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Deliverable 3

Assessment of Potential Impacts of the Proposed Carbon Trade Exchange Pilot Model in Vietnam

VIETNAM CARBON TRADE EXCHANGE - PILOT PREPARATION WITH MINISTRY OF FINANCE

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DELIVERABLE 3 REPORT

Vietnam Carbon Trade Exchange
Pilot Preparation with Ministry of Finance, Phase 2

Assessment of Potential Impacts of the Proposed
Carbon Trade Exchange Pilot Model in Vietnam

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COLOPHON AND DISCLAIMER

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

CAPEX	Capital Expenditure
CBAM	Carbon Border Adjustment Mechanism
CEX	Centralized Exchange
CTX	Carbon Trading Exchange
DCC	Department of Climate Change
ENPV	Economic Net Present Value
ETP	Southeast Asia Energy Transition Partnership
ETS	Emissions Trading System
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GHG	Greenhouse Gas
HNX	Hanoi Stock Exchange
JETP	Just Energy Transition Partnership
MAE	Ministry of Agriculture and Environment
MOF	Ministry of Finance
MRV	Measurement, Reporting, and Verification
NDC	Nationally Determined Contribution
NPV	Net Present Value
NRS	National Registry System
OPEX	Operating Expenditure
SCM	Subsidies and Countervailing Measures
SME	Small and Medium-sized Enterprises
SSC	State Securities Commission
TBT	Technical Barriers to Trade
UNOPS	United Nations Office for Project Services
VNX	Vietnam Exchange
VSDC	Vietnam Securities Depository and Clearing Corporation
WTO	World Trade Organization

EXECUTIVE SUMMARY

This report presents a comprehensive impact assessment of the proposed pilot Carbon Trade Exchange (CTX) model as an important platform for the emissions trading system (ETS) in Vietnam, conducted under the Technical Assistance project *"Vietnam Carbon Trade Exchange – Pilot Preparation with the Ministry of Finance" (Phase 2)*. It evaluates financial feasibility, socio-economic and environmental impacts, institutional readiness, and international alignment, providing evidence-based recommendations for policymakers.

Vietnam's carbon market framework has advanced significantly. The 2020 Law on Environmental Protection and Government's Decree No. 06/2022/ND-CP issued on 7 January 2022 on greenhouse gas (GHG) emission mitigation and ozone layer protection established the mandate for a domestic carbon market. The framework was operationalised through the Government's Decree No. 119/2025/ND-CP issued on 9 June 2025, amending and supplementing certain articles of Decree No. 06/2022/ND-CP, which formally defines the CTX as a centralised trading platform for allowances and credits, and the National Registry System (NRS) as the authoritative ledger. Prime Minister's Decision No. 232/QD-TTg on 24 January 2025 approved the roadmap for piloting the carbon market through 2028 and full implementation from 2029.

Building on these legal foundations, this Deliverable 3 evaluates the economic, social, environmental, and institutional implications of the CTX pilot model proposed in the *Draft Decree on the Domestic Carbon Exchange* prepared by the Ministry of Finance (MOF) and introduced to the public since March 2025.

The Draft Decree defines the CTX as a centralised trading system for GHG emission allowances and eligible carbon credits, operated by the Hanoi Stock Exchange (HNX) and supported by the Vietnam Securities Depository and Clearing Corporation (VSDC). The Ministry of Agriculture and Environment (MAE) manages the NRS as the official ledger for recording ownership and transactions, ensuring data integrity and coordination between registry, exchange, and settlement functions. Together with the State Securities Commission (SSC), these institutions form an integrated framework linking environmental regulation and financial-market supervision.

The CTX pilot (2025–2028) will initially cover the thermal power, cement, and steel sectors and serve as the operational platform of Vietnam's ETS. Its design draws upon existing securities-market infrastructure to ensure transparency, accountability, and operational reliability while minimising setup costs.

The analysis confirms that the CTX is a public-interest investment that generates substantial socio-economic and environmental value even though it is not financially self-sustaining in the short term.

- Under all modelled scenarios, the financial Net Present Value (NPV) remains negative because pilot-phase revenues (membership and transaction fees) are waived to encourage participation.
- However, the economic NPV (ENPV) is consistently positive, indicating significant public benefits from lower compliance costs, enhanced market efficiency, and emission reductions.

- The CTX helps mitigate potential GDP losses under Vietnam's Nationally Determined Contribution (NDC) implementation while fostering technological upgrading and institutional capacity building across government agencies and enterprises.

Policy Recommendations for Sustaining CTX Effectiveness

This report outlines a coherent fiscal and institutional transition pathway to move the CTX from a subsidised pilot to a resilient, self-financing platform that continues to deliver long-term socio-economic and environmental benefits.

(a) Fiscal transition plan and diversified revenue sources

During the pilot phase, state budget support remains essential to ensure stable operations and system maintenance. However, from 2029 onward, a phased fiscal transition should be implemented to gradually reduce reliance on public funding. This transition involves:

- Introducing service-fee mechanisms (e.g. membership, transaction, and data-access fees) in a staged manner, aligned with market maturity and transaction volume.
- Establishing auction-based revenues through periodic allowance sales once the ETS enters full operation, using proceeds to finance system upgrades, capacity building, and market oversight.
- Exploring ancillary services such as certification, reporting, and analytical data services operated under cost-recovery principles.

These diversified revenue streams will secure the CTX's financial sustainability while maintaining affordability for participants and ensuring reinvestment in market development.

(b) Robust market mechanisms and operational resilience

To safeguard market efficiency and credibility, the CTX must adopt a sequenced mechanism design that evolves with the market's maturity:

- In early operation, maintain transparent trading through a centralised order-matching system managed by HNX, applying daily price-fluctuation limits and clear disclosure standards.
- Progressively integrate fee- and auction-based instruments once trading volume stabilises to strengthen price discovery and liquidity.
- Maintain continuous coordination with MAE to ensure that the NRS–CTX–VSDC linkage functions securely and that emission units are traceable and verifiable across all systems.
- Institutionalise independent auditing, surveillance, and reporting to preserve market integrity and investor confidence.

(c) Accountable governance and institutional coordination

Sustained effectiveness requires a transparent and predictable governance structure anchored in existing legal mandates:

- Formalise the division of responsibilities among MOF, MAE, HNX, VSDC, and SSC through detailed regulations and standard operating procedures.

- Establish inter-ministerial coordination mechanisms for policy review, incident response, and capacity building.
- Ensure that all CTX revenues and expenditures are subject to public financial disclosure, reinforcing accountability and trust.
- Strengthen human-resource capacity through targeted training in MRV (Measurement, Reporting, and Verification), compliance auditing, market supervision, and IT security.

In conclusion, the CTX delivers clear socio-economic and environmental value as a public investment and an essential component of Vietnam's transition to a low-carbon economy. To sustain this value under constrained fiscal conditions, policy efforts must focus on building diversified revenue streams, robust market mechanisms, and accountable governance structures.

With these measures in place, the CTX can progress from a state-supported pilot to a self-financing and resilient market platform that contributes directly to the achievement of Vietnam's NDCs and strengthens national credibility in implementing climate-change commitments. The CTX should therefore be viewed not merely as a trading venue but as a strategic policy instrument that underpins Vietnam's green transition and long-term economic competitiveness.

1 INTRODUCTION

1.1 Background

Vietnam is committed to achieving its ambitious climate goals, including the pledge to reach net-zero emissions by 2050. A core instrument for meeting these commitments is the establishment of a domestic carbon market, designed to help the country achieve its Nationally Determined Contribution (NDC) in the most cost-effective manner. By applying carbon pricing and creating tradable emission units, the market will enable regulated entities to meet their compliance obligations at lower cost, while also stimulating investment in cleaner technologies.

The development of this market is firmly grounded in national legislation and policy. The 2020 Law on Environmental Protection (Article 139) and Decree No. 06/2022/ND-CP laid out the foundation and roadmap for carbon market development. Most importantly, the Prime Minister's Decision No. 232/QD-TTg (24 January 2025) confirmed the government's plan to establish a Carbon Trade Exchange (CTX) and assigned clear responsibilities to specific government bodies. This Decision provides both a legal and political mandate to move from high-level policy design to practical implementation of the CTX as the central platform for trading emission allowances and carbon credits.

Recognising the need for a clear operational model, the Ministry of Finance (MOF) is receiving technical assistance from the Southeast Asia Energy Transition Partnership (ETP) managed by the United Nations Office for Project Services (UNOPS). Phase 1 (completed 2024) assessed Vietnam's readiness, reviewed international best practices, and recommended leveraging existing securities market infrastructure for an efficient and transparent CTX.

Building on those findings, Phase 2 *"Vietnam Carbon Trade Exchange: Pilot Preparation with the Ministry of Finance"* focuses on detailed implementation and capacity building for MOF officials. The project document was officially approved by MOF on 26 April 2024, with ETP/UNOPS supporting its implementation as part of broader assistance for Vietnam's carbon market development. On 2nd January 2025, the Consultant team was selected to implement the TA and officially commenced the project. On 25 March 2025, the first version of the *Draft Decree on the domestic carbon trade exchange* was released by MOF for public consultation.

Since the launch of the Draft, the Consultant team has adjusted the working approach to reflect this key policy development in the project's focus from proposing a new model to analysing and refining the existing draft as detailed in Deliverable 2. Furthermore, the MOF requested that the consultation workshop organised on 17 July 2025 be focused on the recommendations for the latest available draft of the Decree. This draft becomes the primary basis for the detailed analysis and recommendations in Deliverable 2 onwards.

In Decision No. 232/QD-TTg, a clear governance structure has been established to guide this process. The MOF leads the setup and key arrangements for the operation of the CTX, while the Ministry of Agriculture and Environment (MAE) oversees the overall carbon market framework. The Hanoi Stock Exchange (HNX) operates the trading platform, and the Vietnam Securities Depository and Clearing Corporation (VSDC) manages clearing and settlement-leveraging decades of securities market expertise to ensure efficiency and reliability. The Draft Decree further

elaborates the mandates, reporting and management arrangements, and the hierarchy among these entities and other participants in the CTX.

Building on Deliverable 2, which provided the detailed operational design of the CTX pilot, setting out governance arrangements, transaction procedures, and supervisory mechanisms needed for the system's initial operation, Deliverable 3 takes the next step by conducting a comprehensive impact assessment of the proposed CTX pilot model, evaluating its economic, environmental, social, institutional, and international implications. In doing so, it seeks to inform policymakers, businesses, and development partners as they navigate the opportunities and challenges involved in building a functional carbon market in Vietnam.

Note: Since Vietnam's ETS will be implemented and transacted through the CTX, this assessment treats "CTX vs. no CTX" as effectively identical to "ETS vs. no ETS," since the platform's effects are inseparable from the policy's effects. This framing ensures that the economic, social, and environmental impacts analysed here capture the combined outcomes of both the trading platform and the ETS.

1.2 Objectives and scope

The objective of this Deliverable is to assess the policy impacts of Vietnam's proposed pilot CTX model, with the aim of providing insights that support evidence-based policymaking for its development and implementation. This evaluation is conducted in line with the regulatory framework for public investment projects, while excluding construction-related components. Specifically, the analysis concentrates on three core dimensions: the financial effectiveness of the CTX, its broader socio-economic implications, and its anticipated impacts on the economy, society, and environment.

The establishment and operation of the CTX constitute a form of public investment. Accordingly, the assessment of policy impacts related to Vietnam's proposed pilot CTX model must comply with existing regulations governing the evaluation of public investment programs and projects. These regulations require initial, mid-term (or phase), and final evaluations aimed at reviewing progress, assessing effectiveness, and recommending appropriate adjustment measures. In particular, the assessment must be conducted in accordance with Article 77 of the 2024 Law on Public Investment, which defines the scope of evaluation to include:

- Current socio-technical operational status: This involves examining the operational structure of the CTX and the policies for its operation, in conjunction with Vietnam's ETS under various scenarios of Vietnam's NDC. This analysis will provide assumptions for assessing financial, socio-economic, and environmental effectiveness, as well as any arising compliance costs of administrative procedures.
- Socio-economic impacts: This section will evaluate the financial and socio-economic effectiveness (including aspects such as employment, income, prices, and gender issues, etc.) of the CTX's operation process, covering both the pilot phase (2025-2028) and the full operational phase (2029-2030).
- Environmental and ecological impacts: This content focuses on how the CTX impacts greenhouse gas (GHG) emissions and green transition under Vietnam's ETS, according to different updated 2022 NDC scenarios (conditional and unconditional).

- Project sustainability: This section assesses how fee collection and non-fee collection mechanisms, as well as emission allowance auctions, impact the project's operational capacity and financial effectiveness. It also considers the appropriate investment scale to ensure the CTX's efficiency.
- Lessons learned from the investment policy, investment decisions, implementation, and operation of the CTX.

1.3 Methodology

A range of advanced qualitative and quantitative research methods is applied under this research. The flexible combination of these methods ensures the objectivity, scientific rigour, and practical relevance of the analytical results.

Review of existing regulations

This review aims to establish the legal and institutional framework for the assessment related to CTX operation, including:

- Identify laws, decrees, circulars, and decisions directly and indirectly related to the carbon market and public investment activities.
- Analyse the consistency, overlaps, or gaps in current regulations for CTX implementation.
- Assess the compatibility of Vietnam's legal framework with international environmental and trade commitments.

Cost Benefit Analysis and Financial-Socio-Economic Effectiveness (NPV, ENPV)

This is a quantitative method to assess the feasibility and benefits.

- **Cost benefit analysis:** Quantifies the CTX pilot (2025–2028) and initial roll-out (2029–2030) by monetising direct costs (capital expenditure - CAPEX and operating expenditure - OPEX) and direct revenues (membership, listing, and transaction fees, set to zero during the pilot, with alternative schedules modelled for 2029–2030), plus indirect effects (GHG reductions valued with shadow carbon prices aligned to the NDC pathway, local air-quality co-benefits, market-efficiency gains, and enterprise compliance/adjustment costs). Key assumptions are summarised in Section 3.
- **Effectiveness metrics:** Net Present Value (NPV) assesses financial viability from the Government/operator perspective; Economic Net Present Value (ENPV) captures net socio-economic benefits including externalities. Scenario and sensitivity analyses are applied; a positive Economic Net Present Value indicates a net social benefit. Detailed results are presented in Section 3.

The input data sources

The economic and environmental impact assessment of the pilot CTX model was conducted by combining qualitative and quantitative methods to ensure objectivity and scientific rigour. The data used in the analysis were collected through a review of existing regulations, as well as domestic and international experience. The details of each source for the input data used in various scenarios are presented in Section 3 and Annexes.

Stakeholder consultation

This method aims to gather expert opinions, multi-dimensional perspectives, and confirm findings from individuals and organisations affected by or with expertise related to the CTX, ensuring the comprehensiveness and practical basis of the analyses. Activities already implemented include organising workshops and focus group discussions at the MOF, Department of Climate Change (DCC) under MAE, HNX, and with domestic and international experts.

SWOT Analysis

This analytical tool systematically identifies the internal Strengths and Weaknesses of the CTX model, as well as external Opportunities and Threats. It is particularly useful in socio-environmental impact assessment to provide a multifaceted view of factors directly and indirectly affecting the project.

Policy benchmarking

This method analyses the limitations and shortcomings of related policies and the institutional structures, regulations, market design, monitoring, and enforcement mechanisms of international CTXs. The aim is to analyse the impacts on administrative procedures for stakeholders when operating the CTX, between the NRS and the CTX, corresponding to administrative procedures and business costs. Additionally, it compares Vietnam's approach with other successful ETSs globally to identify opportunities for improvement to provide suitable recommendations for Vietnam.

2 REGULATORY AND INSTITUTIONAL BASELINE

2.1 Purpose and linkage to Deliverable 2

This baseline reviews the legal basis, institutional roles, and market-design parameters from the analysis of the operational model under Deliverable 2 and existing regulations related to the design and operation of the CTX. It provides a set of quantified inputs for impact assessment under Deliverable 3. It focuses on: (i) cost drivers and revenue levers for the CTX; (ii) compliance obligations affecting enterprise costs and government administration; and (iii) governance features relevant to market integrity and World Trade Organization (WTO)/Paris Agreement alignment.

While Deliverable 2 defines the CTX structure, governance, and procedures, Deliverable 3 applies those design features-together with any legal updates-to the cost–benefit and legal-risk analyses. The parameters extracted here feed directly into: (a) the Economic impact assessment (CAPEX and OPEX inputs; fee scenarios; trading-volume and price assumptions; compliance-cost assumptions); and (b) the Legal and administrative screening (asset status, allocation and fee design, market-conduct provisions, and WTO/Paris Agreement interfaces).

2.2 Legal basis and market roadmap

Vietnam’s carbon-market architecture rests on a sequenced set of instruments that move the system from principle to operation. The overview of the legal framework for the development of the carbon market in Vietnam is depicted in the following Figure:

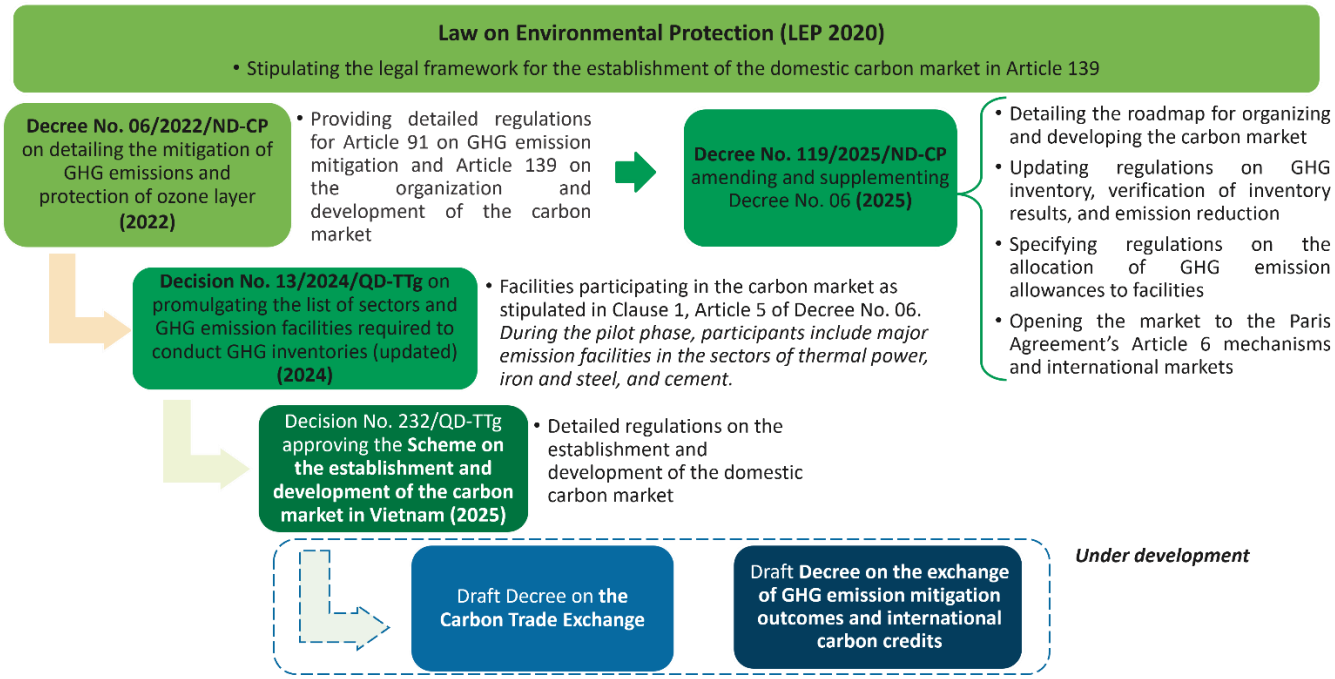


Figure 1: Overview of the legal framework for the development of the carbon market in Vietnam

Source: Elaborated by the Consultant

The 2020 Law on Environmental Protection (Article 139) mandates the development of a domestic carbon market; Government Decree No. 06/2022/ND-CP, which detailed regulations on GHG emission mitigation and ozone layer protection, translates that mandate into a first roadmap. Then, Government Decree No. 119/2025/ND-CP amends and supplements Decree 06 to provide operational rules-most notably by formalising the CTX as a centralised trading venue and the NRS as the authoritative ledger managed by MAE. These steps convert high-level design into actionable procedures for allocation, trading and compliance, giving regulators and participants the legal certainty needed for a pilot market.

The national roadmap approved by the Prime Minister in Decision No. 232/QD-TTg sets the tempo: complete the legal and infrastructure groundwork and pilot the domestic trading floor through end-2028; then move to full operation from 2029 with ongoing framework refinement and capacity building. This sequencing is explicit in the Decision's objectives and timeline for the exchange's launch and maturation. Therefore, in Deliverable 3, the investment and operating profiles, and the introduction of auctioning as a revenue lever from 2029, are timed to this roadmap in the economic scenarios.

Operationally, Decree No. 119/2025/ND-CP provides the compliance mechanics and pilot scope that underpin trading-volume and compliance-cost assumptions. Three sectors, thermal power, cement and steel, enter the initial allowance allocation; covered entities may borrow up to 15% of their allocation within a cycle (borrowing is not tradable) and may use domestic offset credits for up to 30% of their obligation; MAE is empowered to approve eligible offset methodologies and projects to build domestic credit supply. *These parameters are the core behavioural "levers" in the modelling of liquidity, offsetting demand and administrative workload.*

The registry is a critical path item: MAE's Decision No. 1162/QD-BNNMT sets the NRS milestones, trial operation by June 2025, official operation in August 2025, and integration with the CTX, VSDC and payment systems by November 2025. The NRS's role as the master ledger is reaffirmed in Decree No. 119/2025/ND-CP, including account procedures and data-sharing with the exchange. *These dates shape the phasing of capital investment and operational readiness for Deliverable 3, while registry–exchange synchronisation informs throughput and operational-risk assumptions.*

At the exchange level, the **Draft Decree on the Domestic Carbon Exchange**[1] clarifies the operating rulebook relevant to costs, revenues and integrity. It defines the Carbon Trading System (operated by the Hanoi Stock Exchange, HNX), the Carbon Transaction Settlement System (operated by VSDC with settlement banks), and immediate settlement per transaction (simultaneous transfer of units and funds if both sides have sufficient balances). Trading and depository members are licensed securities companies. Principles of fairness, publicity and transparency apply, and prohibited conduct includes fraud, misrepresentation and price manipulation. Only verified units, GHG emission allowances and eligible carbon credits, recorded in the NRS, can be admitted for trading, and MAE may instruct HNX to remove ineligible commodities. *Accordingly, under Deliverable 3, the settlement model and surveillance obligations are mapped to operating expenditure, the member structure and listing/admission rules frame potential fee bases, and the integrity provisions feed the legal/market-order analysis.*

Finally, the roadmap anticipates allowance auctions from 2029, alongside continued framework completion and a possible broadening of scope. This pivot matters for fiscal flows (auction receipts) and for price discovery and liquidity design. Hence, Deliverable 3 analysis reflects auction timing and fee policy that will constitute the principal revenue scenarios, while any future expansion of sectors or credit types is treated as sensitivity rather than base case.

In sum, Deliverable 3 takes the following as fixed parameters for the base scenarios: pilot sectors (thermal power, cement, steel); surrender cycle and penalties; borrowing cap (15%) and offset cap (30%); NRS go-live and integration milestones; exchange definitions of commodities and participants; immediate per-trade settlement via VSDC and settlement banks; and integrity rules (fairness-transparency and anti-manipulation). These inputs drive the capital and operating cost profiles, the trading volume and price paths, and the legal screens in the assessment in the later sections.

2.3 Roles and interactions of the involved institutions

The efficient operation of the CTX requires close coordination among various specialised agencies and organisations, each playing a crucial role in establishing and maintaining market activities. The roles of the key parties in operating the CTX are elaborated in the Draft Decree on the Domestic Carbon Exchange and summarised as follows:

MAE: focus on environmental and market oversight focus

- **Roles:** Supervises trading to detect/manage manipulation; responsible for the integrity of commodities admitted for trading; co-leads inspections with the State Securities

[1] Consultant. (2025). *Draft No. 5 was shared with the Consultant for technical analysis on 15 July 2025*

Commission (SSC); co-chairs the inter-agency coordination protocol (data exchange, security, incident handling); gives opinions on surveillance criteria and operating rules.

- **Implications for analysis of impact on costs/benefits under Deliverable 3:** MAE's gatekeeping and supervision inform compliance-cost assumptions for operators and the legal screens on commodity integrity.

SSC under MOF: Financial market regulator

- **Roles:** Co-inspects operators with MAE; gives opinions on VSDC and Vietnam Exchange (VNX) operating rules; receives time-critical reports from settlement banks when payment operations are impaired or when eligibility conditions lapse.
- **Implications for analysis of impact on costs/benefits under Deliverable 3:** Establishes surveillance/reporting obligations that drive operators' OPEX and shape legal-compliance assumptions.

VNX under SSC: Market rulemaking and second-line surveillance

- **Roles:** Issues surveillance criteria and operational rulebook (with MAE/SSC opinions); admits/suspends trading members; supervises HNX and trading members; reports surveillance outcomes to MAE; coordinates incident responses with MAE/SSC.
- **Implications for analysis of impact on costs/benefits under Deliverable 3:** VNX surveillance and rule-maintenance are recurring OPEX; their fee items (admission/listing/transactions) are modelled post-pilot.

VSDC: depository and unit settlement

- **Roles:** Issues its operating rules (with SSC/MAE opinions); provides depository and settlement services; admits/suspends/terminates depository members; ensures infrastructure and business continuity; reports regularly to MAE.
- **Implications for analysis of impact on costs/benefits under Deliverable 3:** Depository/settlement infrastructure and reconciliations are CAPEX/OPEX; depository/settlement fees are modelled post-pilot.

HNX: trading system operator (front-line surveillance)

- **Roles:** Operates the carbon trading system; implements procedures under VNX rules; conducts front-line surveillance per VNX criteria; coordinates incident reporting; provides trade data to VSDC for settlement.
- **Implications for analysis of impact on costs/benefits under Deliverable 3:** Trading engine, market-data and surveillance stacks are capital expenditure (CAPEX) and OPEX drivers; fee levers are assumed to be zero during pilot, with options tested for 2029–2030.

Settlement banks – payment rails for trade settlement

- **Roles:** Report immediately to SSC and VSDC when payment operations are partially/fully paralysed; report within 24 hours to SSC if the bank no longer meets eligibility.
- **Implications for analysis of impact on costs/benefits under Deliverable 3:** Bank fees and incident-response obligations affect operating cost and working-capital timing assumptions.

Trading members (licensed securities companies) – access intermediation

- **Roles:** Provide client access and trading services; must satisfy VNX reporting metrics; maintain accurate order data and adequate balances prior to trade.
- **Implications for analysis of impact on costs/benefits under Deliverable 3:** Member base underpins liquidity/trading-volume scenarios and feasible fee schedules post-pilot.

Depository members (licensed securities companies) – deposit & post-trade

- **Roles:** Maintain client unit accounts at VSDC; comply with VSDC rules and reporting; process transfers and segregate assets.
- **Implications for analysis of impact on costs/benefits under Deliverable 3:** Service-level and compliance requirements shape VSDC throughput and operator OPEX.

In the current draft version of the Decree, reporting and supervision lines run primarily to MAE and SSC, while MOF is not listed as a primary addressee or operator in these provisions.

3 ECONOMIC IMPACT ASSESSMENT

3.1 Investment-cost profile

In this study, the initial CAPEX for establishing a CTX is analysed under two scenarios: Scenario A - low (essential) and Scenario B - high (enhanced). These scenarios are based on the platform's complexity, integrated features, security requirements, and scalability. While primary references often relate to the development costs of general financial trading platforms or cryptocurrency exchanges due to similarities in technological infrastructure, these estimates are adapted to project the costs for a CTX in Vietnam, assuming comparable costs depending on scale and specific technical requirements.

3.1.1 Scope and costing principles

This subsection defines the boundary of one-time investments required to pilot the CTX and the assumptions underpinning the estimates. It clarifies what is treated as CAPEX versus OPEX so that the subsequent economic analysis uses consistent inputs. Cost anchors for the trading platform are calibrated to external benchmarks (see sources used in Table 1); Other third-party figures (e.g., surveillance stack, cybersecurity, market-data services) draw on vendor quotations and industry benchmarks as listed in Table 1.

Based on the Decree 119/2025/ND-CP that regulates two groups of participants in the CTX, and the Draft Decree on the Domestic Carbon Exchange on the institutional arrangements for CTX (anchoring the CTX system to the existing systems of HNX and VSDC), the following assumptions are made: (i) use the existing HNX and VSDC core where feasible; (ii) no central counterparty clearing; immediate per-trade settlement via the VSDC and designated settlement banks; (iii) three pilot sectors (thermal power, cement, steel); (iv) fee-free pilot, with auctions only from 2029; (v) OPEX (hosting, licences, staffing, security operations) is detailed in Section 3.2.

The concrete components that must be procured or configured for the pilot to serve as a structured checklist for budgeting, drafting requests for proposals, and allocating costs among HNX, VSDC, and the MAE (NRS) are summarised in Table 1.

Table 1: Mapping key stakeholders managing and operating CTX with related cost components

ID	Component (operator)	Scope of procurement/ configuration	Key deliverables (outputs)	Key interfaces	Cost anchor (sources)
A	**Trading system build-out (HNX)**	Configure instruments, order workflows (incl. negotiated trades), controls, reporting, testing, training	Matching and order handling; price bands/halts; trade reports; basic market-data (Scenario A) / real-time feed (Scenario B)	HNX → VSDC (trade feed); MAE/NRS (unit eligibility)	see Table 1
B	**NRS integration (MAE)**	Eligibility checks at admission; account sync; data exchange; application-programming interfaces (APIs)	Registry connectors; eligibility validation; periodic synchronisation	NRS ↔ HNX; NRS ↔ VSDC	Consultant's calculations[2]
C	**VSDC & settlement-bank integration (VSDC)**	Delivery-versus-payment flows; reconciliation; exception handling	DvP interface; settlement confirmations; exception queues	HNX ↔ VSDC; VSDC ↔ settlement banks	Consultant's calculations
D	**Market-surveillance tooling (HNX/VNX)**	Rules engine, alerts, case management, audit trails	Threshold & pattern rules; alert triage; case files; audit logs	HNX ↔ VNX (surveillance data); reports to SSC/MAE	see Table 1
E	**Cybersecurity & hardening (HNX/VSDC)**	Identity/access, privileged-access, key management, penetration tests, disaster-recovery playbooks	Identity and Access Management (IAM)/Privileged Access Management (PAM); Public Key Infrastructure (PKI)/Hardware Security Module (HSM) setup; pen-test reports; Disaster Recovery (DR) DR runbooks	All CTX components; Security Operations Center (SOC) processes	see Table 1
F	**Market data & analytics (HNX)**	Real-time feed, tick history, operator dashboards	Publish/subscribe feed; tick store; ops dashboards	HNX → members/VNX; archival	see Table 1
G	**Member onboarding portal & documentation (HNX/VSDC)**	Onboarding workflows; KYC (Know Your Customer)/AML (Anti-Money Laundering)	Portal; developer docs; self-service test environment	Members ↔ HNX/VSDC	Consultant's calculations

[2] Consultant. (n.d.). *All calculations by the consultant are made based on the Excel model, unless otherwise stated*

		hooks; API docs; sandbox			
H	**Training & change management (HNX/VSDC/MAE)**	Operator run-books; member training; cutover exercises	Training packs; Standard Operating Procedure (SOP)/run-books; go-live rehearsal	All operators & members	Consultant's calculations
I	**Project management, quality assurance & UAT (Project team)**	Planning; test management; acceptance; go-live	Project plan; test cases; User Acceptance Testing (UAT) sign-off; cutover checklist	All vendors & operators	Consultant's calculations
J	**Platform infrastructure (HNX/VSDC)**	Incremental hardware/appliances or initial cloud setup; network	Provisioned compute/storage/network; baseline observability	All CTX components	see Table 1
K	**Contingency (Project)**	Budget for integration variance and security findings	Controlled change budget; issue remediation	Cross-cutting	Consultant's calculations

Source: Compiled by the Consultant

Scenario features: Scenario A delivers essentials (negotiated trades, end-of-day reporting, threshold-based surveillance). Scenario B adds real-time data, pattern-based surveillance, enhanced resilience and security.

- All third-party figures are consolidated in Table 1 (Source column).
- "Consultant's calculations" are parameterised in Section 3.4 and cross-referenced in Table 1 for transparency.

3.1.2 Implementation scenarios

CTX cost items and features

This subsection presents two implementation pathways, i.e., Scenario A and Scenario B. So, decision-makers can match investment depth to readiness, timelines, and integrity needs. Both pathways are upgradeable and align with the pilot-then-scale roadmap. The description of the features of each cost item under each Scenario is presented in Table 2.

Table 2: CTX cost items and features under each Scenario

No	Title of cost item	Feature	
		Scenario A	**Scenario B**
1	**Trading Platform**	Minimum viable emissions trading platform with core/essential functions; simple configuration, no complex customisations.	Comprehensive platform with advanced features, higher throughput processing, and customisations for market requirements.

2	**Development Process**	Fixed end-to-end software development process	Fixed end-to-end software development process (same as low scenario).
3	**User Interface / User Experience Design for a Centralised Exchange (UI/UX for CEX)**	Basic UI/UX for clarity and ease of use without premium customisations.	Premium, fully customised UI/UX with professional charting tools (e.g., TradingView) and performance tuning.
4	**Blockchain Infrastructure**	Minimum public blockchain setup to enhance transparency and prevent double-counting of carbon credits.	More robust public blockchain with customisations/optimisations for performance and scalability.
5	**Security and Encryption for a Centralised Exchange**	Essential controls: DDoS protection, two-factor authentication (2FA).	Enterprise-grade controls: cold storage, smart-contract auditing (if blockchain is applied), and advanced data-protection protocols.
6	**Deployment and Hosting for a Centralised Exchange**	Basic deployment/hosting on dedicated servers or entry-level cloud services.	Scalable cloud deployment with load balancing and redundancy for high traffic and transaction volumes.
7	**Total Capital Expenditure (CAPEX)**	Basic CTX features for a cost-minimising pilot while ensuring operational capability.	High investment vs low scenario; advanced features, comprehensive security, and modern infrastructure geared to international-standard operations.

Source: Elaborated by the Consultant

The trading-platform costs covered as CAPEX and OPEX, references used for third-party figures, are consolidated in Table 3. The notes on the inclusion and exclusion and milestones constrain delivery used in Table 3 are as follows:

- **Included (capital expenditure):** Software configuration/customisation, integrations, testing, training, documentation, limited hardware/appliances or initial cloud setup, and contingency.
- **Excluded (treated as operating expenditure in Section 3.2):** Ongoing cloud/hosting, software subscriptions, 24/7 security operations, annual penetration tests, vendor maintenance, and staffing at HNX/VSDC/MAE.
- **Schedule dependencies:** NRS go-live and integration windows; VSDC/bank certification; security testing cycles.
- **Upgrade path:** If speed-to-market is the priority, adopt Scenario A for year-one pilot, then stage the critical Scenario B upgrades (surveillance, real-time data, disaster-recovery) before 2029 auctions.

Table 3: Initial CTX investment costs under each Scenario

No.	Item	Unit	Scenario A	Scenario B	Source
1	Trading Platform (Basic Overall): Cost of building the core software system for carbon credit trading.	USD	40,000	250,000	World Bank, 2025[3]
2	Development Process (Consulting, Planning, Design, Development, Testing, Launch, Maintenance): Necessary steps to create and deploy the trading platform.	USD	30,000	30,000	RisingMax, 2024[4]
3	UI/UX Design (for CEX): Creating a user-friendly and easy-to-use interface and experience for the centralised exchange.	USD	20,000	50,000	Innowise, 2025[5]
4	Blockchain Infrastructure (Public): Cost of building a public blockchain system to enhance transparency and transaction security.	USD	40,000	50,000	RisingMax, 2024
5	Security and Encryption (for CEX): Costs for measures to protect data and transactions from cyber threats.	USD	50,000	150,000	Innowise, 2025
6	Deployment and Hosting (for CEX): Costs for servers, cloud storage, and platform operational setup.	USD	10,000	50,000	Innowise, 2025
	Total CAPEX	USD	190,000	580,000	

Source: Elaborated by the Consultant

Additionally, if a CEX with the complexity of a cryptocurrency exchange were to be built, the investment cost could range from USD 420,000 - 1,240,000 (Innowise, 2025). This option is not being pursued because, for now, Vietnam should build a basic exchange suitable for its resources and primarily leverage the existing infrastructure of the current stock exchange.

In summary, the Indicative total CAPEX for each Scenario is as follows:

Scenario A: Indicative total CAPEX: **≈ USD 190,000**

- Delivers essential functionality for pilot operation and evidence-gathering (negotiated trades, end-of-day reporting to VSDC, threshold-based surveillance, registry admission checks, baseline security and training).

[3] World Bank. (n.d.). Retrieved from https://openknowledge.worldbank.org/entities/publication/46a400e3-eade-44da-a773-118492f1ce31

[4] RisingMax. (n.d.). *Carbon credit marketplace development cost*. Retrieved from https://risingmax.com/blog/carbon-credit-marketplace-development-cost

[5] Innowise. (2025). *Crypto exchange software development cost*. Retrieved from https://innowise.com/blog/crypto-exchange-software-development-cost/

- Intended for speed-to-market with minimal customisation; upgrades can be staged before auctions in 2029.

Scenario B: Indicative total CAPEX: **≈ USD 580,000**

- Adds integrity and capacity features (pattern-based surveillance with case management, real-time market data, stronger resilience/disaster recovery, deeper NRS/settlement integrations, hardened security and auditability).
- Suitable for higher volumes and pre-auction readiness.

(Calculation note: Scenario totals sum the Table 1 clusters A–K with scenario-specific scaling; model variants are documented in Section 3.4.)

3.2 Operating-cost profile

The annual OPEX of a CTX is evaluated in both scenarios. These cost assumptions are based on estimates from operating financial or cryptocurrency exchanges, due to similarities in technology, security, and personnel requirements. Key operating cost items are included in Table 4:

Table 4: CTX cost items and features under each Scenario

<table>
<tr><th rowspan="2">No</th><th rowspan="2">Title of cost item</th><th colspan="2">Feature</th></tr>
<tr><th>Scenario A</th><th>Scenario B</th></tr>
<tr><td>1</td><td>Personnel Costs</td><td colspan="2">Salaries and benefits for the CTX operation, management, and support team. This item assumes the average staff salary cost, with a reference level from the average salary of Ho Chi Minh City Stock Exchange (HoSE) employees in 2021. A 5% annual increase is applied to adjust for inflation and career development.</td></tr>
<tr><td>2</td><td>Office Rental Costs</td><td colspan="2">Expenses for office space or facilities for the exchange's operations. This analysis is based on an assumed office area of 400 m², calculated according to the standard office space allocation per staff member[6] and the additional area required for common facilities such as meeting and function rooms. This rental price is based on average statistical data for Hanoi.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Software Maintenance and Updates (CEX):</td><td colspan="2">• Recurring costs to maintain, fix bugs, and upgrade the exchange's centralised software system.
• Ongoing costs to protect the system from cyberattacks and ensure data security.</td></tr>
<tr><td>Basic maintenance costs, with an assumed cost of USD 120,000/year (equivalent to USD 10,000/month).</td><td>More frequent updates, complex system upgrades, and more in-depth technical support, necessary to maintain competitiveness and comply with new standards, with an</td></tr>
</table>

[6] Government News. (n.d.). *New regulations on standards and norms for the use of offices and public service facilities*. Retrieved from https://baochinhphu.vn/quy-dinh-moi-ve-tieu-chuan-dinh-muc-su-dung-tru-so-lam-viec-co-so-hoat-dong-su-nghiep-10225061613063274.htm

			assumed cost of USD 360,000/year (equivalent to USD 30,000/month).
4	**Technology Maintenance and Upgrades**	Represents a minimum investment in basic security protocols, with a cost of USD 20,000/year.	High Scenario: Reflects the implementation of comprehensive, continuously updated security solutions, which may include external security audit services, with a cost of USD 100,000/year.
5	**Marketing and Advertising:**	Costs to attract carbon credit buyers and sellers and enhance brand recognition for the exchange. This expenditure aims to attract participants (carbon credit buyers and sellers) and build brand recognition for the exchange.	
		Scenario A has a cost of USD 20,000/year.	Scenario B has a cost of USD 500,000/year, reflecting a more aggressive and comprehensive marketing strategy.

Source: Elaborated by the Consultant

The estimated cost items and total OPEX under each Scenario are presented in Table 5.

Table 5: OPEX items and total estimated under each Scenario

	Item	Unit	Year 0 (2025)	2026	2027	2028	2029	2030	Source
I	**Scenario A**								
Personnel and Premises	**Personnel Costs**	USD/year		118,588	124,518	130,744	137,281	144,145	Le Quang Hung, 2021[7]
	Office Rental Costs	USD/year	96,627	96,627	96,627	96,627	96,627	96,627	Thu Vien Phap Luat, 2025[8]
Technology Maintenance and Upgrades	**Software Maintenance and Updates (CEX)**	USD/year		120,000	120,000	120,000	120,000	120,000	Innowise, 2025
	Cybersecurity and Data Protection	USD/year		20,000	20,000	20,000	20,000	20,000	Henry Sheykin, 2025[9]
Marketing and Market Development Costs	**Marketing and Advertising**	USD/year	20,000	20,000	20,000	20,000	20,000	20,000	Henry Sheykin, 2025
Total OPEX (Scenario A)		**USD/year**	**116.627**	**375.216**	**381.145**	**387.371**	**393.908**	**400.772**	

[7] Le Quang Hung. (2021). *The average salary of HOSE employees in 2020 reached 30.24 million VND, Mr. Le Hai Tra received a total salary and bonus of nearly 840 million VND*. The Manager Magazine. Retrieved from https://nhaquanly.vn/luong-binh-quan-nhan-vien-hose-nam-2020-dat-3024-trieu-dong-ong-le-hai-tra-nhan-tong-luong-thuong-gan-840-trieu-dong-a4504.html

[8] Thu Vien Phap luat. (2025). *How much is the office rental price in Hanoi when the office rental market in Hanoi is attracting customers*. Retrieved from https://thuvienphapluat.vn/phap-luat-nha-dat/gia-cho-thue-van-phong-ha-noi-la-bao-nhieu-khi-thi-truong-cho-thue-van-phong-ha-noi-dang-hut-khach-205.html

[9] Sheykin, H. (2025). *Cryptocurrency exchange (Operating Costs). Finmodelslab*. Retrieved from https://finmodelslab.com/blogs/operating-costs/cryptocurrency-exchange

II	Scenario B								
Personnel and Premises	**Personnel Costs**	USD/year		142,306	149,421	156,892	164,737	172,974	Le Quang Hung, 2021
	Office Rental Costs	USD/year	96,627	96,627	96,627	96,627	96,627	96,627	Thu Vien Phap Luat, 2025
Technology Maintenance and Upgrades	**Software Maintenance and Updates (CEX)**	USD/year		360,000	360,000	360,000	360,000	360,000	Innowise, 2025
	Cybersecurity and Data Protection	USD/year		100,000	100,000	100,000	100,000	100,000	Henry Sheykin, 2025
Marketing and Market Development Costs	**Marketing and Advertising**	USD/year	500,000	500,000	500,000	500,000	500,000	500,000	Henry Sheykin, 2025
Total OPEX (Scenario B)		**USD/year**	**596,627**	**1,198,933**	**1,206,049**	**1,213,520**	**1,221,364**	**1,229,601**	

Source: The Consultant's analysis results

3.3 Revenue analysis

Given the absence of Vietnamese precedents and published fee schedules for a carbon trading venue, the indicative estimates in this report reference prevailing practices from established markets. Specifically, this analysis benchmarks against CBL (operated by Xpansiv), the leading global spot exchange for a broad range of environmental commodities, and Climate Impact X (CIX), a major Singapore-based marketplace known for its focus on high-quality carbon credits. As CBL provides a more comprehensive public fee schedule, its structure is used below to illustrate the common charges associated with environmental-market transactions (used here purely as benchmarking inputs) (Xpansiv, 2024)[10]:

- **Annual membership fees:** Nil for products listed in the venue's portfolio (benchmark: CBL/Xpansiv).
- **Monthly market-access fees:** USD 250 per user, per participant, per month; waived for the next quarter if the participant generated at least USD 750 in transaction fees in the preceding quarter. The Environmental Management Account (EMA) access fee for CBL exchange is set at Nil (benchmark: CBL/Xpansiv).
- **Transaction (market-operation) fees:** Charged to both buyers and sellers; calibrated by product type and levied per asset unit (e.g., Asset Unit, tonne of CO_2 equivalent, Unit, Renewable Energy Certificate) (benchmark: CBL/Xpansiv).
- **Administrative penalty cap:** Up to USD 100,000 for breaches of market rules (benchmark: CBL/Xpansiv).

The comparison of membership and transaction fees on selected CTXs worldwide is summarised in Table 6. These external benchmarks are employed to parameterise fee scenarios for 2029–2030. For the pilot phase, the model maintains **zero fees** to prioritise participation and evidence-gathering; any eventual CTX fee schedule will be subject to Vietnamese policy decisions, market testing, and regulatory approval.

Table 6: Comparison of membership and transaction fees on selected CTXs worldwide

Exchange	Membership/ Registration fees (annual)	Transaction fees (buyer)	Transaction fees (seller)
CBL Exchange*	• Annual participation fee: Nil. • Monthly access fee: USD 250/user (can be waived if USD 750 in transaction	• USD 0.05/tCO_2e (VCS, GS, CAR, ACR, CERCarbono) • USD 2.00/Asset Unit (Puro CORC) • USD 0.01-0.25/Asset Unit	• USD 0.10/tCO_2e (VCS, GS, CAR, ACR, CERCarbono) • USD 2.00/Asset Unit (Puro CORC) • USD 0.01-0.25/Asset Unit

[10] Xpansiv. (2024). *CBL Market Fee Schedule (V2).* Retrieved from https://xpansiv.com/wp-content/uploads/2024/02/CBL-Market-Fee-Schedule-V2-14-February-2024.pdf

	fees in the previous quarter is met).	(Allowances/CA-LCFS).	(Allowances/CA-LCFS).
Climate Impact X (CIX) *(Limited public fee information, focusing on high-quality credits)*	Membership/ registration fees not publicly disclosed.	5% per transaction.	5% per transaction.

**Note:* The asset types refer to standards and programs in the carbon market.*

- *Verified Carbon Standard (VCS), Gold Standard (GS), Climate Action Reserve (CAR), American Carbon Registry (ACR), CERCarbono: standards for carbon credits in the voluntary carbon market.*
- *Puro CORC: A CO_2 Removal Certificate issued by the Puro.earth standard.*
- *Allowances/CA-LCFS: Emission permits from regulated compliance markets, such as the California Low Carbon Fuel Standard program.*

Source: Compiled by the Consultant

However, to conduct a comprehensive socio-economic effectiveness analysis, we perform a full and accurate calculation and comparison with a no-fee scenario to gain a complete understanding of this project.

Key revenue and sources used in the analysis are presented in Table 7.

Table 7: Key revenue and sources used in the analysis

No	Title of revenue item	Feature
1	Carbon Trading Members' management fees	• This revenue stream comes from recurring fees paid by organisations or individuals to maintain membership on the exchange. • The fee level is assumed to be VND 20 million, equivalent to the amount stipulated in Decision 1541/QD-BTC dated 2025 by the Minister of Finance on Service Fees in the Securities Sector applicable at the VNX and its subsidiaries, and the VSDC. • The number of participating members is assumed at 538, which is projected to increase 20% annually. This total is used to scale access, onboarding, and potential fee base (the details of estimation for 538 are presented in Section 3.4.1).
2	Initial Carbon Credit Trading Registration Fees	This fee is assumed to be VND 10 million/enterprise, equivalent to the amount stipulated in Decision 1541/QD-BTC dated 2025 by the Minister of Finance on Service Fees in the Securities Sector applicable at the VNX and its subsidiaries, and the VSDC.
3	Carbon Credit/ Allowance Trading Fees on the Exchange	This revenue stream is assumed based on a rate of 0.0027% of the total transaction value, according to Decision 1541/QD-BTC dated 2025. An assumed credit/allowance price of USD 2.6 per ton is adopted (for 30%

		offset -ETS30), informed by analysis of Vietnam's carbon credit trading and mitigation outcomes under alternative scenarios from a separate ETP project (Loan, N., et al., 2025b)[11].
4	Carbon Credit Trading Fees on the Exchange	This revenue stream is structured based on Joint Circular 58/2008/TTLT-BTC-BTN&MT, guiding Decision 130/2007/QD-TTg on some financial mechanisms and policies for investment projects under the Clean Development Mechanism. Accordingly, a fee of 1.2% of the total credits sold is applied.
5	National Allocation Carbon Allowance Auction Fees	This auction fee is applied at a rate of 0.013%, similar to the provision in Decision 1541/QD-BTC dated 2025. This revenue stream is only assumed to apply from 2029.

Source: Compiled and elaborated by the Consultant

3.4 Investment efficiency analysis of the CTX

This subsection sets out the quantitative assumptions that underpin the investment-efficiency analysis. The choices are aligned with the regulatory and operational baseline (Section 2) and with the investment, operating and revenue inputs established earlier (Sections 3.1–3.3). Assumptions are framed to isolate the effect of policy and design choices (fee policy, market depth, and auctioning), rather than artefacts of inconsistent inputs.

Because Vietnam's ETS will be implemented and transacted through the CTX, this assessment treats "CTX vs. no CTX" as effectively identical to "ETS vs. no ETS," since the platform's effects are inseparable from the policy's effects.

3.4.1 Assumptions in CTX investment efficiency assessment

The CTX facilitates the trading of carbon credits and emission allowances among three target sectors: power generation (coal and gas thermal power plants), cement production, and iron and steel. Within this framework, participating sectors can act as either buyers or sellers of credits and allowances, depending on their ability to cost-effectively meet GHG emission reduction targets.

Accordingly, the proposed CTX will be designed to support both carbon credit and emission allowance trading, helping to optimise costs across sectors. Preliminary estimates suggest that the majority of trading volume will be driven by demand from the energy and iron and steel sectors, with the cement sector potentially serving as a key supplier with low emission abatement costs.

General assumptions (Applicable to both scenarios)

The investment-efficiency assessment quantifies the pilot CTX for 2025–2028 and the initial full-operation period 2029–2030, using NPV (financial) and ENPV (socio-economic) metrics defined in Section 3.3. Direct costs (capital expenditure and operating expenditure), direct revenues (fees/auctions), and externalities (e.g., GHG reductions valued on an NDC-consistent path, local

[11] Loan, N., Linh, N., An, H., Huong, D., Binh, T., & Anh, N. (2025b). *Recommendations on governance options for the emission trading system and carbon credits in Vietnam*. Prepared for the Energy Transition Partnership for Southeast Asia (ETP).

air-quality co-benefits, enterprise adjustment/compliance costs) are included as per the Section 3 framework. Fees are set to **zero during the pilot**, with fee scenarios modelled for 2029–2030.

System boundary and time horizon:

- Horizon: Pilot (2025–2028) and initial full operation (2029–2030).
- Boundary: CTX operator cash flows (HNX trading system, VSDC depository/settlement, registry integrations) and market-wide socio-economic effects captured in ENPV. Scenario features follow the details presented in Section 3.1.

Design and compliance drivers (affecting volumes/costs):

- Covered sectors in base case: Thermal power, cement, steel.
- Compliance mechanics: Surrender cycle; borrowing up to 15% of allocation (not tradable); domestic offsets up to 30% of the obligation parameters used to shape trading/liquidity and compliance-cost paths.

Population and participation assumptions: Potential participant base proxied by Article 16 Entities involved in the exchange or support in exchange in the domestic carbon market of Decree 119/2025/ND-CP that allows two groups of participants in the CTX, namely:

1) Entities involved in the GHG emission allowance exchange are installations allocated allowances specified in Article 12 of this Decree: For this Group so there are 323 installations that will be allocated allowances in the pilot phase (2025-2026), as referred to the number of enterprises in the three sectors in Decision 13/2024/QD-TTg.
2) Entities involved in the carbon credit exchange are agencies and organisations within the territory of the Socialist Republic of Vietnam. For this group, the participants mainly are those who own eligible credits for ETS offset as defined in Article 19, Article 20 and Article 20a under Decree 119/2025/ND-CP. In the first allocation period 2025-2026, only around 65 carbon credit projects[12] are potentially eligible to generate offset credits. With an average of 2-3 participants per project, around 215 participants fall under this group.

In total, in the first allocation period 2025-2026, the participants in the CTX are estimated at around 538, with a projection of a 20% increase annually. This total is used to scale access, onboarding, and potential fee-based services.

Note: This total of participants estimated here is **not** a target, forecast, or representation of actual CTX participation at any time. Actual numbers will be determined through project eligibility and issuance under Decree No. 119/2025/ND-CP (Articles 19, 20, 20a), verification and monitoring cycles, NRS onboarding and account approvals, trading/depository membership requirements, market-readiness of project developers and intermediaries, and broader market conditions (sector coverage, offset supply, and liquidity). The estimate will be updated as registry and exchange data become available.

Price and volume anchors (transaction layer):

[12] Including 14 registered JCM projects, 6 waiting for registered JCM projects and 38 registered CDM projects are waiting for transferred under Article 6.4.

- Unit price anchor for credits/allowances in baseline: No price prevailed at this stage. In the unconditional NDC scenario, credit prices remain low (USD 0.9–2/tCO_2) due to abundant supply and higher offset ratios, with ETS30 showing the lowest and further declining prices. Conversely, under the conditional NDC, stricter targets and limited offsets drive prices up, starting at around USD 3.4–3.7/tCO_2 (Loan et al., 2025b). For this assessment, the average price applied is USD 2.6/tCO_2.
  Note: This price is <u>not a tariff, fee-based, forecast, or representation of actual CTX prices at any time</u>. Actual prices will be discovered through trading and will depend on cap stringency, allocation and auction schedules, offset availability, sector coverage, macro conditions, and market depth.
- Allowances for the 2025-2028 period are allocated free of charge. Auctioned allowances begin from 2029, at 5% of total allowances under the NDC and 10% in 2030 (allowances by year are detailed in the Annex). The carbon credit offset volume equals 30% of the emission allowances.
- Trading-volume paths and order counts are calibrated to pilot functionality (negotiated trades; basic data services) in Scenario A and to enhanced integrity/capacity in Scenario B; detailed calibrations are provided in the scenario worksheet.

Fee and auction assumptions (revenue layer):

- **Pilot (2025–2028):** Zero membership/listing/transaction fees (policy choice to prioritise participation and evidence-gathering).
- **From 2029:** Fee levers parameterised using Vietnamese public-tariff analogues already applied in the securities sector and legacy carbon-credit guidance:
  - Transaction fee: 0.0027% of transaction value (author's estimation).
  - Carbon-credit sale fee: 1.2% of credits sold (referred to the rate in the Prime Minister Decision 130/2007/QD-TTg dated 2 August 2007 on several financial mechanisms and policies applied to investment projects on the Clean Development Mechanism).
  - Auction fee on national allowance auctions: 0.013% (applies from 2029), (similar to the provision in Decision 1541/QD-BTC dated 2025).
  - Membership/registration fees: VND 20 million annual membership; VND 10 million new-registration-used only in post-pilot scenarios (author's estimation).

Capital-expenditure scenarios (investment layer):

Scenario A and Scenario B are taken as the investment envelopes from Section 3.1 and flow into the NPV/ENPV model; capability deltas (e.g., surveillance rules, real-time data, resilience) determine operating-risk and throughput assumptions.

Operating-expenditure treatment:

Annual operating costs (e.g., software maintenance, security operations, staffing, office, market-data services) are taken from Section 3.2 profiles and scaled to scenario features (higher surveillance, data, security in Scenario B).

Discounting, price base, and sensitivity:

All cash flows are expressed in constant 2025 USD; discount rate and exchange-rate handling follow the public-investment appraisal convention, with sensitivity bands around the baseline rate

reported in Section 3.4 tables (Consultant's calculations). (Framework alignment noted in the Objectives and Scope.)

The NPV and ENPV analyses are performed based on several consistent macroeconomic assumptions for the 2025–2030 period. A discount rate of 10%, an average GDP growth rate of 7.3%/year for 2025-2030, and a base year GDP of USD 476.3 billion in 2024 are assumed.

Dependencies and phasing:

Assumes registry–exchange–settlement connectivity is in place per the roadmap, as reflected in the fixed parameters used throughout Section 3.

These assumptions operationalise the Section 3.4 methodology: NPV reflects the Government/operator cash profile; ENPV adds externalities (shadow-priced emissions reductions, air-quality co-benefits, market-efficiency gains and adjustment costs) consistent with the baseline economic framework.

Projected trading volumes are presented in Table 8 as follows:

Table 8: Overview of Potential Trading on the Carbon Market Platform

Year	Potential Market Transactions				Potential Revenue			
	Unconditional NDC Implementation		Conditional NDC Implementation		Unconditional NDC Implementation		Conditional NDC Implementation	
	Carbon credit ($MtCO_2e$)	Allowance ($MtCO_2e$)	Carbon credit ($MtCO_2e$)	Allowance ($MtCO_2e$)	Carbon credit ($MtCO_2e$)	Allowance ($MtCO_2e$)	Carbon credit ($MtCO_2e$)	Allowance ($MtCO_2e$)
2025	11.31	0	15.40	4.3	18.10	-	30.79	8.55
2026	15.55	0	16.44	4.8	20.21	-	26.31	7.73
2027	15.38	0	17.74	5.4	19.99	-	28.38	8.64
2028	15.30	0	18.10	6.0	18.36	-	30.76	10.14
2029	15.32	0	17.98	6.5	16.85	-	37.75	13.71
2030	15.43	0	17.66	7.1	15.43	-	38.85	15.61
Total	**88.28**	**0.00**	**103.31**	**34.09**	**108.94**	**0.00**	**192.85**	**64.38**

Source: Loan, N., et al., 2025a[13].

Differential assumptions between scenarios

Implementing ETS30 in both the Unconditional and Conditional NDC scenarios will reduce the negative impact on GDP.

- ETS30 helps to decrease the negative effect on GDP by 0.001 percentage points per year compared to the "No ETS" scenario during the 2025–2030 period.

[13] Loan, N., Hoa, H., Lam, D., Ha, H., & Ritz, R. (2025a). *The quantitative and modelling of the impacts of international trading of carbon credits and mitigation outcomes from Vietnam to the international market under different scenarios*. Prepared for the Southeast Asia Energy Transition Partnership (ETP).

- In the Conditional NDC scenario, the benefits of ETS30 are greater than in the Unconditional NDC. Specifically, ETS30 reduces the negative impact on GDP by 0.0019 percentage points in 2026 and by 0.0021 percentage points in the years 2028–2030.

The nominal GDP of the economy increases from USD 511.07 billion in 2025 to USD 726.91 billion in 2030. The analysis shows that the GDP Benefits from ETS Implementation (or from CTX) are higher under the Conditional NDC than the Unconditional NDC in the period from 2025-2030. The details are presented in Table 9.

Table 9: GDP Benefits from ETS Implementation (%)

Variable	Scenario	2025	2026	2027	2028	2029	2030
Impact of ETS30 scenario on GDP (%)	**Unconditional NDC**	0,0000	-0,0001	-0,0001	-0,0001	-0,0001	-0,0001
	Conditional NDC	-0,0012	-0,0015	-0,0015	-0,0011	-0,0012	-0,0013
Impact of No ETS scenario on GDP (%)	**Unconditional NDC**	-0,0010	-0,0011	-0,0011	-0,0011	-0,0011	-0,0011
	Conditional NDC	-0,0039	-0,0034	-0,0030	-0,0032	-0,0033	-0,0034
GDP Benefits from ETS Implementation (%)	**Unconditional NDC**	0,0010	0,0010	0,0010	0,0010	0,0010	0,0010
	Conditional NDC	0,0027	0,0019	0,0015	0,0021	0,0021	0,0021

Source: Loan, N., et al., 2025b[14].

3.4.2 Analysis results

According to Article 77 of the 2024 Law on Public Investment, project evaluation must consider not only financial efficiency but also socio-economic and environmental effectiveness. The former is assessed through NPV analysis, while the latter is captured through the ENPV, which reflects the CTX's broader social and environmental benefits during both the pilot phase (2025–2028) and the full operational phase (from 2029). The assessment compares NPV and ENPV outcomes across four main scenario combinations: with and without service fees - each under low and high cost assumptions - and, within each scenario, two policy variants corresponding to Vietnam's Unconditional and Conditional NDC commitments.

a) Financial effectiveness (NPV)

The results indicate that the NPV remains negative across all scenarios, implying that the CTX is not financially self-sustainable:

- In the scenario without service fees: The financial deficit is substantial. Under the low-cost option, NPV reaches −1.14 million USD during 2025–2028 and −1.46 million USD during 2025–2030. In the high-cost case, the deficit deepens, ranging from −3.80 to −5.10 million USD.

[14] Loan, N., Linh, N., An, H., Huong, D., Binh, T., & Anh, N. (2025b). *Recommendations on governance options for the emission trading system and carbon credits in Vietnam.* Prepared for the Energy Transition Partnership for Southeast Asia (ETP).

- When introducing service fees: The deficit is significantly reduced. With low costs, NPV decreases to only −0.43 to −0.40 million USD (2025–2028) and −0.75 to −0.70 million USD (2025–2030). However, under high-cost assumptions, NPV remains considerably negative, at −3.09 to −3.05 million USD (2025–2028) and −4.39 to −4.34 million USD (2025–2030). These results suggest that while charging service fees is necessary to mitigate financial risks, even under the most favourable conditions, NPV remains below zero.

These results imply that the CTX can only achieve breakeven or profitability if it succeeds in attracting a large number of participants and ensuring sufficiently high carbon credit/allowance prices. Therefore, government support during the initial phase is indispensable to secure the financial feasibility of the CTX operation in a stable and reliable manner.

b) Economic effectiveness (ENPV)

Economic effectiveness is reflected via ENPV.

Economic effectiveness is assessed through the ENPV. In this analysis, ENPV is derived from the macroeconomic impact results - particularly GDP differentials - estimated in the *Carbon Impact Assessment (2025)*[15]. These GDP impacts already incorporate the monetised value of key externalities, including avoided abatement costs, improved market efficiency, and environmental co-benefits.

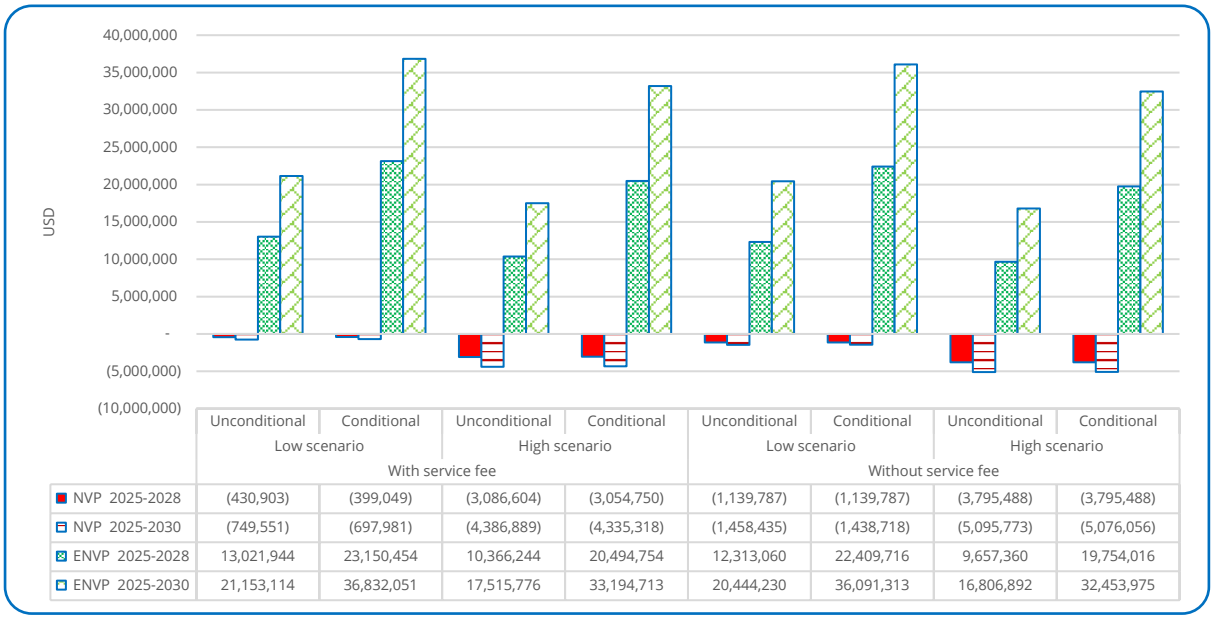
In contrast to the NPV, the ENPV is positive under all scenarios, confirming that the CTX generates net socio-economic benefits for Vietnam:

- In the scenario without service fees: ENPV ranges from 12.31 to 22.41 million USD and from 20.44 to 36.06 million USD under low-cost assumptions in 2025–2028 and in 2025–2030, accordingly. Even in the high-cost case, ENPV remains positive, ranging from 9.66 million USD to 19.75 million USD and from 16.81 million USD to 32.45 million USD.
- In the scenario with service fees: ENPV values reach from 13.02 million USD to 23.15 million USD and from 21.15 million USD to 36.83 million USD under low-cost assumptions in 2025–2028 and in 2025–2030, accordingly. Under high costs, ENPV remains within the range of 10.37 million USD to 20.49 million USD and from 17.52 million USD to 33.19 million USD.

These findings highlight that the imposition of service fees merely reallocates resources within the system and does not significantly alter the overall socio-economic gains.

Figure 2 depicts the NPV and ENPV under different scenarios.

[15] Loan, N., Hoa, H., Lam, D., Ha, H., & Ritz, R. (2025). *Assessing and modelling the impacts of governance options for emission trading system in Vietnam*. Prepared for the Southeast Asia Energy Transition Partnership (ETP).



	With service fee				Without service fee			
	Low scenario		High scenario		Low scenario		High scenario	
	Unconditional	Conditional	Unconditional	Conditional	Unconditional	Conditional	Unconditional	Conditional
NVP 2025-2028	(430,903)	(399,049)	(3,086,604)	(3,054,750)	(1,139,787)	(1,139,787)	(3,795,488)	(3,795,488)
NVP 2025-2030	(749,551)	(697,981)	(4,386,889)	(4,335,318)	(1,458,435)	(1,438,718)	(5,095,773)	(5,076,056)
ENVP 2025-2028	13,021,944	23,150,454	10,366,244	20,494,754	12,313,060	22,409,716	9,657,360	19,754,016
ENVP 2025-2030	21,153,114	36,832,051	17,515,776	33,194,713	20,444,230	36,091,313	16,806,892	32,453,975

Figure 2: Comparison of Financial and Economic Effectiveness Across Scenarios

Source: The Consultant's analysis results

In summary, although the CTX is not financially self-sufficient, it still delivers substantial economic and social benefits. Hence, the state intervention and financial support play a pivotal role in the early phase, particularly through subsidies or cost-sharing mechanisms, to maintain the operation of the exchange and to maximise environmental and societal benefits.

c) Break-even analysis of CTX

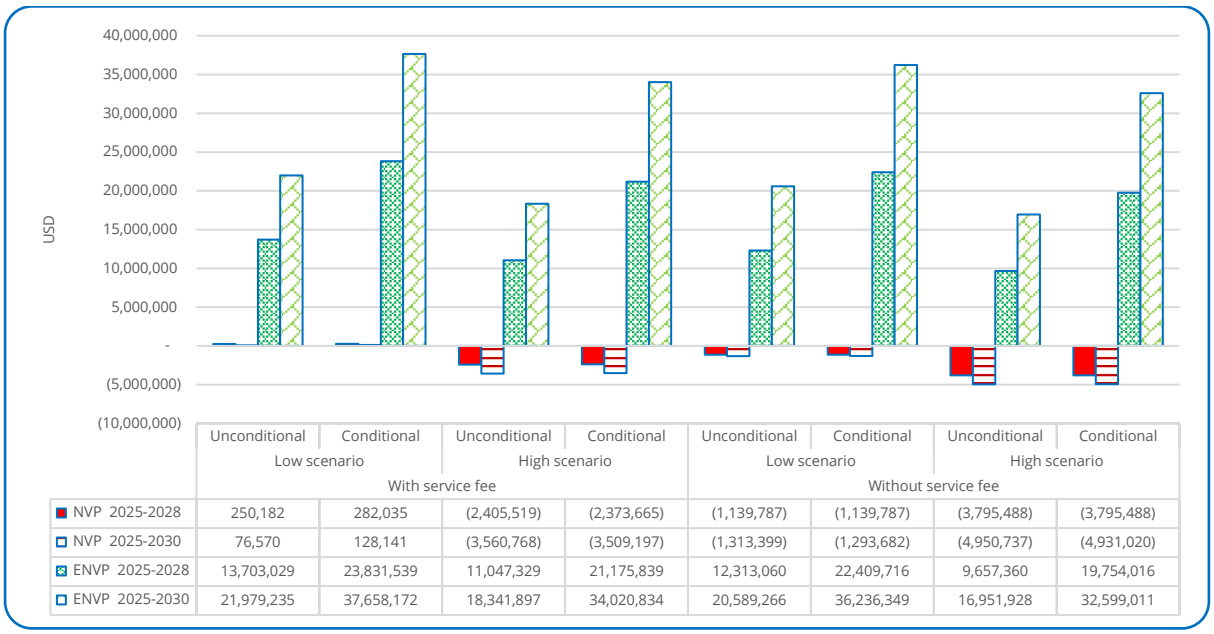
Accordingly, the government needs to have supporting policies under the following options to ensure the feasibility of the project:

(1) Option 1: The State has policies to expand the number of participating enterprises in the carbon trading market by approximately 50% of the facilities subject to GHG inventory in Decision 13/2024/QD-TTg.

As mentioned above, under the scenarios analysed above, during the first allocation period (2025–2026), CTX participation assumed around 538 enterprises, with a projection of an annual increase of 20%. Assuming that market participation expands to the equivalent of 50% of facilities subject to GHG inventory under Decision 13/2024/QD-TTg on the List of Sectors and GHG Emission Facilities Subject to GHG Inventory (updated in 2024), and grows steadily at 20% per year (approximately 1,058 enterprises from 2026 onward), the NPV results are more positive:

- In the low-investment scenario with service fee collection, NPV remains positive in both conditional and unconditional cases, indicating the financial feasibility of the CTX project. Concretely, in the unconditional case, NPV reaches USD 250,182 during 2025–2028 and declines to USD 76,570 over 2025–2030. Under conditionality, NPV is slightly higher at USD 282,035 and USD 128,141 in 2025–2028 and 2025–2030, respectively.
- By contrast, the high-investment scenario does not ensure financial viability, with NPV remaining negative in both periods, reflecting significant financial risks. In the

unconditional case, NPV records −USD 2,405,519 (2025–2028) and declines further to −USD 3,560,768 (2025–2030). Under conditionality, negative values are slightly improved, at −USD 2,373,665 and −USD 3,509,197, respectively, but still remain financially unfeasible.



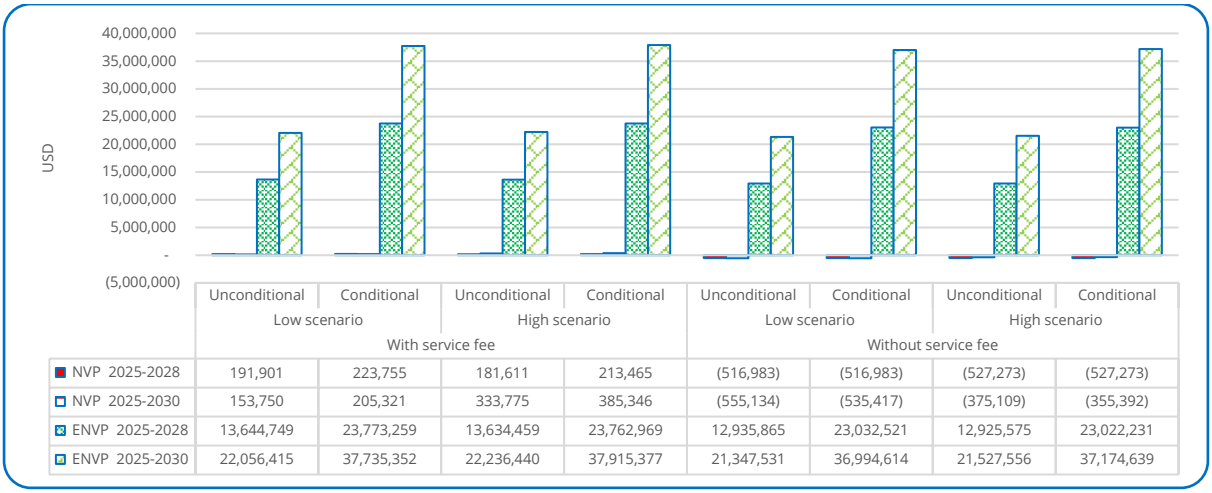
	With service fee				Without service fee			
	Low scenario		High scenario		Low scenario		High scenario	
	Unconditional	Conditional	Unconditional	Conditional	Unconditional	Conditional	Unconditional	Conditional
NVP 2025-2028	250,182	282,035	(2,405,519)	(2,373,665)	(1,139,787)	(1,139,787)	(3,795,488)	(3,795,488)
NVP 2025-2030	76,570	128,141	(3,560,768)	(3,509,197)	(1,313,399)	(1,293,682)	(4,950,737)	(4,931,020)
ENVP 2025-2028	13,703,029	23,831,539	11,047,329	21,175,839	12,313,060	22,409,716	9,657,360	19,754,016
ENVP 2025-2030	21,979,235	37,658,172	18,341,897	34,020,834	20,589,266	36,236,349	16,951,928	32,599,011

Figure 3: Comparison of Financial and Economic Effectiveness Across Option 1

Source: The Consultant's analysis results

Thus, with this option, the government only needs to issue policies to attract more organisations to participate in the CTX and bear the loss from the free service fees. The project would only be financially feasible with a low-investment scenario. In contrast, this option is not feasible for a high-investment scenario.

(2) Scenario 2: The government provides subsidies for (i) land lease costs, (ii) software maintenance and update costs for the CEX, and (iii) recurring costs for system maintenance, bug fixes, and software upgrades for the exchange. These subsidies are estimated at approximately 1.28 million USD for the low-price scenario with fees for the 2025-2030 period, and all operating costs, estimated at 6.67 million USD, for the high-price scenario during the same period. For the no-fee scenario from 2025-2028, service fees would need to be added to ensure the project's financial feasibility.



	With service fee				Without service fee			
	Low scenario		High scenario		Low scenario		High scenario	
	Unconditional	Conditional	Unconditional	Conditional	Unconditional	Conditional	Unconditional	Conditional
NVP 2025-2028	191,901	223,755	181,611	213,465	(516,983)	(516,983)	(527,273)	(527,273)
NVP 2025-2030	153,750	205,321	333,775	385,346	(555,134)	(535,417)	(375,109)	(355,392)
ENVP 2025-2028	13,644,749	23,773,259	13,634,459	23,762,969	12,935,865	23,032,521	12,925,575	23,022,231
ENVP 2025-2030	22,056,415	37,735,352	22,236,440	37,915,377	21,347,531	36,994,614	21,527,556	37,174,639

Figure 4: Comparison of Financial and Economic Effectiveness Across Option 2

Source: The Consultant's analysis results

For ENPV, both low- and high-investment scenarios yield positive results, demonstrating combined economic–environmental benefits. Notably, conditional cases show significantly higher ENPV compared to unconditional cases, underscoring the added value of supportive policy frameworks.

The break-even analysis indicates that the CTX can achieve financial viability only under low-investment conditions and with broad participation, underscoring the need for extensive market engagement. Given that the pilot phase imposes no transaction or membership fees, the financial NPV that is based solely on direct cash inflows and outflows remains negative, as government expenditures on system development, staffing, cybersecurity, and maintenance are not immediately recovered. However, the CTX generates substantial socio-economic and environmental benefits, reflected in a positive ENPV under all scenarios. This divergence between financial and economic performance highlights the importance of continued government support through subsidies, policy incentives, and institutional backing during the pilot and early operational phases.

Consistent with Article 77 of the 2024 Law on Public Investment, which requires evaluation of both financial efficiency and socio-economic effectiveness, the CTX's positive ENPV justifies public investment by delivering net benefits to society and laying the institutional and technological foundation for a sustainable carbon market that will, in later years, generate fiscal revenues through auctioning and service fees.

Government Support Policy for CTX Operations

A financial analysis indicates that the CTX is not financially self-sufficient in its initial phase. Therefore, government support is of the utmost importance to ensure the project's feasibility, given the substantial benefits of the carbon market (high economic effectiveness). This support should not only aim to offset financial deficits but also to address market and operational risks that could threaten the stability of the exchange.

Market and Liquidity Risks: One of the risks to the CTX's stability is related to price and liquidity. The market price will be determined through trading and depends on several factors, including the stringency of the cap, the availability of offset credits, and market depth. The risk of low

liquidity, particularly during the pilot phase, may result in insufficient revenue for the CTX. This is because the initial phase features 100% free allowance allocation and negotiated trading, which could undermine the price discovery mechanism. Therefore, the government needs to implement market stabilisation mechanisms, such as reserve price floors and daily fluctuation limits, to prevent disorderly price movements.

Cybersecurity and Operational Risks: As a centralised trading platform, the CTX is a potential target for cyberattacks, which requires robust protective measures to ensure system integrity and reliability. Cybersecurity costs are a component of both initial investment (CAPEX) and recurring operational costs (OPEX). These costs include basic security features like DDoS protection and two-factor authentication (2FA), as well as more comprehensive, enterprise-grade controls. The government's support for investing in the cybersecurity system is essential to mitigate these operational risks. Therefore, contingency plans are needed to support cybersecurity and ensure system security.

4 SOCIAL IMPACT ASSESSMENT

4.1 Impacts on the labour market

The pilot operation of the CTX is expected to generate modest but strategic effects on Vietnam's labour market. Direct employment creation will mainly occur in specialised functions related to market governance, registry operation, trading supervision, and compliance management. New positions will emerge within the MOF, the MAE, the HNX, the VSDC, and among covered enterprises. In parallel, demand will increase for professionals in GHG inventorying, MRV (Measurement, Reporting, and Verification) systems, financial trading, and data management. Private service providers - such as verification bodies, consulting firms, and banks, trading members (brokerage companies) - are also expected to expand their services, contributing to the creation of high-skilled technical and analytical jobs.

During the pilot phase, approximately 120–150 new technical and administrative positions are expected to be created across public institutions and market operators. This includes about 40–50 staff within MAE and its DCC for registry administration and market oversight; 30–40 staff at SSC and HNX for market surveillance, transaction monitoring, and reporting; and 20–30 staff at VSDC for depository, settlement, and cybersecurity operations. A further 20–30 specialised experts are anticipated to be engaged by enterprises and service providers for emissions accounting, verification, and brokerage functions. These roles will require targeted training in carbon accounting, compliance procedures, and environmental finance, laying the foundation for capacity building in Vietnam's emerging carbon market.

Despite these institutional and skill-development benefits, quantifying the labour-market impacts at the national or economy-wide level is not feasible at this stage. As defined in Decree No. 119/2025/NĐ-CP and Decision No. 232/QĐ-TTg, the pilot phase of the ETS and CTX will cover only three sectors - thermal power, cement, and steel - comprising roughly 150 installations, a relatively small number compared to the overall scale of the national labour force. Furthermore, these sectors are highly capital-intensive, with a relatively fixed and specialised workforce. The introduction of compliance obligations or allowance trading is unlikely to alter total employment

or wage structures significantly in the short term. Moreover, the CTX serves primarily as a compliance and trading infrastructure rather than a production-stimulating investment, resulting in very low employment elasticity.

At present, no official datasets exist that capture labour composition, reallocation, or wage impacts within the pilot sectors or the broader supply chain. Attempting to extrapolate employment effects from such a narrow and data-limited base would produce speculative and unreliable results. Doing so would also contradict the evidence-based appraisal standards for public-investment projects under Article 77 of the 2024 Law on Public Investment, which require assessments to be grounded in verifiable, measurable parameters. Therefore, this study confines its analysis to qualitative dimensions, namely, skill upgrading, the emergence of new professional roles, and the strengthening of institutional capacity, rather than quantitative forecasting of economy-wide employment impacts.

Hence, the CTX pilot will create a small but valuable niche of specialised human capital in emissions accounting, environmental finance, and market oversight. A meaningful quantification of broader labour-market effects will only become feasible once the ETS expands beyond the initial sectors and reaches economy-wide coverage after 2029.

4.2 Distributional considerations for SMEs

The implementation of the ETS through the CTX will indirectly influence consumer prices, mainly through the pass-through of carbon costs in energy-intensive goods and services. According to macro-economic modelling under the *Carbon Impact Assessment (2025)*[16], the introduction of ETS results in an average consumer-price increase of about 0.02–0.05% compared with the non-ETS scenario, reflecting higher production and transport costs in power, cement, and steel. Although the overall impact on inflation remains marginal, these cost adjustments can cascade along supply chains and gradually affect downstream industries and household consumption.

Small and medium-sized enterprises (SMEs), which account for roughly 98% of Vietnamese enterprises and employ more than half of the national workforce that are particularly exposed to such cost pass-through. Most SMEs operate with thin profit margins, low energy efficiency, and limited capacity to absorb input-price fluctuations. Without targeted support, rising electricity and material costs could constrain liquidity, reduce competitiveness, and slow technological upgrading in key regional clusters.

Therefore, during the pilot phase, policy attention should focus on information sharing, technical assistance, and access to preferential finance for SMEs to manage indirect cost pressures. Capacity-building programs coordinated by MAE and MOF should also help local enterprises integrate energy-efficiency and low-carbon measures, ensuring that carbon pricing becomes a driver of productivity and green innovation rather than a source of regional or sectoral inequality.

[16] Loan, N., Hoa, H., Lam, D., Ha, H., & Ritz, R. (2025). *Assessing and modelling the impacts of governance options for emission trading system in Vietnam.* Prepared for the Southeast Asia Energy Transition Partnership (ETP).

4.3 Implications for gender equality

As with other major economic transitions, without deliberate planning, women may be left behind in the shift to a low-carbon economy. This risk is particularly pronounced in Vietnam's energy and heavy industry sectors, where women are significantly underrepresented, especially in technical and managerial roles. GIZ's synthesis of Vietnam's Labour Force Survey shows that in 2021, women represented around 23,600 employees in the energy sector, or 21.1% of the workforce, while their presence in management was almost non-existent at 0.01%[17]. At the national level, women earn on average 13.8% less than men, with the gap higher in rural and industrial zones[18]. These disparities reflect structural barriers: limited access to STEM education, social norms that discourage women from entering industrial trades, and institutional hiring biases. Moreover, women are less likely to hold certifications in energy-related fields, making it more difficult to access reskilling opportunities without targeted outreach.

The ETS and CTX pilots are expected to have differentiated gender impacts across sectors and occupational groups. Current labour statistics indicate that women represent about 19–23% of the workforce in the three pilot sectors compared to over 45% in the national economy[19]. This imbalance reflects the male-dominated nature of heavy industry and technical operations, where most employment opportunities are concentrated. As such, direct gender effects from the pilot ETS are likely to be limited in absolute numbers but important in shaping future inclusion strategies.

At the same time, the introduction of the CTX will generate new professional roles in emissions monitoring, data management, verification, and environmental finance, fields with more balanced gender participation. These knowledge-based, service-oriented positions offer opportunities to promote women's participation in the emerging carbon market workforce. Integrating gender equality into recruitment, training, and certification programs under MAE, MOF, HNX, and VSDC can help ensure that women have equitable access to these new opportunities, particularly in MRV, registry administration, and carbon-accounting services.

From a broader socio-economic perspective, model results from the GreenCIC study suggest that the ETS may slightly shift labour demand from emission-intensive industries toward service and technology sectors, which typically employ a higher share of women. This structural change, although modest during the pilot phase, can be harnessed to narrow gender gaps in employment quality and wage distribution if supported by targeted capacity-building and retraining programs.

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[17] Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). (n.d.). *The roles and participation of women in the energy sector in Vietnam.* Retrieved from https://www.giz.de/en/downloads_els/241003-Brochure-PNTNNL-final-ENG-formatted.pdf

[18] International Labour Organization (ILO). (2025, March). *Gender diagnostics in support of transforming employment frameworks in Vietnam.* Retrieved from https://www.ilo.org/sites/default/files/2025-03/VN%20Gender%20Equality%202025%20En_v1.0.pdf

[19] Loan, N., Hoa, H., Lam, D., Ha, H., & Ritz, R. (2025). *Assessing and modelling the impacts of governance options for emission trading system in Vietnam.* Prepared for the Southeast Asia Energy Transition Partnership (ETP).

Therefore, gender-responsive implementation of the CTX should include: (i) the adoption of measurable inclusion targets (e.g., at least 30 percent female participation in technical training and exchange operations); (ii) collaboration with universities and professional associations to promote women in carbon-market professions; and (iii) monitoring and reporting of gender-disaggregated data in CTX workforce development programs. Embedding these measures within MAE's and MOF's capacity-building frameworks will align the CTX pilot with Vietnam's national gender equality strategy and ensure that the low-carbon transition also advances social equity.

Ultimately, if Vietnam succeeds in embedding gender equity into the CTX's architecture, it will not only advance its commitments under the National Strategy on Gender Equality for 2021–2030 and SDG 5 but also enhance the efficacy, legitimacy, and long-term sustainability of its climate policies.

5 ENVIRONMENTAL IMPACT ASSESSMENT

5.1 Indicative GHG-reduction

International experience

An ETS sets a legally binding cap on aggregate GHG emissions and allocates tradable allowances which, unlike a carbon tax that fixes price but not quantity, ensure environmental integrity via a progressively tightening, enforceable GHG emissions budget aligned with Paris Agreement trajectories, while market tradability directs abatement to least-cost opportunities by incentivizing firms to improve energy efficiency, switch to cleaner fuels, and invest in low-carbon technologies. Empirical evidence supports the superior effectiveness of this approach: a cross-country econometric study covering 30 jurisdictions between 1990 and 2020 found that ETS implementation was associated with an average GHG emissions reduction of 12.06%, compared to 8.91% under carbon tax regimes, even after controlling for GDP, energy intensity, and policy stringency (Energies, 2025)[20]. These findings reinforce the conclusion that ETS mechanisms not only offer a high degree of environmental certainty but also tend to produce deeper emissions cuts per unit of economic effort, making them a central pillar in effective and efficient climate mitigation strategies.

Further quantitative evidence supports this view. An analysis of carbon offset programs in major economies, including EU member states, Australia, New Zealand, Japan, the United States, and Canada, estimates that, following the introduction of ETS mechanisms, GHG emissions declined at an average annual rate of 1.58% (Energy Strategy Reviews, 2024)[21]. Moreover, ETS implementation over a ten-year period can yield up to a 23.43% reduction in GHG emissions compared to a scenario without such a system in place (Journal of Cleaner Production, 2016)[22].

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[20] Al-Abdulqader, K. S., Ibrahim, A.-J., Ong, J., & Khalifa, A. A. (2025). *Does carbon pricing matter? Evidence from a global sample. Energies, 18(5), 1030.* https://doi.org/10.3390/en18051030

[21] Pan, J., Cross, J. L., Zou, X., & Zhang, B. (2024). *To tax or to trade? A global review of carbon emissions reduction strategies. Energy Strategy Reviews, 55, Article 101508.* https://doi.org/10.1016/j.esr.2024.101508

[22] Villoria-Sáez, P., Tam, V. W. Y., del Río Merino, M., Arrebola, C. V., & Wang, X. (2016). *Effectiveness of greenhouse-gas emission trading schemes implementation: A review on legislations. Journal of Cleaner Production, 127, 49–58.* https://doi.org/10.1016/j.jclepro.2016.03.148

Among existing systems, the EU ETS stands out as the longest-running and most comprehensive carbon market globally. Since its launch in 2005, the EU ETS has played a central role in driving down emissions from major emitters in the power and industrial sectors. By 2023, emissions from fixed installations covered by the EU ETS had fallen by approximately 47% relative to 2005 levels, demonstrating the system's capacity to deliver sustained, long-term reductions[23].

A comparable example from another jurisdiction is the California Cap-and-Trade Program, which likewise demonstrates how market-based mechanisms can drive sustained emissions reductions. Launched in 2013 under the Global Warming Solutions Act (AB 32), California's system covers over 80% of the state's GHG emissions. Forming a cornerstone of the state's climate policy framework, the program has contributed to a significant decline in per capita emissions. By 2014, California's per capita emissions were more than 5 metric tonnes below the U.S. national average, highlighting the program's role in achieving both absolute and relative reductions (EDF, 2018)[24].

However, the effectiveness of ETS mechanisms in reducing emissions is not always accompanied by uniformly positive economic outcomes. China's regional carbon trading pilots, launched in 2013, offer a nuanced example. Empirical research indicates that while these programs significantly reduced carbon intensity, particularly in coal-dependent provinces, they also produced modest, short-term economic impacts. Studies show that the ETS pilots led to measurable emissions reductions and improvements in energy efficiency but exerted slight downward pressure on local GDP during the early years of implementation, primarily due to transitional adjustment costs. Nonetheless, the negative economic impacts were considerably smaller than the environmental gains, suggesting that the overall trade-off was favourable (Sustainability, 2018)[25].

The highlight of GHG emission reduction achieved under selected ETSs is presented in Table 10.

Table 10: Highlights of GHG emission reduction achieved under selected ETSs

Jurisdiction	ETS Start Year	GHG Reduction Achieved
EU ETS	2005	-48% from 2005 to 2023.
California Cap-and-Trade Program	2013	-5.3% from 2013 to 2017. Met the 2020 target in 2016.
UK ETS	2021	-11.5% from 2023 to 2024.
China National ETS	2021	Regional pilots (2013-2015) led to a 16.7% reduction in total emissions

[23] European Commission. (n.d.). *About EU ETS*. Retrieved from https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/about-eu-ets_en

[24] Environmental Defense Fund (EDF). (2018). *California Case Study.* Retrieved from https://www.edf.org/sites/default/files/california-case-study-jan2018.pdf

[25] Magalhães, L. G., Rente, D., Pato, P., & Pinho, C. (2018). *Market intelligence precursors for the entrepreneurial resilience approach: The case of the Romanian eco-label product retailers. Sustainability, 10(1), 98.* https://www.mdpi.com/2071-1050/10/1/98

K-ETS	2015	-5.7% from 2019 to 2020.

Source: Compiled by the Consultant

Quantification of GHG reduction with ETS implementation in Vietnam

Vietnam's own modelling further supports this perspective, indicating that while ETS implementation may involve transitional economic costs, it can substantially mitigate the GDP losses associated with achieving ambitious climate targets. As part of the *Carbon Impact Assessment (2025)* supported by ETP/UNOPS, three primary policy scenarios were developed to assess the macroeconomic effects of ETS adoption, each reflecting different levels of market flexibility and international cooperation:

- The No-ETS scenario includes 03 sub-scenarios: unconditional NDC, conditional NDC, and the conditional NDC combined with the Just Energy Transition Partnership (3 NDC scenarios).
- The ETS10 scenario, in which up to 10% of the emission allowances can be met through carbon credit offsets (ETS10), also includes the 03 NDC sub-scenarios mentioned above.
- The ETS20 scenario, allowing 20% of the total allocated allowances to be offset (ETS20), with the same 03 NDC sub-scenarios.

The ETS30 scenario, allowing 30% of the total allocated allowances to be offset (ETS30), with the same 03 NDC sub-scenarios. As shown in Figure 2, all three scenarios result in some decline in GDP compared to a business-as-usual baseline. However, the magnitude of this decline varies significantly. Under both unconditional and conditional NDCs, the No ETS scenario produces the sharpest drop in GDP, with losses deepening steadily from 2025 to 2030. In contrast, ETS10, ETS20 and ETS203 scenarios substantially reduce the scale of GDP impact, particularly in the earlier years of implementation, and the ETS203 scenario will offer less negative impact on GDP compared to the ETS10 and ETS20 scenarios.

The impacts on GDP with ETS30 (30% offset by credits is allowed) are not calculated in the latest Carbon *Impact Assessment (2025),* as the decision on 30% was made very recently in the promulgation of Decree 119/ND-CP/2025. However, with the result tendency of ETS10 and ETS20 scenarios, one can project that the ETS30 scenario will offer the least negative impact on GDP among the three scenarios.

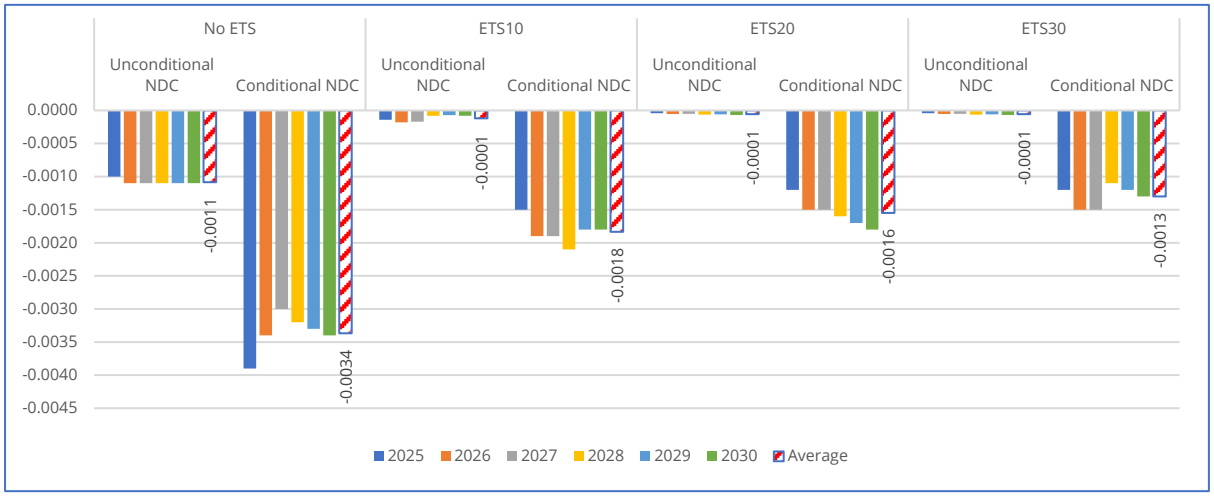

Figure 5: Impacts on GDP in three scenarios

Source: Loan, N., et al., 2025b)[26].

Based on the research findings of Loan et al. (2025a) and updated to include the ETS30, business behaviour simulations have indicated that NDC targets can be achieved in all scenarios with offset percentages of 10% (ETS10), 20% (ETS20), and 30% (ETS30). The quantitative results show that the total emissions reduction achieved in all scenarios exceeds the established NDC targets. Specifically, for the unconditional NDC scenario, the total emissions reduction reached 235.84 million tCO_2 in the No ETS scenario. This is because businesses must invest in a synchronised set of measures to meet the NDC, resulting in a higher CO_2 reduction than the NDC requirement. In the ETS10 scenario, the reduction was 225.07 million tCO_2, while in the ETS20 and ETS30 scenarios, it was 223.32 million tCO_2. Similarly, for the conditional NDC scenario, the total emissions reduction was 524.41 million tCO_2 (No ETS scenario), 475.92 million tCO_2 (ETS10 scenario), 476.44 million tCO_2 (ETS20 scenario), and 452.17 million tCO_2 (ETS30 scenario). These data confirm that the emission reduction targets were met in all simulated cases.

[26] Loan, N., Linh, N., An, H., Huong, D., Binh, T., & Anh, N. (2025b). *Recommendations on governance options for the emission trading system and carbon credits in Vietnam.* Prepared for the Energy Transition Partnership for Southeast Asia (ETP).

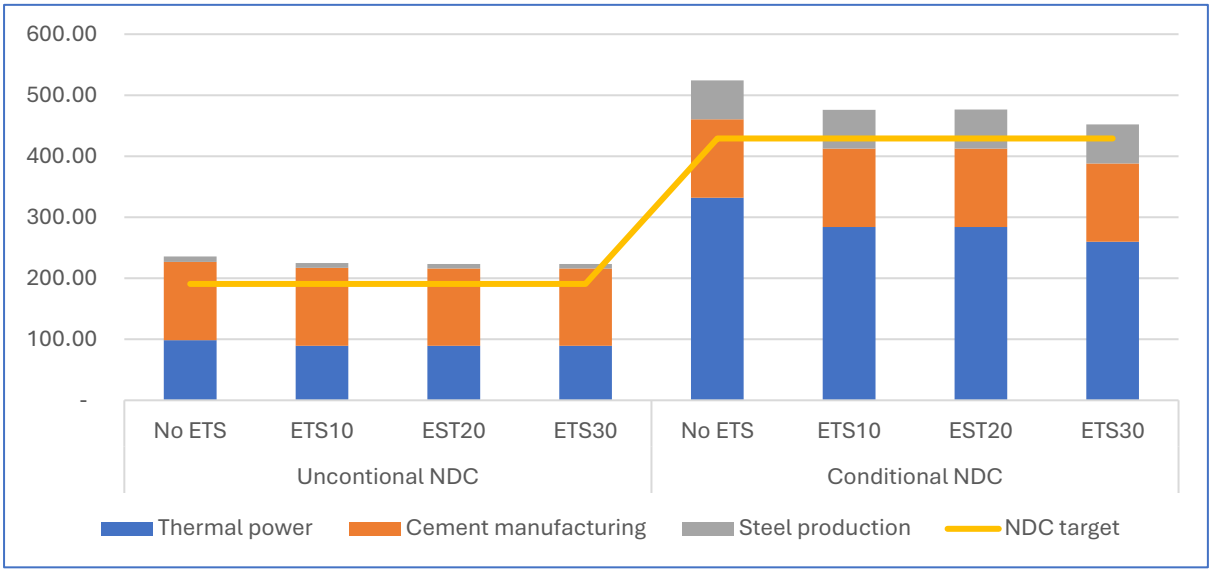

Figure 6: GHG emission reductions under policy scenarios

Source: Update from Loan, N., et al., 2025a[27]

The modelling results show that the CTX pilot will not, by itself, achieve Vietnam's Net Zero trajectory, but it lays the groundwork for scalable, market-based abatement. Early reductions, though modest, are significant because they validate the system design, demonstrate real mitigation potential, and build confidence among stakeholders for future expansion.

5.2 Co-benefits

Beyond direct GHG reductions, the ETS/CTX pilot is expected to generate multiple co-benefits that are highly relevant to Vietnam's economic structure and development priorities.

First, the system will yield significant environmental and public-health gains. By incentivising cleaner production and energy efficiency in the power, cement, and steel sectors, the ETS can lower emissions of co-pollutants such as SO_2, NO_x, and $PM_{2.5}$. In Vietnam, high particulate levels already impose major health and economic costs - air pollution contributes to approximately 60,000 premature deaths annually, with $PM_{2.5}$ concentrations in industrial provinces like Quảng Ninh and Hải Phòng frequently exceeding national standards[28]. Even a modest reduction in $PM_{2.5}$ through improved combustion efficiency and lower coal use would translate into measurable public-health benefits and reduced healthcare expenditures, particularly in densely populated industrial corridors.

Second, the ETS will promote industrial upgrading and technological innovation. Enterprises that invest in low-carbon processes to meet compliance obligations will improve operational efficiency

[27] Loan, N., Hoa, H., Lam, D., Ha, H., & Ritz, R. (2025a). *The quantitative and modelling of the impacts of international trading of carbon credits and mitigation outcomes from Vietnam to the international market under different scenarios*. Prepared for the Southeast Asia Energy Transition Partnership (ETP).

[28] Huong, N. T., et al. (2022). *Vietnam Country Environmental Analysis; Health impacts of ambient air pollution in Hanoi. International Journal of Public Health.*

and reduce long-term energy costs. These measures align with the objectives of the National Green Growth Strategy (Decision 1658/QĐ-TTg 2021) and the National Action Plan on Air Quality Management (Decision 1973/QĐ-TTg 2021). They also strengthen Vietnam's preparedness for international carbon-related trade measures - most notably the EU Carbon Border Adjustment Mechanism (CBAM), which initially covers cement and steel. Currently, the EU accounts for about 15–18% of Vietnam's steel exports and nearly 10% of cement and clinker exports,[29] making carbon-pricing readiness an important determinant of trade competitiveness. While the implementation of a domestic ETS will not, by itself, constitute "equivalence" with the EU ETS, particularly since Vietnam's pilot phase relies mainly on free allocation, it will help exporters prepare for CBAM requirements by improving emissions MRV systems and by establishing transparent data on embedded emissions. In the longer term, as Vietnam gradually introduces allowance auctions and explicit carbon-cost payments, the ETS can serve as a recognised domestic carbon-pricing mechanism, supporting claims for partial deduction under the CBAM and reducing exposure to adjustment charges. This progressive alignment will help mitigate competitiveness risks and sustain market access for Vietnamese exports to the EU.

Third, the establishment of the CTX will enhance financial-sector capacity and transparency. Building a centralised registry, trading, and settlement infrastructure through HNX and VSDC will foster innovation in environmental finance and pave the way for new instruments such as carbon-linked bonds, sustainability-linked loans, or emission-reduction certificates. This contributes to the broader development of green-finance markets in Vietnam and strengthens linkages between the environmental and financial sectors.

Finally, the co-benefits extend to institutional governance and public awareness. The operation of the CTX will improve data reliability, accountability, and inter-agency coordination, reinforce evidence-based policymaking and build trust among enterprises and investors in Vietnam's low-carbon transition.

Overall, while the immediate impacts of the pilot ETS/CTX will be modest due to its limited sectoral coverage, its cumulative co-benefits, in cleaner air, improved health, enhanced competitiveness, and financial innovation, demonstrate that carbon pricing is not merely a regulatory tool but a catalyst for sustainable and inclusive economic transformation.

6 ADMINISTRATIVE & LEGAL IMPACT

6.1 Institutional and governance impacts

The launch of Vietnam's CTX marks a significant milestone in the country's climate governance architecture, necessitating a reconfiguration of institutional responsibilities and the strengthening of regulatory frameworks across multiple layers of government. At the heart of this transformation

[29] Eurostat. (2024). *Trade statistics for HS code 2523 (cement and clinker)*. European Commission. https://ec.europa.eu/eurostat/web/international-trade-in-goods/database?utm
UN Comtrade. (2023). *Trade statistics for HS codes 7208–7214 (steel products).* United Nations. https://comtradeplus.un.org/

is the establishment of a robust governance model capable of overseeing market-based emissions reduction mechanisms in a manner that is transparent, accountable, and efficient.

The draft Decree assigns and arranges the institutions for the establishment and operation of the CTX according to and in line with the functions of the line ministries, related agencies and entities that are specified in the Law on Environmental Protection 2020, Decree No. 06/2022/ND-CP on Mitigation of GHG Emissions and Protection of Ozone Layer, and the more recent Decree 119/2025/ND-CP amending Decree 06/2022/ND-CP as well as Decision 232/2024/QD-TTg approving a national scheme to develop the country's carbon market.

The key stakeholders and interactions are reflected in Figure 7 on the institutional arrangement to establish and operate the CTX in the pilot phase.

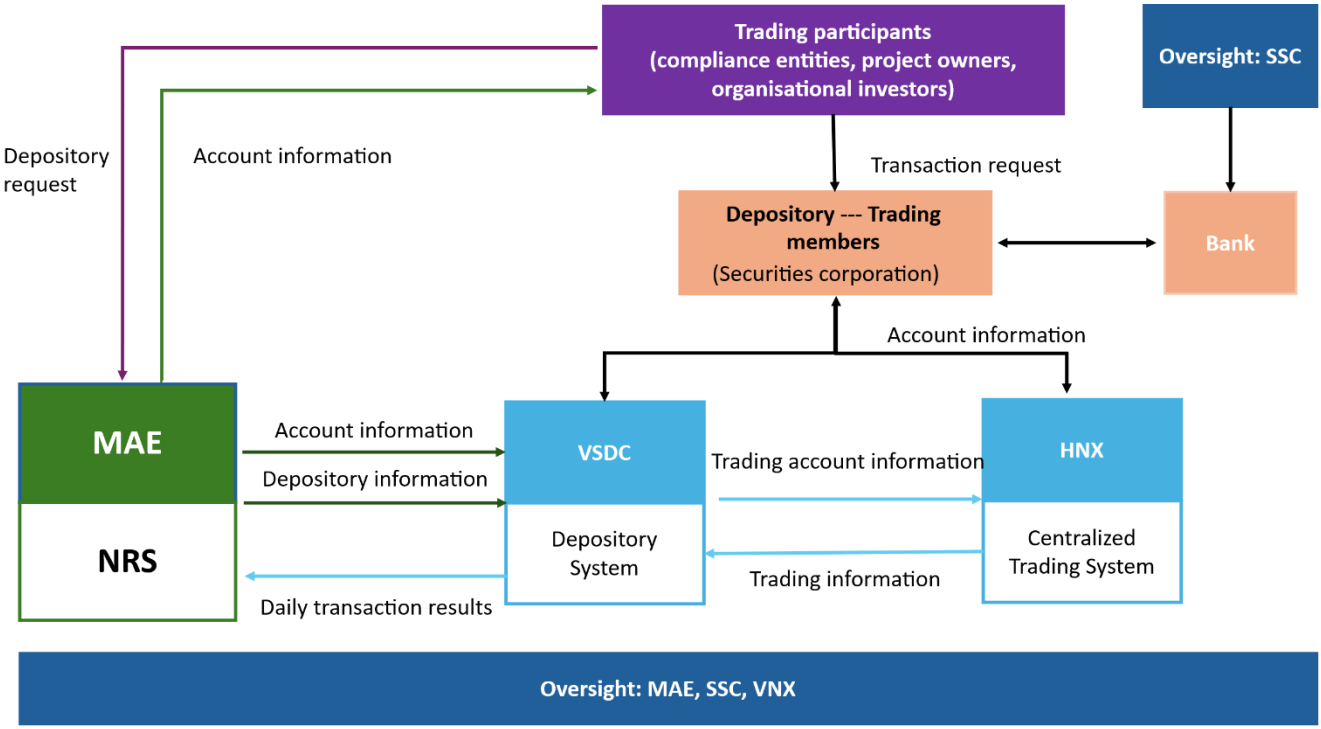

Figure 7: Institutional arrangement to establish and operate the CTX in the pilot phase

Source: Elaborated by Consultant based on the draft Decree

The MAE, as the lead regulator for the CTX, is responsible for establishing the market's legal and technical foundations, including setting sectoral caps, defining MRV standards, and coordinating allowance allocation. Given the cross-sectoral nature of the carbon market, effective oversight will require close inter-ministerial coordination, supported by clear mandates, data-sharing protocols, and joint decision-making mechanisms.

During the design stage, the Legal Department under the MOF leads the finalisation of the Draft Decree on the CTX and the preparation of subsequent legal instruments to ensure coherence and long-term consistency of the market's regulatory framework.

At the operational stage, the SSC, under the MOF, acts as the core financial supervisor responsible for maintaining the CTX's integrity. Its duties include approving and overseeing the operating regulations of the HNX and VSDC, conducting real-time surveillance to prevent manipulation, and

enforcing compliance among trading members. In coordination with the MAE, the SSC will also establish risk-management protocols for trading, clearing, and settlement. However, mandates on market-stabilisation functions, such as liquidity management, prevention of speculative distortions, and control of price volatility, remain undefined. Experience from other jurisdictions shows that lacking such financial-stability mechanisms at an early stage can hinder performance and increase systemic risks. These responsibilities should therefore be clarified in the next phase of legal and operational development.

The HNX and VSDC hold central roles in managing trading activities and maintaining the registry of allowance accounts. They ensure the day-to-day operation of the trading platform, including transaction execution, registry updates, and settlement. As carbon allowances are tradeable commodities, these institutions must also foster a transparent and reliable marketplace through safeguards against fraud, insider trading, and manipulation, while ensuring equitable access for all participants.

Operating the CTX requires explicit mandates, adequate resources, and capacity-building across the MAE, MOF/SSC, HNX, and VSDC. As trading begins, enforcement and compliance mechanisms will be critical to maintaining credibility and environmental effectiveness. The deterrent value of the market depends on a clear and predictable penalty regime aligned with international practice, such as the EU ETS and K-ETS. In addition, robust dispute-resolution mechanisms that include arbitration and administrative review are needed to uphold fairness and trust. These measures should be supported by legal harmonisation with existing laws, including the Anti-Corruption Law, the Law on Handling Administrative Violations.

A critical institutional challenge lies in the cost burden of CTX participation. Both regulators and covered enterprises will assume substantial new responsibilities, ranging from MRV implementation to allowance management and compliance reporting. These obligations generate direct costs, such as technical staffing, IT upgrades, and verification services, as well as indirect costs, including managerial time and possible disruptions to production planning. If left unsupported, these burdens risk discouraging participation and weakening market effectiveness.

For public authorities, costs will arise from operating the registry, market surveillance, auditing, cybersecurity, and inter-agency coordination. For enterprises, expenditures will include MRV system upgrades, verification fees, onboarding with trading and depository members, development of internal compliance systems, and recurring reporting. To address these pressures, the CTX design should:

- **Quantify procedural costs** for both regulators and participants;
- **Identify simplification opportunities**, such as re-using securities market licenses, adopting single-window submissions, and applying risk-based verification cycles;
- **Sequence implementation** with phased timelines and clear service-level standards that minimise compliance costs while safeguarding environmental integrity and market order.

Sustained investments in capacity-building, inter-agency coordination, and legal enforcement will therefore be essential to ensure that Vietnam's ETS not only operates effectively but also maintains stakeholder confidence in the long term.

6.2 Administrative impacts

For the CTX, the Administrative Procedure Impact Assessment examines the necessity, proportionality, and legality of each CTX-related action.

The draft Decree establishes a comprehensive, coherent, and functionally structured framework of administrative procedures encompassing the core processes required for the operation of carbon credit and GHG emission quota transactions. These procedures are logically aligned with the sequential stages of market participation and operation, including: (i) registration and issuance of domestic codes for carbon credits and emission quotas, and off-exchange ownership transfers (Articles 12–13); (ii) depository services, on-exchange ownership transfers, and transaction settlement (Articles 14–17); (iii) recognition and management of trading members and depository members (Articles 18–25); and (iv) selection and registration of settlement banks (Articles 26–28).

The clear delineation of these procedures is essential to ensure effective state oversight of carbon market operations, including the establishment and transfer of ownership of carbon credits, environmental assets of economic value that are directly linked to Vietnam's national emission reduction targets and its international commitments under the Paris Agreement. In addition, this procedural framework contributes to the formalisation of transactions, the legal recognition of ownership rights, and the enhancement of transparency, traceability, and regulatory control throughout the carbon market infrastructure.

In terms of procedural terminology, the draft Decree adopts concise and consistent language, applying accurate administrative and sector-specific legal terms such as "registration," "code issuance," "deposit," "transaction," "settlement," and "ownership transfer." This approach reflects the legal function of each procedure within the operational workflow and facilitates standardisation and integration with the national administrative procedure database, consistent with the government's broader administrative reform and digital transformation agenda in the environmental and financial sectors.

Regarding regulated entities, the draft Decree adopts an open and inclusive approach, aligned with the Law on Environmental Protection and relevant implementing regulations. It clearly identifies the categories of entities subject to procedural obligations, including facilities subject to allowance allocation; holders of carbon credits eligible for trading on the CTX; licensed securities companies acting as trading or depository members; commercial banks designated as settlement banks; and market infrastructure operators. This classification ensures broad institutional coverage while maintaining flexibility for future market expansion, thereby limiting the need for legal amendments as the CTX evolves.

In terms of competent authorities, the draft Decree clearly delineates the mandates of key institutions, ensuring functional division, inter-agency coordination, and accountability in accordance with applicable laws. Specifically, MAE is responsible for the national carbon registry and domestic code issuance, off-exchange ownership transfers, and oversight of tradable units; from MOF's side, VSDC provides deposit and settlement services; HNX operates the trading platform; and SSC selects and supervises the settlement banks. This institutional design reflects effective cross-sectoral coordination between environmental regulators and financial market

operators, aiming to build a dedicated but integrated carbon market aligned with Vietnam's broader financial system.

In terms of compliance burden, while the procedural framework covers the full transaction lifecycle, from pre-trade to post-trade, it remains technically complex. Many procedures are implemented through internal operational rulebooks issued by infrastructure operators (HNX, VSDC) but are not yet supported by uniform requirements on documentation, process steps, timelines, and standard templates in line with administrative procedure control norms. The absence of such standardisation may compromise transparency, complicate integration with national procedure databases, and increase unnecessary compliance costs for market participants.

To address these shortcomings and support efficient implementation, the draft Decree may be further strengthened by the following aspects: (i) Introduce minimum procedural requirements for the core administrative processes outlined above, including process steps, documentation, timelines, and feedback mechanisms, sufficient to ensure legal certainty, enable integration with the national administrative procedure system, and reduce unnecessary burden for market actors. (ii) Explicitly assign infrastructure operators the obligation to publicly disclose their internal regulations and technical manuals via official portals, enhancing predictability and accessibility. (iii) Establish a mechanism for periodic assessment of compliance costs during the pilot phase (2025-2028) to identify and rectify unnecessary administrative burdens in a timely manner. These assessments should be publicly reported and serve as inputs for future regulatory revisions.

6.3 International obligations and WTO alignment for Vietnam's ETS/CTX design

The CTX will be the central infrastructure for trading allowances and carbon credits in Vietnam, and therefore its design must align not only with domestic climate law but also with international obligations under the Paris Agreement and the WTO framework.

On the climate side, two guiding principles apply. First, the CTX must be firmly anchored in Vietnam's NDC pathway, with allowance trading and crediting activities transparently supporting the emission-reduction trajectory committed internationally. This requires MRV procedures that are consistent with Paris Agreement transparency rules, ensuring that transactions recorded through the CTX are reliable and internationally defensible. Second, all units admitted for trading must meet safeguards of environmental integrity, permanence, and avoidance of double claiming. The methodologies used for generating credits or defining eligibility for trading should be published in full, giving participants and international partners confidence that units transacted through the CTX meet recognised standards of quality.

From a trade-law perspective, the CTX also engages core WTO disciplines. Non-discrimination under General Agreement on Tariffs and Trade (GATT) Articles I and III implies that any benchmarks or rules governing admissible credits and allowances must apply equally to domestic and foreign-origin goods and services. If differentiated treatment becomes necessary, for example, through carbon-intensity standards, Vietnam must be able to justify such measures under GATT Article XX(b) or (g), demonstrating necessity, proportionality, and consistent application. If Vietnam notifies product-related standards or disclosure rules linked to CTX transactions, these will fall under the Technical Barriers to Trade (TBT) Agreement and must be

based on legitimate climate objectives, rely where possible on international standards, and avoid unnecessary trade restrictiveness.

Most directly relevant to CTX operations, allocation and cost-containment choices intersect with subsidy rules. Where free allocation is applied to protect competitiveness or prevent leakage, it must be time-limited, benchmark-based, and strictly decoupled from export performance or import substitution to avoid de jure or de facto prohibited subsidies under the WTO Subsidies and Countervailing Measures (SCM) Agreement. Similarly, any indirect cost relief (for example, compensation for higher electricity tariffs faced by covered entities) should be based on transparent and objective criteria, applied neutrally across sectors, and subject to regular review.

In addition, the CTX as a trading platform involves brokerage, depository, clearing, and settlement functions that fall under Vietnam's WTO commitments on financial services. Participation rules for these service providers must respect the country's GATS schedule and apply licensing, conduct, and prudential requirements on a most-favoured-nation and national-treatment basis. Vietnam can rely on the prudential carve-out to impose risk controls, but these measures must be clearly justified and non-discriminatory.

Taken together, these disciplines shape a checklist for CTX rule-making: (i) ensure transparent, NDC-aligned MRV and registry procedures; (ii) publish methodologies and safeguard criteria for all traded units; (iii) apply non-discriminatory benchmarks and notify standards under the TBT Agreement where relevant; (iv) design free allocation and cost-containment instruments to comply with SCM rules; and (v) regulate brokers, depositories, and settlement banks in line with GATS, while using the prudential carve-out for financial stability. By embedding these elements, Vietnam can minimise legal risks, reinforce investor confidence, and prepare the CTX for future interoperability with international carbon markets.

Box 6.2: International lessons on WTO alignment

- **EU ETS:** The European Union gradually phased out free allocation and justified remaining leakage protection with sectoral benchmarks and clear sunset provisions. This limited exposure to WTO subsidy claims while ensuring competitiveness safeguards.
- **Korea ETS:** Korea initially relied heavily on free allocation but introduced benchmark-based allocation and time-bound support. This was paired with strict rules separating allocation from export performance, mitigating subsidy-related risks.
- **Lesson for Vietnam's CTX:** Early reliance on free allocation is common, but WTO risks are minimised when allocation is benchmark-based, transparent, and clearly transitional. Embedding such principles into CTX rules will reduce trade disputes and strengthen credibility.

6.4 Legal and regulatory impacts

The legal foundation for Vietnam's carbon market in general and for the CTX specifically derives from the 2020 Law on Environmental Protection, Decree No. 06/2022/ND-CP, and its amendment under Decree No. 119/2025/ND-CP and Decision 232/2024/QD-TTg approving a national scheme to develop the country's carbon market. Together, these instruments authorise the allocation,

trading, and retirement of emission allowances and carbon credits, while the Draft Decree on the Domestic Carbon Exchange specifies CTX operations. Although this framework establishes the CTX's legitimacy, several areas require further refinement to ensure market credibility and investor confidence.

A first challenge is the ***legal classification of carbon units***. It is not yet defined whether allowances and credits transacted on the CTX constitute securities, commodities, or sui generis environmental assets. This ambiguity has implications for taxation, accounting, collateralization, insolvency treatment, and contractual enforcement. For the CTX to function effectively, ownership, transferability, and liability of these units must be codified, providing certainty to market participants and regulators alike. This gap should be addressed in the coming revision of the Law on Environmental Protection 2020.

A second priority is a robust dispute resolution framework. As CTX activity expands, disagreements over credit eligibility, allowance shortages, settlement failures, or alleged manipulation are inevitable. Vietnam needs clear administrative and judicial mechanisms to resolve such disputes efficiently. This includes jurisdictional clarity between MAE, SSC, HNX, and VSDC; specialised training for arbitrators and judges; and standardised procedures for mediation and appeals. Embedding such mechanisms in CTX regulations will help sustain trust in the platform.

Third, the CTX must be integrated with international obligations. Alignment with the Paris Agreement requires that MRV rules and registry functions underpinning CTX transactions are transparent and compatible with global reporting frameworks. Safeguards such as permanence, environmental integrity, and prevention of double claiming must be codified for any units admitted to trading. At the same time, WTO law introduces additional constraints: allocation and cost-containment measures must avoid creating prohibited subsidies; CTX participation rules for brokers, depositories, and settlement banks must respect Vietnam's General Agreement on Trade in Services (GATS) commitments while using the prudential carve-out to justify risk-control measures. These obligations place the CTX at the intersection of environmental, financial, and trade law, making cross-regulatory coordination essential.

Finally, the effectiveness of the CTX will depend on subordinate regulations and technical guidelines. Detailed rules on allowance auctions, offset eligibility, fee structures, and compliance timelines are still under preparation. Their clarity will determine how burdensome compliance becomes for enterprises and how predictable revenues are for the government. For businesses, certainty on unit eligibility, accounting treatment, and reporting requirements is a prerequisite for active participation. For regulators, coherent rules are necessary to safeguard market integrity, prevent abuse, and ensure compatibility with both domestic law and international norms.

In sum, while the high-level framework for the CTX exists, its long-term credibility will hinge on clarifying the legal nature of carbon units, establishing effective dispute-resolution mechanisms, ensuring compliance with international commitments, and issuing detailed technical rules. These steps are critical to building market confidence and enabling the CTX to operate as a credible, rules-based trading platform.

6.5 International and geopolitical impacts

Vietnam's carbon market is not only a domestic environmental policy but also a geopolitical signal of the country's climate leadership and trade adaptability. From an international law perspective, the ETS strengthens Vietnam's credibility in fulfilling its NDCs under the Paris Agreement. By creating a legally enforceable, market-based system to limit emissions, Vietnam moves beyond aspirational climate goals and into the realm of verifiable implementation. This enhances its diplomatic standing in climate negotiations and may improve access to climate finance under Article 6 or the Green Climate Fund. Moreover, the ETS sends a strong signal to development partners and investors that Vietnam is willing and able to institutionalise long-term decarbonization strategies. This credibility can translate into concessional funding, technical assistance, and preferential terms for climate-aligned investments.

The ETS also plays a critical role in preparing Vietnam for the EU's CBAM. Sectors such as steel, cement, and aluminium, which are among Vietnam's leading exports to the EU, will face CBAM tariffs unless they can demonstrate that carbon costs have already been borne at home. By capping emissions and assigning carbon prices to these sectors through the domestic ETS, Vietnam provides a means to offset or mitigate CBAM liabilities. This will help protect market access for Vietnamese exporters while encouraging domestic industries to modernise and decarbonise. In this sense, the carbon market is both a compliance tool and a trade safeguard, ensuring that Vietnam remains competitive in a global economy that increasingly values carbon transparency.

Beyond trade defence, the ETS provides a credible framework for mobilising green finance. By establishing clear legal and market structures for carbon credit generation and trading, Vietnam opens the door to investments from companies and countries seeking high-integrity offsets. Bilateral agreements under Article 6.2 are already being explored with Japan, Switzerland, and Singapore, while Vietnam's participation in multilateral offset markets is expected to grow. The ETS also lays the groundwork for future regional integration with ASEAN or other carbon markets in Asia. This regionalisation could enhance market liquidity, reduce compliance costs, and create a level playing field for regional trade. However, international engagement also introduces new dependencies. Vietnam must manage exposure to volatile offset prices, fluctuations in foreign demand, and shifts in international rules. The government must also ensure that international transfers of emission reductions do not compromise domestic climate goals. This calls for a careful balancing act between attracting foreign investment and maintaining environmental sovereignty.

In sum, Vietnam's CTX positions the country as a regional leader in climate market design, enhances its bargaining power in international negotiations, and provides a pathway to harmonise economic development with environmental responsibility. If implemented effectively, the CTX will not only reduce emissions but also reinforce Vietnam's role as a proactive and resilient state in global climate governance.

7 SWOT ANALYSIS OF THE CTX

This section summarises the internal strengths and weaknesses and the external opportunities and threats associated with the establishment and operation of the CTX. The analysis draws on

the preceding assessments of economic, environmental, institutional, and legal impacts, reflecting the CTX's role as a strategic public-investment platform for implementing Vietnam's ETS.

Table 11: SWOT matrix of the CTX (Internal vs external factors)

Internal Factors	External Factors
Strengths • Strong legal and institutional foundation: The CTX is firmly embedded in the 2020 Law on Environmental Protection, Decree 06/2022/ND-CP, as amended by Decree 119/2025, and Decision 232/QD-TTg. These instruments establish clear mandates for the MOF, MAE, HNX and VSDC, ensuring regulatory certainty and a sequenced roadmap from pilot to full operation. The *Draft Decree on the domestic carbon trade exchange* will strengthen the operational governance of the market by defining detailed procedures for trading, clearing, and settlement; clarifying the legal status of emission allowances and carbon credits as financial assets; and establishing supervisory, disclosure, and risk-management requirements consistent with securities-market standards. • Integration with existing market infrastructure: By leveraging HNX and VSDC systems, the CTX benefits from established clearing, settlement, and surveillance procedures. This ensures operational reliability, transparency, and credibility comparable to the national securities market, while significantly reducing start-up costs and implementation time through the reuse of existing infrastructure and technical expertise. • Socio-economic and environmental benefits: ENPV analysis confirms consistent net social gains even where financial NPV is negative. The CTX stimulates low-carbon investment, creates skilled employment, and supports measurable GHG reductions aligned with NDC targets. • Alignment with international standards: Design features ensure conformity with international standards, safeguards such as verified units, prevention of double counting, and transparency in reporting reinforce integrity and enable future market linkages.	**Opportunities** • Transition to a mature, self-financing ETS – From 2029 onward, the introduction of allowance auctions and fee-based revenues will move the CTX from a budget-supported pilot to a financially sustainable national platform, generating fiscal resources for reinvestment in climate actions. • Integration with regional and international markets: Once domestic systems mature, Vietnam can pursue bilateral linkages under Article 6.2 and participation in global mechanisms under Article 6.4, attracting international capital and enhancing liquidity. • Catalyst for private-sector innovation and green finance: The CTX can spur development of carbon-related financial products and digital solutions (e.g., blockchain-based registry, carbon-linked securities), expanding participation and transparency across the green-finance ecosystem. • Enhancement of trade competitiveness: Through standardised MRV and verified carbon-price data, exporters can demonstrate compliance with CBAM and other emerging trade measures, strengthening Vietnam's green-industrial competitiveness.
Weaknesses • Limited financial sustainability in the pilot phase: During 2025–2028, fee-based revenues are insufficient to offset operating costs, requiring continued public or donor funding. This underscores the need for a phased fiscal-transition plan toward cost recovery. • Institutional and human-resource constraints: The MAE, MOF/SSC, HNX and VSDC need expanded technical	**Threats** • Fiscal and institutional sustainability risks: If state support declines before fee and auction mechanisms mature, operational continuity could be jeopardised. Prolonged deficits would erode confidence and delay the transition to full market operation.

staffing for operation, compliance auditing, and market oversight. Enterprises also require training to participate effectively. • Incomplete data and system interoperability: Full real-time integration between the NRS and CTX platform is still under development. Any delays or data inconsistencies could undermine transparency and efficiency. • The risk of low liquidity: Early-stage liquidity may be low due to the absence of stabilisation mechanisms, limited domestic credit supply and limited participation beyond the initial compliance sectors. However, this challenge is expected to ease over time as the domestic credit pipeline expands, auctioning mechanisms mature, and liquidity tools are introduced in subsequent phases of the CTX's development.	• Regulatory fragmentation and coordination gaps: Unclear division of roles between environmental and financial regulators could cause overlap or inconsistent enforcement, weakening market discipline and trust. • Exposure to external market and policy volatility: Fluctuations in global carbon prices or adjustments to international measures such as CBAM may affect domestic allowance values and market stability. • Capacity and enforcement challenges: Weak surveillance or limited sanctioning capacity may increase risks of market manipulation or non-compliance, slowing Vietnam's readiness for international linkage.

Source: The Consultant's analysis results

Overall, the CTX possesses a robust legal and institutional base, strong synergies with existing market infrastructure, and clear alignment with Vietnam's Net Zero pathway. These internal strengths, combined with the opportunities arising from international linkage and green-finance innovation, position the CTX as a cornerstone of Vietnam's long-term carbon-market architecture. However, the platform's short-term financial dependency, institutional capacity gaps, and evolving data systems present implementation challenges that must be managed carefully. Sustained fiscal support, coordinated oversight between MAE and MOF/SSC, and accelerated capacity building are essential to ensure operational stability and prepare for international connectivity. If these issues are addressed proactively, the CTX will evolve into a durable, self-financing, and internationally credible market mechanism supporting Vietnam's ETS and Net Zero commitment through 2050.

8 CONCLUSIONS AND POLICY RECOMMENDATIONS

8.1 Overall conclusions

The pilot CTX represents a critical step in Vietnam's transition from policy design to practical implementation of carbon pricing as a core instrument for meeting its NDC and Net Zero commitment.

The assessment under this Deliverable confirms that the CTX represents a strategic public-investment initiative rather than a profit-oriented enterprise. Although the platform is not expected to achieve financial self-sufficiency during the pilot phase, its wider economic, social, and environmental benefits justify continued state support in the short term and a structured transition toward financial sustainability thereafter.

Under the quantitative analysis, the CTX requires an estimated capital investment (CAPEX) of USD 190,000 – 580,000 and annual OPEX of USD 100,000 – 200,000 during 2026 – 2028. Fee revenues are intentionally set to zero in the pilot to encourage market participation; therefore, the financial NPV is negative in all pilot scenarios.

However, while the CTX will not generate sufficient financial returns to cover its own operating costs during the pilot phase, the ENPV or positive socio-economic and environmental net benefits remain positive across all scenarios. The CTX is projected to mitigate the macroeconomic impact of compliance costs by up to +0.0019 percent of GDP per year under the conditional NDC scenario while directly contributing to the achievement of Vietnam's 2022 NDC targets. The CTX also brings significant co-benefits in air quality and energy efficiency.

At the same time, the CTX generates significant social value that strengthens skilled employment within regulatory bodies and market operators (MAE, MOF/SSC, HNX, VSDC), improving enterprise readiness for carbon pricing, and supporting more inclusive participation in emerging green-finance markets. These outcomes collectively demonstrate high social returns on public investment and reinforce the CTX's importance as an enabling infrastructure for the national ETS.

8.2 Strategic threats to long-term CTX sustainability

Despite the positive socio-economic and environmental impact, the following four key structural threats could constrain the CTX's effectiveness in the long run, particularly under limited state-budget conditions:

(1) Fiscal constraint risk: A persistent reliance on annual budget allocations exposes the CTX to fiscal tightening and competing public-expenditure priorities, threatening operational continuity.
(2) Liquidity and participation risk: Slow development of domestic offsets and the absence of market stabilisation tools may result in thin trading volumes, weak price discovery, and reduced confidence among participants.
(3) Operational fragility risk: Dependence on governmental agencies for system operation without cost-recovery mechanisms could impede necessary upgrades, cybersecurity assurance, and service quality.
(4) Institutional inertia risk: Without clear incentives and performance-based governance, the CTX may struggle to innovate and maintain efficiency once external technical assistance concludes.

8.3 Policy recommendations for sustaining CTX effectiveness

To maintain the long-term effectiveness and credibility of the CTX, policy actions should focus on strengthening its financial viability, market functionality, operational efficiency, and institutional governance. The following recommendations outline a phased and coordinated approach that enables the CTX to evolve from a state-funded pilot into a self-sustaining, transparent, and resilient market platform.

(a) Fiscal transition plan and diversified revenue sources

- Introduce phased service fees: Commence moderate listing and transaction fees from 2029, indexed to market volume and capped to avoid deterring participation.
- Establish allowance-auction revenues: Auction a small percentage of annual allowances (e.g. 5 – 10%) by 2029 to generate transparent price signals and stable income for CTX operations.

- Reinvest compliance-related revenues: Dedicate penalties, late-payment interest, and administrative fines to a Carbon Market Development Fund earmarked for CTX maintenance, capacity-building, and research & development.
- Mobilise external financing: Utilise international climate-finance sources to co-finance system enhancements and training during the transition to self-financing.

(b) Liquidity-enhancement and market-confidence measures

- Adopt price-stabilisation instruments: Introduce an Auction Reserve Price (ARP) as a floor and a Cost Containment Mechanism (CCM) as a ceiling, consistent with Deliverable 2 recommendations, to prevent excessive volatility.
- Expand credit supply: Accelerate approval of domestic offset methodologies and streamline project registration under MAE to guarantee steady credit availability for trading and compliance.
- Consider accrediting market makers in the full operation phase: Authorise licensed brokers or financial institutions to provide continuous bid–ask quotations within defined spreads, ensuring market depth.

(c) Efficiency and digital infrastructure improvement

- Automate registry–exchange linkage: Integrate NRS, HNX, and VSDC systems for real-time data exchange and automated reconciliation, reducing administrative overheads.
- Offer value-added digital services: Provide analytics, emissions-tracking, and compliance-advisory tools on a subscription basis to enterprises, generating supplemental income.
- Contract specialised cybersecurity services: Engage certified IT providers through performance-based contracts to ensure system integrity at predictable costs.

(d) Institutional and governance strengthening

- Formalise cost-sharing arrangements: Define service-level agreements (SLAs) among MAE, MOF/SSC, HNX, and VSDC specifying budget responsibilities, revenue allocation, and data-sharing protocols.
- Adopt performance-based budgeting: Link annual CTX funding to measurable indicators such as trading volume, compliance rate, system uptime, and audit results.
- Enhance transparency and accountability: Mandate annual publication of CTX financial statements, trading statistics, and operational performance indicators.

(f) Address foundational legal constraints

- Clarify the legal nature of carbon units: Establish a clear legal classification for carbon credits and emission allowances should be prioritised to reduce significant risks related to taxation, accounting, and the use of units as collateral.

(e) Mid-term review and adaptive regulation

- Conduct a comprehensive mid-term evaluation in 2027 to reassess fiscal sustainability, market performance, and regulatory effectiveness, consistent with the 2024 Law on Public Investment.
- Adjust fee schedules and operational rules based on the review findings, ensuring that cost-recovery measures do not compromise accessibility or environmental integrity.

- Coordinate with Deliverable 4 implementation to integrate transaction-monitoring, market-supervision, and risk-management frameworks that reinforce both transparency and long-term sustainability.

8.4 Forward-looking perspective

Over the long run, the CTX should evolve from a state-financed pilot into a self-sustaining, market-based infrastructure underpinning Vietnam's ETS and broader climate-finance ecosystem. By 2030, the CTX is expected to:

- Operate on a cost-recovery basis through a mix of auction revenues, service fees, and dedicated funds.
- Maintain liquid and orderly markets supported by rule-based stabilisation mechanisms and credible market-maker participation.
- Integrate seamlessly with the NRS, MRV framework, and national financial-supervision architecture under unified digital governance.
- Uphold environmental integrity, transparency, and compliance confidence necessary for future international linkages under Article 6 of the Paris Agreement.

In conclusion, the CTX delivers clear socio-economic and environmental value as a public investment and a strategic policy instrument for Vietnam's low-carbon transition. To sustain this value under constrained fiscal conditions, policy efforts should prioritise diversified revenue streams, robust market mechanisms built upon a clear legal classification for carbon units, and accountable governance. With careful sequencing, from a state-supported pilot in the short term to a fee- and auction-based model in the long term, the CTX can evolve into a resilient, self-financing platform that supports national NDC achievement and strengthens Vietnam's competitiveness in regional and global carbon markets.

ANNEXES

Annex 1: International Emissions Trading Systems

No.	Jurisdiction/platform	Reference (public title + date)	Citation
1	EU ETS – Union Registry & Common Auction Platform	*Report on the Functioning of the European Carbon Market 2024*(European Commission, Nov 2024) – includes EU-level budget appropriations for registry & auction administration	climate.ec.europa.eu
2	Western Climate Initiative (California & Québec)	Budget Change Proposal "Cap-and-Trade Administrative Services (WCI, Inc.)" – California Air Resources Board, FY 2025-26	bcp.dof.ca.gov
3	Regional Greenhouse Gas Initiative (RGGI Inc.)	*2024 Operating Budget* (RGGI Inc., Jan 2024) – line-item breakdown of personnel, IT, and auction costs	rggi.org
4	New Zealand ETS (EPA Register)	*Annual Report 2024* – Environmental Protection Authority, section "Management of the NZ ETS" with Register CapEx/OpEx figures	epa.govt.nz
5	Korea ETS (K-ETS, Korea Exchange)	Korea ETS (K-ETS) Factsheet 2025 – International Carbon Action Partnership (ICAP)	icapcarbonaction.com
6	China National ETS (Shanghai EEX)	Global Times article "China's national carbon trading begins, ramping up efforts to cut emissions" – 16 Jul 2021	globaltimes.cn
7	Intercontinental Exchange (ICE)	Press release "Intercontinental Exchange Reports Strong Full Year 2024 Results" – 6 Feb 2025 (OpEx & CapEx guidance)	ir.theice.com
8	Lao Securities Exchange (LSX)	Reuters dispatch "Laos dips toe in global marketplace with new bourse" – 11 Jan 2011 (USD 20 million start-up cost)	

Source: Compiled by the Consultant

Annex 2: Input assumptions for CTX investment and operating cost scenarios

Assumptions	Unit	Year 0 (2025)	2026	2027	2028	2029	2030
I. Low Scenario							
Auction Rate	%	0%	0	0	0	5%	10%
Allowance Auction Price	USD/allowance	2.8	2.8	2.8	2.8	2.8	2.8
Total Auctioned Allowances (10% of total)	thousand tons CO_2	0	-	-	-	10,189	20,511
Carbon Credit Transaction Value from Unconditional Market with 30% Offset Policy	USD	-	7,918,799	6,320,672	6,365,494	6,482,382	6,689,605
Carbon Credit Transaction Value from Conditional Market with 30% Offset Policy	USD	-	53,439,746	51,620,907	50,308,542	47,298,695	43,789,164
Allowance Transaction Value from Unconditional Market with 30% Offset Policy	USD	-	-	-	-	-	-
Allowance Transaction Value from Conditional Market with 30% Offset Policy	USD	-	-	-	23,876,985	22,597,532	22,514,782
In total, in the first allocation period 2025-2026, the participants in the CTX are assumed to be around 538, which is projected to increase 20% annually. This total is used to scale access, onboarding, and potential fee-based	Enterprises	-	538	108	108	108	108
Carbon Trading Member Management Fee	million VND/member/year	20	20	20	20	20	20
Initial Carbon Credit Trading Registration Fee	million VND	10	10	10	10	10	10

Assumptions	Unit	Year 0 (2025)	2026	2027	2028	2029	2030
Carbon Credit Trading Registration Information Change Fee	million VND/instance	5	5	5	5	5	5
Carbon Credit/Allowance Transaction Fee on the Exchange	% of transaction value	0.027	0.027	0.027	0.027	0.027	0.027
Carbon Credit Transaction Surcharge on the Exchange	% of transaction value	1.2	1.2	1.2	1.2	1.2	1.2
Value Added due to ETS with Unconditional Scenario	% GDP	0.001	0.001	0.001	0.001	0.001	0.001
Value Added due to ETS with Conditional Scenario	% GDP	0,0027	0,0019	0,0016	0,0017	0,0018	0,0018
Assumed On-Exchange Trading Rate	%	100					
GDP Value	billion USD	511.07	548.38	588.41	631.36	677.45	726.91
Personnel	Persons	10	10	10	10	10	10
Average Salary (average 5% annual increase)	VND/person/year	302,400,000	317,520,000	333,396,000	350,065,800	367,569,090	385,947,545
Office Rental Price	USD/m²/month	20	20	20	20	20	20
Floor Area	m²	400	400	400	400	400	400
II. High Scenario							
Auction Rate	%	0	0	0	0	0	0
Allowance Auction Price	USD	2.6	2.6	2.6	2.6	2.6	2.6
Total Auctioned Allowances (10% of total)	thousand tons of CO_2	0	0	0	0	10,189	20,511

Assumptions	Unit	Year 0 (2025)	2026	2027	2028	2029	2030
Carbon Credit Transaction Value from Unconditional Market with 30% Offset Policy	USD	-	7,918,799	6,320,672	6,365,494	6,482,382	6,689,605
Carbon Credit Transaction Value from Conditional Market with 30% Offset Policy	USD	-	53,439,746	51,620,907	50,308,542	47,298,695	43,789,164
Allowance Transaction Value from Unconditional Market with 30% Offset Policy	USD	-	-	-	-	-	-
Allowance Transaction Value from Conditional Market with 30% Offset Policy	USD	-	-	-	23,876,985	22,597,532	22,514,782
In total, in the first allocation period 2025-2026, the participants in the CTX are around 538, that assumed to increase 20% annually. This total is used to scale access, onboarding, and potential fee-based	Enterprises	-	538	108	108	108	108
Carbon Trading Member Management Fee	million VND/member/ year	20	20	20	20	20	20
Initial Carbon Credit Trading Registration Fee	million VND	10	10	10	10	10	10
Carbon Credit Trading Registration Information Change Fee	million VND/instance	5	5	5	5	5	5
Carbon Credit/Allowance Transaction Fee on the Exchange	% of transaction value	0.027	0.00027	0.00027	0.00027	0.00027	0.00027
Carbon Credit Transaction Surcharge on the Exchange	% of transaction value	1.2	1.2	1.2	1.2	1.2	1.2

Assumptions	Unit	Year 0 (2025)	2026	2027	2028	2029	2030
Value Added due to ETS with Unconditional Scenario	% GDP	0.001	0.001	0.001	0.001	0.001	0.001
Value Added due to ETS with Conditional Scenario	% GDP	0.0027	0.0019	0.0015	0.0016	0.0016	0.0016
Assumed On-Exchange Trading Rate	%	100	100	100	100	100	100
GDP Value	billion USD	511.07	548.38	588.41	631.36	677.45	726.91
Personnel	Persons	12	12	12	12	12	12
Average Salary (average 5% annual increase)	VND/person/year	302,400,000	317,520,000	333,396,000	350,065,800	367,569,090	385,947,545
Office Rental Price	USD/m²/month	20	20	20	20	20	20
Floor Area	m²	400	400	400	400	400	400

Source: The Consultant's analysis results.