The firm expanded its initial focus beyond the CORSIA market, now offering voluntary carbon credits generated from renewable energy projects, clean stoves, and nature-based solutions.<sup>12</sup> Other key players shaping Singapore's carbon landscape include the International Emissions Trading Association and Asia Carbon Institute. The former provides a regional foundation to support its carbon market initiatives, while the latter serves as a registry that certifies and issues carbon credits generated from technology-based and urban-related carbon removal solutions. Moreover, Singapore has entered into bilateral agreements with four neighbouring countries – Cambodia, Indonesia, Thailand, and Viet Nam – to collaborate on emissions reduction under Article 6 of the Paris Agreement (MOTI, 2022a; 2022b; 2023; NCCS, 2022).

**Thailand.** Thailand stands out as one of the most active participants in the CDM in the Association of Southeast Asian Nations (ASEAN), particularly in its collaboration with Japan through the JCM. Drawing from these experiences, Thailand explored carbon markets as early as 2014, introducing the Thailand Voluntary Emissions Reduction (T-VER) programme (TGO, 2022). To amplify the impact of the T-VER, the Thailand Greenhouse Gas Management Organisation (TGO) joined forces with Verra in August 2022. During fiscal year 2023, the trade volume of the T-VER reached 857,102 tonnes of carbon dioxide equivalent (tCO<sub>2e</sub>), a total value of nearly US\$2,000, and an average price per tonne of US\$2.30. These figures experienced a decline of 28%, 64%, and 26%, respectively, compared to 2022.<sup>13</sup> In a partnership between the Federation of Thai Industries (FTI) and TGO, the Federation of Thai Industries Exchange (FTIX) was inaugurated on 22 September 2022 (Thadaphrom, 2022). FTIX serves as a carbon credit trading platform connected to the T-VER. It empowers private companies and government agencies to engage in carbon credit trading and to monitor their emissions through an online dashboard. Further, regarding Article 6 of the Paris Agreement, Thailand has bilateral agreements with Singapore, Switzerland, and potentially the Republic of Korea, in addition to its existing collaboration with the Japan through the JCM (Korea Energy Agency, 2023; MOTI, 2022; KLiK, 2023). Notably, the partnership with the Government of Switzerland via the KLiK programme represents a milestone, as it is the first authorised Article 6 programme in Asia and the second globally (South Pole, 2023; World Bank, 2023). The KLiK programme since 2023 has facilitated the flow of climate finance from Switzerland to the Bangkok E-Bus Initiative, which works at integrating electric vehicles into privately-operated public transport. This exemplifies Thailand's remarkable climate leadership, particularly in adopting the ITMOs approach under Article 6.2.

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<sup>12</sup> ACX, <https://acx.net/about-us/>

<sup>13</sup> TGO, Carbon Market, <https://carbonmarket.tgo.or.th/index.php?lang=EN&mod=Y2hhcnQ=&action=bGlzdA==>

**Viet Nam.** Viet Nam boasts extensive experience in carbon market mechanisms, with its registered projects under the CDM and JCM ranking as the largest and second largest, respectively, amongst ASEAN Member States. The pilot National Crediting Mechanism is scheduled to commence in 2024, with full operational status anticipated by 2026, aligning with the crediting mechanisms under Article 6 of the Paris Agreement.<sup>14</sup> Viet Nam actively seeks international collaboration, evident in its bilateral agreements with Singapore and the Republic of Korea, complementing the existing partnership with Japan through the JCM (MOTI, 2022b; Investment and Trade Promotion Centre, 2023). Notably, CT Group, a prominent multi-industry economic group in Viet Nam, inaugurated the ASEAN Carbon Credit Exchange Joint Stock Company in September 2023 (Investment and Trade Promotional Centre, 2023). It offers comprehensive consultancy for enterprises, organisations, and individuals in developing carbon credit projects, understanding carbon offset and credit mechanisms, and navigating the application of carbon taxes at both the regional and global levels. Viet Nam is set to initiate a carbon credit exchange in 2025, coupled with capacity-building initiatives and public awareness campaigns to propel carbon market development.

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<sup>14</sup> ICAP, Vietnam, <https://icapcarbonaction.com/en/ets/vietnam>

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