Institut européen
European Institute

LUISS
School of Government

Joint Master in Global Economic Governance and Public Affairs

Linking the EU and Chinese ETS: Policy Pathways and Economic Implications for Climate Cooperation

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2025

THESIS PITCH

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Statutory Declaration

I hereby declare that I have composed the present thesis autonomously and without use of any other than the cited sources or means. I have indicated parts that were taken out of published or unpublished work correctly and in a verifiable manner through a quotation. I further assure that I have not presented this thesis to any other institute or university for evaluation and that it has not been published before.

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ABSTRACT

This thesis looks at the feasibility and strategic consequences of linking the European Union Emissions Trading System (EU ETS) with China's national ETS. As global climate governance becomes more reliant on carbon markets, connecting these two main systems could improve cost-efficiency, emissions reductions, and international collaboration. However, legal, institutional, and political differences provide considerable problems. The thesis assesses the conditions under which linking is feasible by combining economic studies, comparative policy and legal analysis with semi-structured expert interviews. A review of quantitative modeling research affirms the economic benefits of linking, particularly for the EU, but also exposes distributional disparities and design trade-offs. The legal analysis identifies differences in cap structures, monitoring systems, and enforcement mechanisms, whilst the political evaluation reveals fragmented support within the EU, weak regulatory convergence in China, and foreign geopolitical pressures, most notably from the US. Rather than advocating for rapid integration, the thesis presents a scenario-based roadmap with progressive approaches, including sectoral pilots and Article 6 cooperation under the Paris Agreement. It contends that linking should be viewed as a gradual governance process characterized by sequencing, institutional alignment, and trust-building.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

CBAM – Carbon Border Adjustment Mechanism

CEPS – Centre for European Policy Studies

CER – Centre for European Reform

CGE – Computable General Equilibrium (model)

CGTN – China Global Television Network

CLIMA – Directorate-General for Climate Action

CMA – Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement

COP – Conference of the Parties (UNFCCC)

DART – Dynamic Applied Regional Trade model

DG – Directorate-General

EC – European Commission

EDF – Environmental Defense Fund

EPPA – Emissions Prediction and Policy Analysis model

ESMA – European Securities and Markets Authority

ETS – Emissions Trading System

EU – European Union

GASSA – Global Arrangement on Sustainable Steel and Aluminium

ICAP – International Carbon Action Partnership

ITMO – Internationally Transferred Mitigation Outcome

LPA – Law and Public Administration

LRF – Linear Reduction Factor

MEE – Ministry of Ecology and Environment (China)

MRV – Monitoring, Reporting and Verification

MSR – Market Stability Reserve

NDC – Nationally Determined Contribution

NGFS – Network for Greening the Financial System

SOE – State-Owned Enterprise

UNFCCC – United Nations Framework Convention on Climate Change

Chapter 1: INTRODUCTION

1.1 Background and Context

Climate change is one of the most pressing and complex challenges facing humanity, with profound consequences for ecosystems, economies, and societies worldwide. Adopted in 2015, the Paris Agreement marked a turning point in climate governance, setting a binding goal to limit global warming well below 2°C, with efforts toward 1.5°C. To realize this objective, it is imperative that ambitious and cost-effective mitigation policies are adopted both across sectors and borders.

Emissions Trading Systems (ETSs) are among the most widely adopted tools, using market-based mechanisms to reduce emissions. ETSs function on the principle of "cap and trade," wherein a regulatory authority sets a limit (cap) on total emissions and issues allowances that can be traded among entities. This mechanism creates a carbon price, incentivizing firms to invest in low-emission technologies and reduce emissions where it is cheapest to do so (Liu & Wei, 2016). As of 2025, 38 ETSs are in force globally, covering approximately 19% of global greenhouse gas emissions and raising about USD 70 billion in revenue in 2024 (ICAP, 2025).

The EU ETS and China's national ETS are two of the most influential carbon markets globally. Launched in 2005, the EU ETS is the most developed carbon market, covering electricity, industry, and aviation across 27 member states. It has undergone numerous stages to improve price stability, environmental ambition, and consistency with the EU's overall Green Deal (Ellerman et al., 2016; Verde et al., 2021). The Chinese ETS, which was introduced in 2021, is in its early stages of development and only covers the power industry. It is an expansion of several regional pilot schemes that were launched in the early 2010s and is currently the largest ETS in the world in terms of the volume of emissions (Schreifels et al., 2012; Feng et al., 2018).

Nevertheless, although the theoretical benefits of linkage are well-documented, there are still significant obstacles in practice. The EU and Chinese systems have a lot of differences regarding legal framework, cap-setting processes, allowance distribution, monitoring and enforcement processes, and market maturity (Mehling & Haites, 2009; Zhang et al., 2022). The situation is complicated by political and institutional differences, which cast doubt on the possibility and timing of such a linkage (Oberthür et al., 2022; Evans & Wu, 2021).

While most literature focuses on theoretical benefits or economic models, this thesis examines the legal, institutional, and political conditions shaping linkage feasibility.

1.2 The Importance of Climate Policy and ETS Linkages

Climate policy has changed from establishing domestic carbon objectives to encouraging international collaboration and market integration as global efforts to combat climate change acceleration. By internalizing the cost of carbon and using market-based mechanisms to incentivize emission reductions, ETS, as adaptable economic policy tools, have emerged as key tools in this transition (Mehling & Haites, 2009). For these reasons, large economies looking to balance industrial competitiveness and decarbonization find them particularly appealing. Additionally, by constantly modifying the carbon price signal in response to shifting economic conditions, ETSs can gradually promote investment in cleaner technologies (Doda & Taschini, 2016). These benefits can be increased by linking ETSs across jurisdictions.

A joint carbon market leads to higher liquidity, less volatility of prices, and the ability of countries or companies to find cheaper abatement opportunities (Flachsland et al., 2009; Sun, 2022). By doing so, linkage increases cost-effectiveness and environmental ambition, as well as representing a high degree of international policy coordination (Bodansky et al., 2016). Nevertheless, successful linkage requires the compatibility of systems, such as cap-setting approaches, allocation of allowances, monitoring, reporting and verification (MRV) processes, and enforcement (Zhang et al., 2022; Mehling et al., 2018).

The Paris Agreement, namely Article 6.2, highlights the strategic importance of such market integration. It provides a framework of transferring internationally transferred mitigation outcomes (ITMOs) that basically legitimizes and encourages international carbon market linkages (Bodansky et al., 2016). The past experience of linkage is informative. The EU-Switzerland ETS linkage is often cited as a successful example of cross-border integration of carbon markets because of shared institutional frameworks and aligned regulations (Vöhringer, 2012). The failed EU-Australia talks, however, show the technical and political challenges that can be in the path of connection, especially when systems are different in design, stringency, or political will (Evans & Wu, 2021). In this regard, the connection between the EU and Chinese ETSs holds both the transformative potential and significant challenges. This would not only establish the biggest carbon market globally but also be a bold move in transnational climate collaboration between two structurally dissimilar economies and governance systems (Oberthur et al., 2022). Although it is likely to bring efficiency and increased emissions reductions (Li et al., 2019), it also requires coordination on legal, institutional, and political levels, which makes it a decisive and complicated frontier in the development of international carbon markets (Schreifels et al., 2012; Verde et al., 2021).

1.3 The Role of EU–China ETS Linkage in Global Climate Governance

In the evolving landscape of global climate governance, the European Union and China occupy pivotal roles as both influential policymakers and emitters. Together, the EU and China account for over one-third of global greenhouse gas emissions and possess the economic and technological capacities to shape global climate action (Verde et al., 2021). As such, their cooperation on climate mitigation, particularly through carbon market integration, holds far-reaching implications for the success of international efforts under the Paris Agreement.

The possible connection between the EU ETS and the Chinese National ETS would be the most ambitious effort so far to harmonize two dissimilar carbon markets. In addition to the possible economic and environmental benefits, including increased cost-efficiency and faster emissions reductions (Li et al., 2019; Winkler et al., 2021), such a connection would represent a transition to more coordinated and institutionalized transnational climate governance. Paterson et al. (2013) claim that such form of governance is becoming more reliant on polycentric networks of actors and institutions rather than top-down treaty-based mechanisms, which implies that market linkages are a key mechanism of operationalizing global commitments.

The EU-China connection may also increase the effectiveness and credibility of Article 6 mechanisms by facilitating cross-border carbon trading in a strong governance framework, particularly when it comes to bilateral or plurilateral agreements (Bodansky et al., 2016; Mehling & Haites, 2009).

However, geopolitical situation cannot be ignored. The relationship between EU and China is not merely motivated by the common desire to cooperate on climate but also by the trade, technology, and world power conflict (Zhang et al., 2022; Oberthür et al., 2022).

Although technical in its nature, carbon market integration is part of this wider diplomatic context. The experience with ETS linkages demonstrates the significance of the long-term political will, legal compatibility, and trust-building actions (Vöhringer, 2012; Evans & Wu, 2021). Consequently, although the EU and Chinese ETSs are not likely to be connected in the near future, they are a strategically important objective in the framework of international climate collaboration.

This research investigates the legal, institutional, and political feasibility of linking the EU and Chinese Emissions Trading Systems. It addresses the following questions: *How can linking the EU and Chinese Emissions Trading Systems (ETS) optimize cost-efficiency, enhance global emission reductions, and align with the Paris Agreement goals, while overcoming* *legal, political, and operational challenges? What legal and operational barriers exist to linking the EU and Chinese ETS, and how might they be addressed?*

The thesis integrates semi-structured expert interviews and comparative policy and legal analysis to address this question, offering a structural and stakeholder-informed understanding of linking feasibility. By focusing on both structural divergences and stakeholder perspectives, the thesis contributes a comprehensive feasibility assessment grounded in practice, not just theory. The thesis proceeds as follows:

Chapter 2: Methodology

Outlines the qualitative research design, including the use of comparative policy analysis and expert interviews, and explains how these methods contribute to the overall feasibility assessment.

Chapter 3: Literature Review

Reviews the existing academic literature and identifies three main gaps.

Chapter 4: Quantitative evaluation of desirability

Reviews economic modeling studies on cost-efficiency and climate outcomes.

Chapter 5: Legal and institutional feasibility: can this work in practice?

Analyzes the legal structures, cap-setting methods, MRV procedures, and enforcement systems of both ETSs, assessing compatibility and identifying areas for convergence.

Chapter 6: Political challenges: who supports, who blocks and why it matters

Examines the political dynamics within the EU and China, as well as the broader geopolitical context, including the impact of US relations and strategic interests.

Chapter 7: Strategic pathways to EU-China ETS linkage: a conditional roadmap

Offers concrete policy pathways for moving toward EU–China ETS linkage.

Chapter 8: Conclusions

Summarizes the key findings and reflects on the implications for integration and climate diplomacy more broadly.

Chapter 2: METHODOLOGY

2.1 Research Design Overview

This research uses qualitative methods to study EU ETS-China's National ETS linkage feasibility while drawing from existing quantitative studies. The research aims to assess potential legal and operational as well as political obstacles to linking EU ETS with China's National ETS while developing policy strategies for successful implementation. Qualitative research methods were selected because the research question focuses on institutional compatibility alongside regulatory divergence and political dynamics instead of developing new economic models. The theoretical economic advantages of ETS linkage have been demonstrated through existing CGE studies and dynamic modeling frameworks (Winkler et al., 2021; Li et al., 2019; Sun, 2022) yet these models use simplified assumptions that do not capture the complete range of real-world regulatory, legal, and diplomatic complexities (Mehling et al., 2009; Gavard et al., 2016). This thesis uses selected findings from existing studies to establish the wider context yet its core original value stems from studying the institutional and political aspects of linkage feasibility. The research foundation consists of two qualitative methods which support each other:

1. The analysis compares structural elements and potential convergence points between EU and Chinese ETS through a study of cap-setting procedures and allowance distribution strategies and monitoring systems and compliance procedures. The analysis seeks to detect institutional barriers that might prevent linkage while evaluating standardization possibilities through mutual recognition.

2. Semi-Structured Expert Interviews serve as a methodology to understand how political and institutional factors influence ETS design processes and linkage negotiations. The research will possibly conduct interviews with EU and Chinese policymakers together with carbon market experts and representatives from national institutions and international organizations to understand regulatory and legal findings and stakeholder perspectives and feasible governance strategies.

The research uses qualitative methods to create a policy-relevant assessment of ETS linkage conditions. This method provides an accurate view of how institutional frameworks and political determination influence each other to understand realistic possibilities for integration under the Paris Agreement.

2.2 Review of Quantitative Findings

To establish a baseline of potential efficiency and environmental gains from EU–China ETS linkage, this thesis draws on existing quantitative literature. Although it lacks unique economic modeling, this thesis contextualizes the merits of ETS integration by methodically reviewing important findings from dynamic multi-region models, computable general equilibrium (CGE) models, and policy simulations.

These modeling results consistently suggest that:

A linked EU–China ETS could deliver aggregate economic benefits, even if these are unevenly distributed;

China stands to gain from access to the EU's carbon market, while the EU benefits from lower-cost abatement options;

The global climate impact of a linked system would likely be greater than the sum of its parts, provided regulatory integrity is maintained. However, these studies also rely on simplifying assumptions, such as full regulatory alignment, stable political cooperation, and frictionless trade, that may not reflect real-world conditions.

Therefore, while quantitative literature strongly supports the theoretical desirability of linkage, it also reinforces the importance of assessing practical barriers to implementation. These include cap-setting methodologies, allowance allocation, and compliance systems.

2.3 Comparative Policy and Legal Analysis

Building on the economic rationale for ETS linkage established in the quantitative literature, this thesis turns to a comparative analysis of the legal and institutional design of the EU and Chinese Emissions Trading Systems. The objective is to identify the regulatory divergences that may hinder linkage and to assess the potential for policy alignment, mutual recognition, or phased convergence. This approach responds to the research sub-question: *What legal and operational barriers exist to linking the EU and Chinese ETS, and how might they be addressed?*

This analysis will be based on desk research and document analysis of:

Official EU legislation, including the EU ETS Directive (2003/87/EC) and its subsequent amendments;

Chinese national ETS regulatory documents and guidelines from the Ministry of Ecology and Environment;

Reports by international organizations such as the International Carbon Action Partnership (ICAP);

Academic and policy literature evaluating past and current linkage cases.

The comparison will be structured around four key dimensions:

Cap-Setting Approaches

Allowance Allocation Methods

Monitoring, Reporting, and Verification (MRV)

Compliance and Enforcement Mechanisms

This comparative analysis will serve two purposes: first, to identify concrete legal and technical barriers to a viable linkage; and second, to inform the design of interview questions in the next stage of the research, ensuring that they are based on real institutional challenges rather than abstract theoretical assumptions.

The results of this section will help identify which barriers are likely to be politically sensitive, which are technically solvable, and which may necessitate long-term structural adjustment, laying the groundwork for policy suggestions in the final chapter.

2.4 Expert Interviews

To complement the institutional analysis, this thesis integrates semi-structured expert interviews aimed at exploring the dynamics influencing the feasibility of linking the EU and Chinese ETSs. While existing literature and policy documents highlight technical and legal differences between the two systems, expert interviews offer a way to uncover practitioner insights, stakeholder perceptions, and informal barriers that are often less visible in formal sources.

This method addresses the research sub-question: *What are the political and institutional dynamics influencing the feasibility of EU–China ETS linkage?*

The interviews are designed to:

Identify stakeholder perspectives on the regulatory and institutional obstacles to ETS linkage;

Understand the political and strategic motivations of key actors;

Explore possible pathways for cooperation, such as phased linkage or mutual recognition;

Assess the perceived relevance of Article 6 of the Paris Agreement as a legal and diplomatic framework for carbon market integration.

Interviewees will be selected based on their expertise in emissions trading, climate diplomacy, or carbon market governance. The intended participants include:

Officials from EU institutions, or national institutions; professionals involved in international ETS negotiations or linkage feasibility studies.

If direct access to Chinese government representatives is not possible, the study will supplement primary interviews with public statements, conference remarks, or published expert interviews to capture the Chinese perspective, if this solution is not possible the thesis will state its positionality as a European standpoint.

This method allows for consistency across key themes while retaining the flexibility to explore new insights, in line with Flick's (2014) best practices in qualitative research.

Interviews will be conducted via video call or email correspondence, depending on participant availability and preference. Each interview is expected to last 20-30 minutes. With prior informed consent, interviews will be recorded and transcribed. Where recording is not permitted, detailed written notes will be taken.

The interview guide will be structured around three thematic areas:

1. Institutional and Legal Compatibility
2. Political Will and Strategic Priorities
3. Linkage Models and Governance Options

Qualitative content analysis will be applied to determine common perspectives, differences, and policy-relevant information. The interviews will be an important source of empirical knowledge, which will assist in putting the findings into perspective in the context of political and administrative processes.

Expert perceptions from various institutions and positions will be compared to determine areas of agreement and disagreement on the potential for EU-China ETS connectivity. These findings will not only help to identify important political and institutional impediments but will also shape the creation of practical policy proposals, particularly those centered on gradual methods to linking, trust-building measures, and governance initiatives. Interview findings will be interpreted alongside the document analysis to ensure triangulation and enhance the robustness of the thesis's conclusions.

All interviews will be conducted in compliance with standard research ethics. Participants will be fully informed about the study's purpose and the use of their data. Anonymity will be maintained unless participants explicitly agree to be cited. Findings will be reported in a way that protects participant confidentiality and data will be securely stored.

Chapter 3: LITERATURE REVIEW

3.1. Introduction to Literature

The linkage between the European Union Emissions Trading System (EU ETS) and China's Emissions Trading System (China ETS) is situated within broader scholarly debates on international carbon markets, policy convergence, and transnational climate governance.

Significant barriers to linkage persist, including regulatory misalignment, allocation system disparities, divergent compliance mechanisms, and carbon price structure differences. The EU–Switzerland ETS linkage and the failed EU–Australia negotiations offer important lessons on the opportunities and challenges of cross-border carbon market integration.

The EU ETS, widely seen as the most mature carbon market, features stringent oversight, transparent reporting, and market stability mechanisms. In contrast, China's ETS remains in an early developmental stage, facing challenges such as price volatility, regulatory inconsistency, and limited data transparency. These discrepancies raise doubts about long-term compatibility. Moreover, the potential for linkage is shaped not only by technical factors but also by the geopolitical dynamics of EU–China trade and climate diplomacy.

This literature review divides its analysis across five sections which include (1) Theoretical and conceptual frameworks of ETS linkages, (2) Examples from other experiences, (3) Economic and environmental implications, (4) Regulatory and institutional challenges, and (5) Political and geopolitical dimensions. The research identifies three main gaps in the existing literature regarding China's national ETS and hybrid linking approaches and ETS integration's geopolitical effects.

3.2. Discussion of Literature

3.2.1 Theoretical and Conceptual Frameworks of ETS Linkages

The concept of linking ETSs is widely discussed in climate policy literature. Mehling & Haites (2009) define linking as the integration of two or more carbon markets to allow trade in emissions allowances, increasing efficiency and reducing compliance costs. According to Flachsland et al. (2009), emissions trading systems can be linked to varying degrees: full linkage involves mutual recognition of allowances and integrated markets; indirect linkage occurs when systems are connected through a shared third-party system; and unilateral linkage refers to one-way acceptance of allowances from another system.

The literature debates between two approaches for linking: top-down harmonization through pre-established common rules versus bottom-up alignment through system evolution over time (Bodansky et al., 2016). Top-down approaches rely on predefined rules negotiated diplomatically, while bottom-up strategies enable flexible evolution but risk regulatory fragmentation and inefficiencies (Tuerk et al., 2009; Mehling et al., 2018; Burtraw et al., 2013).

A key challenge in linking ETSs is the heterogeneity of governance structures. Mehling et al. (2018) argue that differences in market oversight, compliance mechanisms, and price controls create significant barriers to linking developed and developing countries ETSs. Similarly, Mehling and Haites (2009) emphasize that sustaining regulatory compatibility over time requires governance mechanisms for coordinated policy adjustments, periodic revisions, and dispute resolution**.** China's ETS, for instance, operates with strong state influence and evolving compliance measures, whereas the EU ETS follows a more market-driven structure with clear long-term policy signals (Schreifels et al., 2012; Oberthür et al., 2022).

Furthermore, the effectiveness of an ETS linkage is dependent on the level of coordination in monitoring, reporting, and verification (MRV) standards. Zhang et al. (2022) stress that misaligned MRV requirements can lead to market distortions, leakage risks[1], and reduced confidence in carbon pricing. In contrast, the EU-Swiss ETS linkage serves as an example of successful regulatory alignment, where Switzerland adjusted its MRV framework to match EU standards before formal linkage (Vöhringer, 2012).

Paterson et al. (2013) claim that the spread of ETS is not based on a centralized approach but on a polycentric governance model, which implies that the connection between ETSs should be achieved through the realization of their decentralized and networked development. This is consistent with the results of Winkler et al. (2021), who observe that the negotiation of ETS linkages is frequently motivated by economic and geopolitical factors, as opposed to technical harmonization.

Also, Doda & Taschini (2016) indicate that the economic advantage of linking ETSs can be realized when the market structures are complementary, but policy stringency, carbon price levels, and allowance allocations can create volatility in a linked system. This point of view is confirmed by Sun (2022), who states that connecting the ETS of China to the EU ETS would necessitate a thorough overhaul of cap-setting approaches to guarantee the stability of the market in the long term. This underscores the need to have strong institutional frameworks to support cross-border

[1] Carbon leakage refers to the situation that may occur if, for reasons of costs related to climate policies, businesses were to transfer production to other countries with laxer emission constraints. This could lead to an increase in their total emissions. The risk of carbon leakage may be higher in certain energy-intensive industries. See: European Commission (2024), *Carbon leakage*, https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/carbon-leakage_en

carbon trading, as witnessed in the previous experiences of linkage between the EU and Norway (Ellerman et al., 2016).

3.2.2 Regulatory and Institutional Challenges of EU-China ETS Linkage

The literature discusses regulatory mismatches as a barrier to linking the EU and Chinese ETSs. The EU uses a centralized cap-and-trade system that has a transparent legal framework, whereas the Chinese system is marked by provincial autonomy, which creates a lack of consistency in enforcement between regions (Schreifels et al., 2012). The disjointed nature of the Chinese ETS and the changing governance structures have remained a challenge to the harmonization of regulations with the EU standardized and legally enshrined system (Zhang et al., 2022; Sun, 2022).

The other important problem is the allocation of allowances: China is mostly based on free allocation with intensity-based targets, which permits emissions to increase with economic growth- whereas the EU has increasingly used auctioning in a cap-and-trade system that imposes decreasing emissions caps (Goulder et al., 2020). This inherent difference is of concern because Chinese firms could gain an advantage due to an excess of allowances relative to their European peers in a linked system (Li et al., 2019; Oberthür et al., 2022).

China's developing MRV system has faced criticism for data accuracy and enforcement gaps, in contrast to the EU's mature and transparent framework, raising risks of regulatory arbitrage in a linked market (Zhang et al., 2022; Jotzo et al., 2018; Burtraw et al., 2013).

Additionally, compliance mechanisms vary significantly. While China's penalty structure is less stringent and depends more on administrative measures and government oversight than on market-based enforcement, the EU enforces severe financial penalties for non-compliance, guaranteeing high levels of adherence to emissions caps (Ellerman et al., 2016; Wang et al., 2017; Verde et al., 2021).

Offset governance also poses challenges: the EU permits only high-quality credits, while China has traditionally relied on more flexible mechanisms for compliance, raising concerns about environmental integrity in a linked market (Liu & Wei, 2016; Sun, 2022; Mehling & Haites, 2009).

Scholars raise attention to the geopolitical ramifications of regulatory divergence in addition to these structural disparities. China has presented its ETS as a tool to balance economic growth and environmental goals, resulting in different policy priorities from the EU's pursuit of a leadership role in global carbon markets and strict measures to reduce emissions (Bodansky et al., 2016; Paterson et al., 2013).

Regulatory convergence is further complicated by political factors, such as the EU's preference for market-driven climate solutions and China's state-led approach to market governance (Oberthür et al., 2022).

Some researchers suggest incremental linkage strategies considering these institutional and regulatory obstacles. A possible technique is a phased approach in which industries with more compatible regulations, such as the power industry, are linked first before moving on to other industries (Flachsland et al., 2009; Evans & Wu, 2021). Others argue that rather than comprehensive linkage, a more feasible short-term method to enabling market integration while protecting regulatory autonomy would be reciprocal recognition of carbon permits (Doda & Taschini, 2016; Burtraw et al., 2013).

Ultimately, while linking the EU and Chinese ETSs could provide significant economic and environmental benefits, regulatory mismatches remain a substantial barrier. Ensuring a successful linkage would require comprehensive reforms in China's ETS to enhance: transparency, enforcement, market stability and diplomatic negotiations to align regulatory frameworks and address governance discrepancies (Tuerk et al., 2009; Mehling & Haites, 2009).

3.2.3 Linking ETS: Examples from Other Experiences

Previous EU linkage experiences with Switzerland and Australia offer important lessons on the challenges and benefits of international carbon market integration.

CGE models by Vöhringer (2012) and Gavard et al. (2016) highlight efficiency gains from ETS linkage but also warn of distributional impacts and regulatory misalignments, particularly for China's compatibility with the EU in MRV and compliance.

The experience of Australia further highlights key considerations for ETS linkages. Evans & Wu (2021) emphasize that political alignment was a decisive factor in the Australia-EU ETS linking negotiations.

Institutional compatibility was significant in negotiations indicating that regulatory harmonization is important to connect ETSs with variably policy frameworks. In the negotiations it was evident that a variation in price controls, offset mechanisms, and methods in setting up caps could pose obstacles to an effective linkage. The concept of ETS linkages is similarly presented by Mehling & Haites (2009), who state that the interconnection must also have legal and governance congruence such that compliance procedures, enforcements and transparent requirements must be made convergent across boundaries. Historical attempts at linking have shown the importance of using a phased process to reduce the risks of regulatory misalignment. As an example, the EU-Swiss ETS linkage was only successful following long negotiations on allowance recognition, carbon leakage and market stabilization (Vöhringer, 2012; Burtraw et al., 2013). Flachsland et al. (2009) also emphasize the need to slowly change policy frameworks and market design characteristics when negotiating linkage. These examples highlight the importance of incremental institutional coordination and regulatory flexibility in the process of aligning systems with different structures. Although these technical factors are crucial, political orientation and geopolitical environment are also decisive. According to Oberthür et al. (2022), the sustainability of ETS linkage, especially between large players such as the EU and China, depends on the overall diplomatic ties and shared strategic interests.

China's ETS is still developing, with substantial regional variations in implementation and enforcement (Schreifels et al., 2012). This creates added complexity in determining how best to structure a linkage that ensures regulatory consistency without disrupting domestic policy objectives in either jurisdiction.

According to Tuerk et al. (2009) and Paterson et al. (2013), a hybrid linkage model is a viable option for markets of different maturity. For example, integrating the energy sector first, given its dominance in both the EU and Chinese ETSs, could serve as a test case before moving on to other industries. This method may allow regulators to resolve market stability concerns and compliance differences gradually rather than seeking complete harmonization from the start.

Ultimately, the EU's previous collaborations with Switzerland and Australia show that effective ETS linkages require robust institutional coordination and transparent market governance alongside strategic implementation phases to achieve environmental and economic benefits while upholding market stability and regulatory autonomy.

3.2.4 Economic Implications of EU-China ETS Linkage

A linked EU-China ETS could theoretically lower compliance costs for Chinese firms while expanding the market for EU allowances. Several studies emphasize that linked carbon markets enhance market liquidity, reduce volatility, and foster innovation in low-carbon technologies (Doda & Taschini, 2016; Liu & Wei, 2016). Sun (2022) highlights that linking the EU and Chinese ETS could generate efficiency gains, as China could leverage its lower marginal abatement costs while EU firms would benefit from lower compliance costs.

CGE models by Winkler et al. (2021) and Gavard et al. (2016) confirm mutual economic gains from linkage but highlight challenges including regulatory misalignment and distributional imbalances. Winkler finds that China favors restricted trading to avoid welfare losses, while Gavard et al. (2016) warns that access to lower-cost allowances could give Chinese firms a competitive edge. Both underscore the need for transitional compensation, particularly given the EU's stricter regulatory oversight and China's evolving system (Ellerman et al., 2016).

ICAP (2025) reports that ETSs raised around USD 70 billion in revenue in 2024, illustrating the financial scale of carbon markets. In an EU–China context, Shenghao et al. (2018) caution that regional disparities in China may result in uneven benefits, requiring fair revenue-sharing and targeted support.

Although this section focuses primarily on economic implications, environmental outcomes are closely tied to system design. Regulatory convergence is essential to prevent market distortions and uphold emissions caps (Sun, 2022). Winkler et al. (2021) suggest that phased or sectoral linking could allow time for alignment. Doda & Taschini (2016) also note that linking systems facing different economic shocks can improve overall resilience and emissions efficiency.

Linking ETSs also has distributional implications. In their analysis, Gavard et al. (2016) explore the implication of economic redistribution of an EU-China ETS linkage, where wealthier regions in China may experience more economic benefits than emission-intensive provinces, creating regional differences. Likewise, Shenghao et al. (2018) consider that cap-setting mechanisms should consider industrial composition and emissions intensity to prevent widening economic inequality. Furthermore, ICAP (2025) emphasizes the importance of a unified system of auctioning and revenue sharing, based on which the financial results were to be equitable. Although modeling suggests efficiency improvement, effective linkage rests on trade-offs and environmental integrity management through converging regulations.

3.2.5 Political and Geopolitical Dimensions of EU-China ETS Linkage

The literature explores the political feasibility of linking the EU and Chinese ETSs. Verde et al. (2021) argue that China's ETS could serve as a model for other developing economies, though its impact depends on governance and coordination with broader climate measures. Positioned as a tool to balance growth and emissions, China's ETS reflects a flexible, stability-focused approach in contrast to the EU's emphasis on regulatory rigor and environmental integrity (Bodansky et al., 2016; Mehling & Haites, 2009; Wang et al., 2017; Zhang & Wang, 2020).

Geopolitically, carbon market linkages are embedded within broader EU-China relations. Wang et al. (2017) examine how the network structure of scientific collaborations between China and the EU has changed over time, emphasizing a rise in collaboration in the study of the carbon market. ETS talks, however, may be impacted by problems including trade disputes, technical competition, and human rights issues (Oberthür et al., 2022).

Past linkage efforts, such as the Australia–EU negotiations, show that political alignment often outweighs economic incentives in determining feasibility (Evans & Wu, 2021). The EU has generally avoided partnerships with ETSs lacking strong governance, implying that China would need to reform its MRV and compliance frameworks before a viable linkage (Mehling & Haites, 2009; Jotzo et al., 2018; Schreifels et al., 2012; Verde et al., 2021). China's intensity-based cap system also diverges from the EU's absolute cap model, raising concerns about carbon leakage and equitable allowance allocation (Goulder et al., 2020; Li et al., 2019).

Zhang et al. (2022) emphasize that geopolitical events, such as the COVID-19 pandemic, have influenced carbon market correlations. Their study finds that external shocks can drive temporary linkages even when structural differences persist. This highlights the complex and dynamic nature of international carbon markets, where political will and economic circumstances fluctuate over time. Burtraw et al. (2013) suggest that instead of a full linkage, soft-linking mechanisms such as mutual recognition of allowances or indirect price coordination could serve as intermediary steps, allowing for policy convergence without complete market integration.

3.3. Synthesis

The literature highlights the opportunities and challenges of linking the EU and Chinese ETSs by pointing out that economic gains will require surmounting profound regulatory and political hurdles (Li et al., 2019). Market expansion would contribute to balancing marginal abatement costs, increasing cost-dependence (Doda & Taschini, 2016; Liu & Wei, 2016). Moreover, a connected ETS would stimulate greater investments in the field of low-carbon technologies and foster international climate policy collaboration (Ellerman et al., 2016; Mehling & Haites, 2009). Putting aside whether they can harmonize carbon markets, the EU-China climate partnership has economic interests, trade disputes, and geopolitical rivalries all complicating the picture (Oberthür et al., 2022; Verde et al., 2021; Wang et al., 2017; Zhang et al., 2022). The implementation of ETSs requires more than technical competence as it is also tied to political will and trust among all jurisdictions to continue policy coordination (Bodansky et al., 2016; Evans & Wu, 2021).

Given these challenges, some researchers advocate for phased approaches and technical collaboration (Tuerk et al., 2009; Flachsland et al., 2009; Paterson et al., 2013; Mehling & Haites, 2009; Burtraw et al., 2013; Gavard et al., 2016). Linking feasibility will depend on sustained regulatory reforms, political negotiations, and alignment of market structures in both jurisdictions.

3.4. Identification of Gaps in Literature

Despite the extensive discussion on ETS linkages, some gaps remain. There is limited empirical research on China's ETS at the national level, with most studies relying on provincial pilot data rather than national-level market performance (Feng et al., 2018; Li et al., 2019). Future research should assess China's national ETS readiness for linkage (Mehling & Haites, 2009; Schreifels et al., 2012). Additionally, the role of China's ETS within national climate and industrial strategies remains underexplored (Zhang et al., 2022).

Furthermore, more research is needed on partial linkages, such as mutual recognition of offsets or indirect price coordination between the EU and China. While some scholars highlight the potential for incremental steps towards linkage (Bodansky et al., 2016; Burtraw et al., 2013), others argue that a full integration strategy remains unlikely without substantial regulatory alignment (Ellerman et al., 2016). More comparative studies on past linkages could clarify how to address institutional and geopolitical barriers (Evans & Wu, 2021; Vöhringer, 2012).

Chapter 4: QUANTITATIVE EVALUATION OF DESIRABILITY

4.1 Introduction

This chapter evaluates the economic and environmental desirability of linking the EU ETS with China's national carbon market, based on quantitative evidence. It synthesizes findings from economic modeling studies on cost-efficiency, environmental performance, market stability, and distributional outcomes.

Answering the sub-question—*What are the economic and environmental benefits of linking the EU and Chinese ETS?* —this chapter draws upon computable general equilibrium (CGE) models, dynamic simulation tools such as the DART framework, and partial equilibrium analyses. Rather than presenting new models, the goal is to summarize how the literature quantifies the trade-offs of linking two of the world's largest carbon markets.

4.2 Modeling Frameworks and Analytical Approaches

Assessing ETS linkage effects requires robust, multi-dimensional modeling tools. The studies reviewed in this chapter rely predominantly on computable general equilibrium (CGE) models, complemented by dynamic simulations and theoretical frameworks. While differing in scope and structure, CGE models serve as the cornerstone of the quantitative literature on ETS linkage.

They simulate how economies respond to external shocks—such as the introduction of an emissions trading scheme or its linkage to another jurisdiction—by modeling interactions between producers, consumers, governments, and the international trade system. Key features include sectoral disaggregation, substitution possibilities between production inputs and energy carriers, and endogenous price formation. Their ability to capture economy-wide feedback makes them particularly well-suited to analyzing policies with far-reaching structural impacts, such as carbon markets.

Among the models employed in the literature, the EPPA model (used by Gavard et al., 2016) offers a detailed representation of the global economy and energy system, with recursive-dynamic properties and a strong focus on technological substitution. In their simulations, the EPPA model allows researchers to model sector-specific ETSs and introduce quantitative constraints on permit flows, enabling an analysis of both unlimited and restricted linkage scenarios.

A second prominent tool is the DART model (Winkler et al., 2021), a recursive-dynamic CGE model with an enhanced disaggregation of EU member states, which is particularly relevant for capturing intra-European distributional impacts. It simulates full and partial linkages with China's ETS, including permit allocation adjustments.

Other CGE models include C-GEM, a China-specific model used by Li et al. (2019), and GRACE, a global energy-economy-environment model applied by Liu and Wei (2014). C-GEM's strength lies in its capacity to reflect the carbon intensity targets used in Chinese climate policy, rather than absolute emission caps, a distinction that proves crucial in scenarios involving linkage.

In contrast to these empirical models, Doda and Taschini (2016) propose a stylized theoretical framework grounded in stochastic general equilibrium theory. They emphasize the importance of market size, cost volatility, and the correlation of economic shocks between jurisdictions as key variables shaping the potential efficiency gains of market integration.

Despite the differences among these models, they presume perfect compliance with emissions caps, seamless trading permits in linked markets, and uniform enforcement of regulatory rules across jurisdictions. Moreover, they generally exclude the political and administrative frictions that would likely accompany real-world linkage negotiations.

4.3 Economic Efficiency Gains from Linking the EU and Chinese ETSs

In scenarios where both the EU and China adopt absolute emission caps and allow unrestricted trading of allowances, the results are striking: the total cost of achieving the joint mitigation target is significantly lower than if the systems remain isolated.

In their dynamic CGE simulations, Winkler et al. (2021) estimate that full linkage would yield a welfare gain of approximately +0.55% of GDP for the EU, while China would experience a more modest gain of +0.08%. Importantly, the study highlights that China's welfare is maximized not under full but under *restricted* linkage specifically, when only 50% of its surplus allowances can be sold to the EU. The authors also show that reallocating initial endowments can help rebalance welfare, though without significantly changing the EU's relative advantage.

Using the C-GEM model, Li et al. (2019) find that full linkage lowers the EU's carbon price from \$45.5/t to \$15/t and raises China's from \$13.4/t, leading to a net welfare gain that benefits the EU disproportionately.

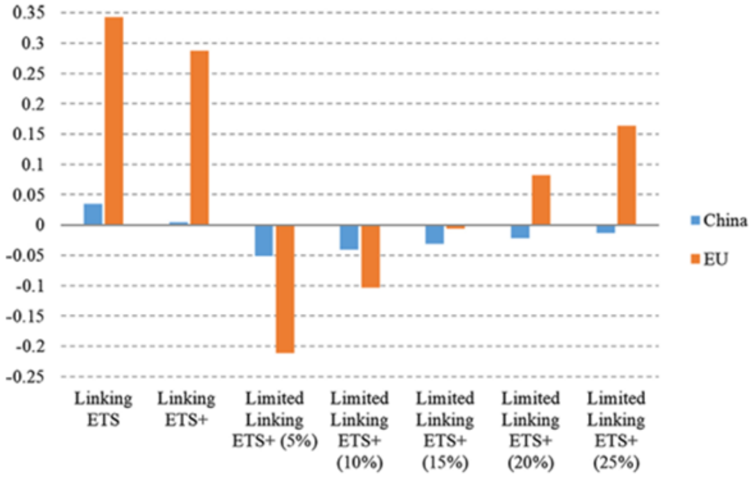

Fig 1: Welfare effects of different linkage scenarios in 2030. The EU sees significant gains under full linkage, while China experiences slight welfare losses unless trading is restricted. Source: Li et al. (2019).

To address this imbalance, they simulate scenarios with a limited permit exchange quota (15–25%), finding that such a mechanism preserves the bulk of EU efficiency gains while mitigating negative competitiveness effects in China. Moreover, they show that linkage enables both partners to adopt a more ambitious joint emissions reduction target (169 MtCO_2 more) without increasing aggregate costs, a finding of considerable policy relevance.

By contrast, Liu and Wei (2014) demonstrate that efficiency gains are not always aligned with climate integrity. In their GRACE-based analysis, China operates under an intensity-based cap, which allows absolute emissions to increase even as emissions per unit of GDP fall. Under linkage with the EU ETS, the joint carbon price collapses to \$0.7/t, severely weakening the incentive for abatement in both regions. This illustrates how poorly aligned cap structures can weaken environmental outcomes despite lower costs.

Finally, Doda and Taschini (2016) argue that gains from integration are highest when markets are of comparable size, when abatement costs are volatile, and when economic shocks are negatively correlated. In such cases, permit trade allows one region to offset its shock with excess permits from the other, stabilizing the market and enhancing resilience.

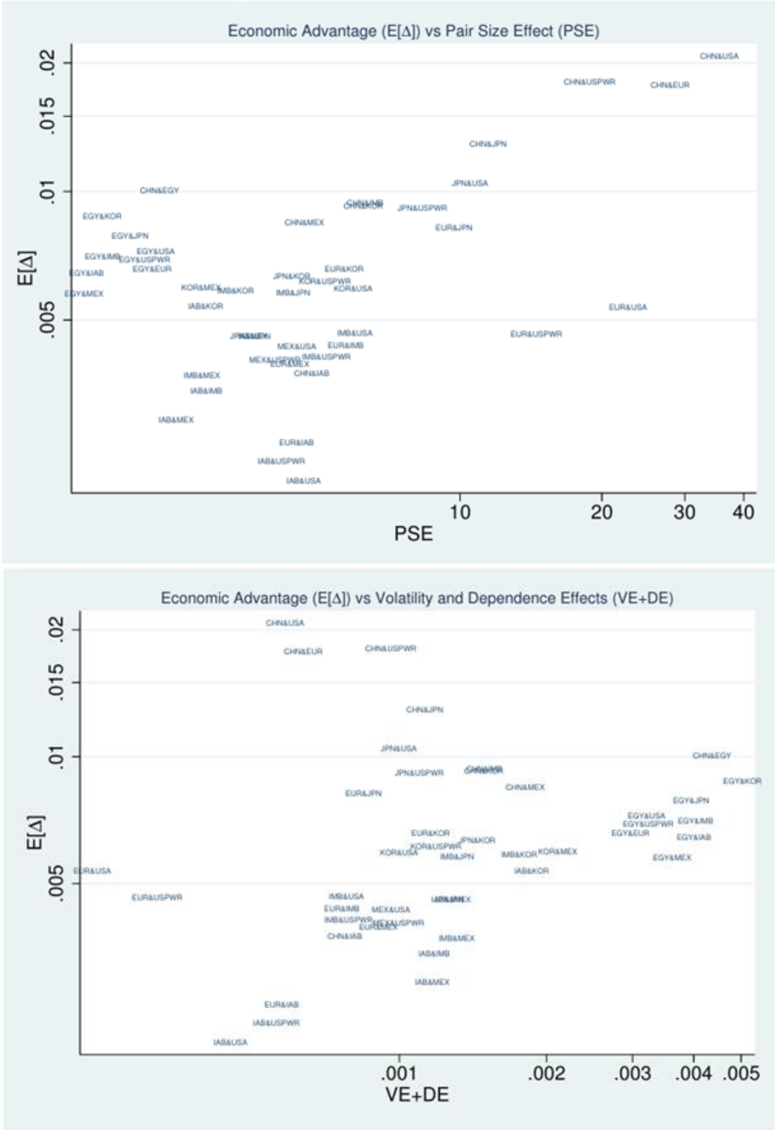

Fig 2: Economic advantage (E[Δ]) plotted against pair size effect (top) and volatility plus dependence effects (bottom). The figure illustrates that linking benefits are greater for market pairs with high size asymmetry or strong volatility and shock divergence. Source: Doda and Taschini (2016)

Table 1 summarizes the core modeling approaches, linkage scenarios, and headline results regarding welfare outcomes, carbon prices, and environmental effectiveness; highlighting the diversity of approaches and conditions under which ETS linkage delivers mutual benefits or trade-offs.

Study	Model Type	Linkage Scenario	Key Findings on Welfare	Key Findings on Prices	Environmental Effectiveness
Winkler et al. (2021)	CGE (DART)	Full & Partial	EU: +0.55% GDP; China: +0.08% GDP; Welfare balance improves with endowment adjustment	Carbon price convergence; lower prices in EU, higher in China	Maintained under absolute caps; depends on design
Li et al. (2019)	CGE (C-GEM)	Full & Restricted	EU gains most; China gains if trade is restricted to 15–25%	EU price drops from \$45.5 to \$15; China's rises to \$15	Improved under restricted trade and increased ambition
Liu & Wei (2014)	CGE (GRACE)	Full with Intensity Cap	Welfare not emphasized; focus on environmental integrity risks	Joint price collapses to \$0.7/tCO_2	Undermined due to intensity-based cap in China
Doda & Taschini (2016)	Theoretical Model	Stylized Theoretical	Welfare gains highest when market sizes differ and shocks are negatively correlated	Price volatility influenced by shock correlation	Depends on market structure and volatility

Table 1: Comparative summary of ETS Linkage studies

Building on the comparative insights presented above, these studies affirm that ETS linkage can deliver substantial cost savings and welfare gains, especially for the EU. However, they also reveal important asymmetries in benefit distribution and highlight the need for careful linkage design to ensure mutual advantage.

4.4 Distributional Impacts

The previous section addressed the aggregate efficiency gains and their uneven distribution *between* jurisdictions; this section turns into a more granular analysis of how the costs and benefits of ETS linkage are distributed *within* countries and *across economic sectors*. Though political implications arise from these patterns, the focus here remains on their economic nature and measurable impact, leaving institutional and policy responses for later discussion.

European firms are able to access cheaper emissions allowances from China, thereby reducing compliance costs and preserving competitiveness in energy-intensive sectors. This dynamic, however, comes at the cost of shifting a disproportionate share of abatement to the Chinese side, especially in sectors with low marginal abatement costs, such as power generation and heavy industry.

For China, the situation is more nuanced. Although economic theory predicts that selling permits should generate rents and improve welfare, this outcome depends critically on the type of emissions cap applied, the terms-of-trade effects, and whether permit revenues offset structural losses in the domestic economy. In Li et al. (2019), for example, full linkage leads to a reallocation of abatement efforts toward China's energy-intensive industries, which in turn face declining output and exports. Under full linkage, China's net exports decline by nearly 18%, while aggregate output in emissions-intensive sectors shrinks, despite a modest rise in welfare. These sectoral losses are not evenly distributed across the country and tend to be concentrated in less developed, coal-dependent provinces, which lack the capacity to absorb rapid structural adjustment.

Although most CGE models do not disaggregate Chinese provinces, several studies—particularly Liu and Wei (2014) and Gavard et al. (2016)—acknowledge that wealthier, more diversified regions such as the eastern coastal provinces (e.g., Guangdong, Jiangsu, Shanghai) are better positioned to benefit from permit sales, investments in low-carbon technology, and increased renewable deployment.

Winkler et al. (2021) incorporate intra-EU heterogeneity into their DART model and find that EU Member States with net permit purchasing positions under the current ETS—typically Western and Northern European countries—gain more from linkage than net sellers, such as some Eastern and Southern European economies. This asymmetry arises because a fall in the joint CO_2 price reduces the revenues earned by states or firms that would otherwise sell allowances in a more expensive, EU-only market.

In the EU, linkage tends to relieve cost pressure on sectors such as steel, cement, and chemicals by lowering permit prices. In China, however, the same sectors may experience a loss of competitiveness and even output contraction when carbon prices rise to converge with those in the EU. Gavard et al. (2016) show that under full linkage with the US, Chinese coal generation falls by 7.5%, while wind and hydro increase modestly.

In summary, while ETS linkage can generate clear aggregate gains, it creates winners and losers whose identities vary across and within jurisdictions. Policymakers contemplating such integration must therefore consider not only efficiency but also equity and compensation, as ignoring distributional dynamics may lead to social resistance and undermine the legitimacy of the policy.

4.5 Environmental Effectiveness

A fundamental question in the debate over linking the EU and Chinese ETSs is whether such integration would strengthen—or potentially undermine—the environmental effectiveness of climate policy. While linkage can reduce emissions in the aggregate and enable more ambitious climate targets at lower cost, its effectiveness ultimately depends on the design of the caps, the credibility of enforcement, and the robustness of institutional frameworks in both jurisdictions. However, this logic assumes ideal conditions that are rarely held in practice. As the studies reviewed in this chapter demonstrate, differences in cap design as well as institutional asymmetries, can lead to outcomes where linkage undermines rather than strengthens environmental ambition. *Figure 3*, based on Liu and Wei (2014), illustrates how cap design and complementary policies affect abatement and prices across scenarios.

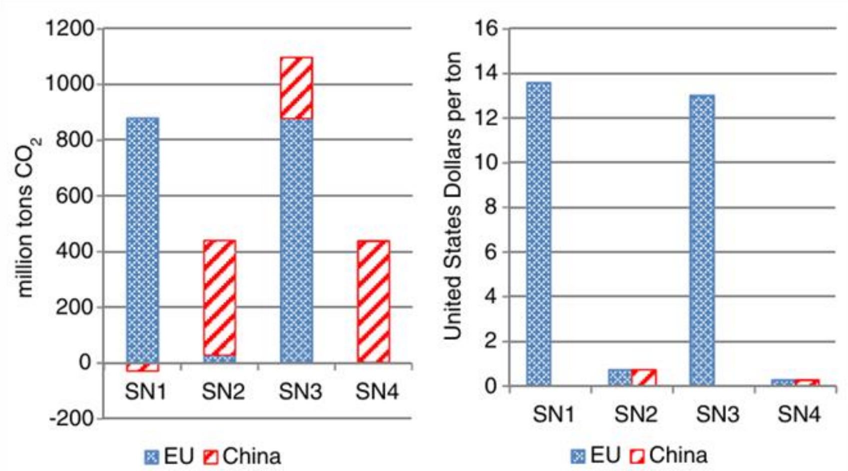

Fig 3: CO_2 abatements and carbon prices in 2020 across different policy scenarios. This figure illustrates the distribution of emissions reductions between the EU and China (left) and the resulting carbon prices (right) under four scenarios. In the Joint ETS case (SN2), carbon prices collapse to below $1/tCO_2$ and the bulk of abatement shifts to China, demonstrating how unrestricted linkage with an intensity-based cap can erode climate ambition. Adding renewable energy subsidies (SN3 and SN4) increases China's mitigation effort slightly but fails to restore price signals. The figure shows that poorly aligned ETS integration, especially when one cap is relative—can undermine both environmental outcomes and market credibility. Source: Liu and Wei (2014)

If emissions caps are weak or structurally inconsistent, linkage can create perverse incentives and even lead to higher global emissions than under autarky. This risk is particularly acute when one of the systems operates under a relative cap—such as an emissions intensity target—rather than an absolute emissions limit. In such cases, the linkage may import weaker climate ambition into the combined system.

The issue is reflected in Liu and Wei (2014), whose model is a simulation of the linkage between the EU ETS and a Chinese system with an intensity-based cap (i.e., emissions per unit of GDP). In this scenario, the common carbon price collapses to $0.7 per tone, which weakens the incentive to invest in low-carbon technologies in both jurisdictions. Consequently, the overall emissions in China rise, despite the EU cutting its own emissions, and the net effect on the environment is a loss compared to a situation where there are distinct and well-functioning ETSs. The authors conclude that linkage in China without an absolute cap can jeopardize environmental integrity, particularly when it is not complemented with other policies

Even when both systems apply absolute caps, the redistribution of abatement efforts across jurisdictions can lead to geographically and sectoral uneven environmental outcomes. According to Winkler et al. (2021), for example, full linkage results in an 18.7% increase in emissions in the EU since European companies depend more on imported permits than on local reductions. Even while these imported allowances match real cuts in China, the change might still be divisive politically and environmentally if it leads to less money being invested in clean technologies or delays in Europe's structural reform.

The risk of carbon leakage is generally considered low in the context of bilateral ETS linkage, since both systems remain capped. However, the structural characteristics of the Chinese economy, particularly the continued dominance of coal and the high carbon intensity of heavy industry, mean that peripheral leakage (i.e., increases in uncapped sectors) remains a concern. Gavard et al. (2014) note that while the linkage of sectoral ETSs leads to reduced leakage in electricity production and trade-exposed industries, it also requires strict monitoring of indirect emissions and supply chain effects, which are more difficult to control in developing economies.

In China, permit revenues and higher carbon prices under linkage tend to favor a transition away from coal and toward renewables, particularly in full-linkage scenarios. Li et al. (2019) report a 7% decline in coal use and a modest increase in wind and solar deployment under their “Linking ETS+” scenario. However, in the EU, the fall in carbon prices under linkage reduces the cost-effectiveness of renewable energy investments. In their simulations, renewable generation in the EU falls by over 10%, unless permit trade is restricted or additional policy instruments are deployed. These dynamics underscore the importance of policy complementarity: linkage should not replace domestic green investment strategies but rather be designed in coordination with them.

Finally, price stability is a key concern. Some studies suggest that a larger, integrated market could dampen price fluctuations by spreading economic shocks across jurisdictions, the empirical evidence is mixed. Doda and Taschini (2016) argue theoretically that volatility is reduced only if the correlation of shocks is negative; otherwise, integration may amplify uncertainty. This point is particularly salient for China, whose economic structure and policy cycles differ markedly from those of the EU. As such, careful market design is essential to ensure that linkage does not undermine investor confidence or lead to speculative behavior.

In conclusion, when well-structured, linkage can unlock deeper mitigation at manageable costs and foster low-carbon transitions in both regions. Yet when poorly aligned linkage can compromise environmental outcomes, depress carbon prices, and disincentivize clean investment. It follows that any move toward market integration must be grounded in strict emissions accounting, comparable ambition, and mutual trust in enforcement capacity. Without these foundations, linkage may achieve economic efficiency at the cost of climate effectiveness—an outcome incompatible with the goals of the Paris Agreement.

4.6 Risks and Limitations of the Models

Recognizing the limitations of the models reviewed in this chapter is essential for any serious discussion about the feasibility and design of ETS linkage. For such a reason, the results discussed should therefore be interpreted not as forecasts, but as conditional projections—estimates of what could happen under certain circumstances, given specific constraints.

A first and fundamental limitation lies in the assumption of perfect compliance and full enforcement. Most CGE and dynamic simulation models presume that emissions caps, trading rules, and monitoring frameworks are fully operational and uniformly applied across jurisdictions. Yet the discrepancy in enforcement capacities raises important questions about whether linked markets could ensure the environmental integrity of traded permits, especially if verification procedures are opaque or influenced by political discretion. The assumption of full compliance may thus exaggerate environmental benefits while underestimating risks of non-additional abatement.

Closely related is the assumption of regulatory alignment and market compatibility. Many models simulate linkage as if it were technically and legally frictionless—as though permit definitions, scope of coverage, allocation methods, and price management mechanisms were already harmonized. In doing so, they often overlook the structural asymmetries between the EU and

Chinese national ETSs, assuming instead an idealized equilibrium that diverges significantly from policy reality.

Another major limitation concerns the static or stylized treatment of political-economic constraints. Most models assume that governments are both willing and able to implement optimal strategies. They do not account for the strategic behavior of stakeholders—such as industry lobbying, public opposition, or intergovernmental bargaining—all of which can shape policy design and implementation.

Distributional impacts are likewise either over-aggregated or under-represented. Socioeconomic effects at the subnational level are typically ignored, even though some studies, like Winkler et al. (2021), disaggregate results across EU member states, while others, such as Li et al. (2019), point to significant sectoral disparities within China. Yet it is precisely at this level—where regions differ in energy intensity, economic structure, or social vulnerability—that support or resistance to carbon market reform is likely to emerge. Models that fail to reflect these dynamics may therefore provide an incomplete picture of the likely winners and losers from linkage.

Uncertainty and volatility are further limitations, especially over the long-term horizon. This approach limits the ability to account for unexpected events, such as technological breakthroughs, political reversals, or global economic crisis, factors that have repeatedly shaped carbon markets in the past. Moreover, by focusing on mean values or equilibrium outcomes, the models may underestimate tail risks, such as sudden price collapses or regulatory failures, which could undermine both environmental ambition and market confidence.

Finally, some methodological concerns apply more broadly to CGE models. By construction, CGEs often assume full employment, market-clearing prices, and representative agents, which may obscure the presence of transitional frictions, unemployment effects, or income inequality. Moreover, the calibration of substitution elasticities, particularly the Armington elasticities that govern trade behavior, can have a significant impact on the results. As Winkler et al. (2021) demonstrate, altering these elasticities changes the estimated welfare effects of ETS linkage more than policy variation itself—highlighting the sensitivity of outcomes to parameter choices.

Taken together, the models reviewed in this chapter offer valuable insights into the potential economic and environmental effects of linking the EU and Chinese ETSs, but they must be interpreted with caution. Their simplifying assumptions do not invalidate the models' findings but rather highlight the need for complementary qualitative analysis of legal, institutional, and political dimensions, which will be the focus of the following chapters.

Chapter 5: LEGAL AND INSTITUTIONAL FEASIBILITY: CAN THIS WORK IN PRACTICE?

5.1 Introduction

While the previous chapter explored economic rationale, this chapter shifts focus to the legal structures, regulatory divergences, and governance arrangements that may affect operational implementation.

Legal compatibility and institutional coherence are critical to the credibility, integrity, and stability of any international carbon market linkage. Differences in cap design and allocation methods raise legal challenges, as later sections will show. Furthermore, differences in MRV, enforcement mechanisms, and oversight structures pose challenges that cannot be resolved through economic modeling alone.

This chapter investigates these issues through comparative legal analysis and institutional review, to identify both the structural incompatibilities and areas of potential convergence.

5.2 Legal Compatibility and Regulatory Divergence

To begin, this section analyzes and evaluates the primary legal and regulatory differences between the EU ETS and the Chinese ETS, with an emphasis on five key dimensions: cap-setting procedures, allowance allocation processes, MRV systems, enforcement structures, and permit recognition. Each pose distinct legal and policy challenges that must be addressed for operational feasibility

5.2.1 Cap Type Compatibility: Absolute vs. Intensity-Based

The EU ETS operates under an absolute cap, established through Directive 2003/87/EC, which imposes a fixed and declining limit on total emissions from covered sectors across the EU. This cap is enforced via a Linear Reduction Factor (LRF), which increases ambition over time, and is embedded in a binding legal framework.

China's ETS, by contrast, remains based on emissions intensity. Allowances are allocated according to benchmarks such as emissions per megawatt-hour (tCO_2/MWh) of electricity produced. This approach allows aggregate emissions to increase if output rises, reducing environmental certainty (Zeng et al., 2018; Liu et al., 2022). While reflecting China's development priorities, this creates a systemic asymmetry with the EU's fixed-cap model.

From a legal standpoint, the EU's recognition of external allowances depends on the principle of equivalence in environmental effectiveness, as codified in Article 25 of Directive 2003/87/EC. Shen and Feng (2017) argue that the lack of a fixed emissions ceiling in China makes it difficult to quantify environmental outcomes ex ante, thereby undermining legal equivalence.

Nonetheless, China could pursue hybrid cap models or move toward sectoral emission ceilings as part of a phased convergence strategy. Indeed, policy discussions in China have already acknowledged the eventual need for absolute targets aligning with the country's 2060 carbon neutrality goal (Liu et al., 2022).

5.2.2 Allowance Allocation Mechanisms: Auctioning vs. Free Allocation

The EU has gradually adopted auctioning as the primary method for issuing carbon allowances. Over 57% of allowances are auctioned, a share expected to increase with CBAM and the ongoing phase-out of free allocation. This process is governed by the Auctioning Regulation and conducted via a centralized EU platform (European Commission, 2023).

China, in contrast, relies heavily on free allocation, using sectoral benchmarks and historical output levels. This technique decreases the financial burden on businesses while increasing political support, especially in regions with little administrative capability or carbon market maturity. However, when combined with a more mature auction-based system such as the EU ETS, it dilutes price signals, lowers incentives for emission reduction, and may cause distortions (Li et al., 2019).

The legal implications of this difference extend beyond the notion of perceived fairness and economic equivalence of allowances to the practical feasibility of a linked system. In a joint market, the firms that are auctioned in one jurisdiction may be put at a competitive disadvantage relative to the firms that are given free permits in the other, which may undermine the level playing field and may distort trading behavior.

Besides fairness, the distortions can also be in contravention of the principle of reciprocity and environmental equivalence in EU law, notably Article 25 of Directive 2003/87/EC, which states that linked systems should produce comparable environmental and economic outcomes. Moreover, asymmetric allocation rules may complicate mutual recognition of allowances by compromising price signals and integrity of market-based incentives. Thus, while not a legal incompatibility per se, the divergence in allocation methods could obstruct operational linkage unless addressed through transitional safeguards or phased convergence.

Yet here too, convergence is possible. Several Chinese pilot ETSs—notably Guangdong and Hubei—have conducted limited auctions, and China's national policy discourse has begun to explore auctioning for the power sector (Liu et al., 2022). The development of a national legal framework for auctioning, with pilot implementation and gradual sectoral expansion, would significantly enhance legal compatibility.

5.2.3 MRV Frameworks: Legally Binding vs. Developing Systems

The EU has developed an integrated and legally binding MRV regime codified in Regulation (EU) No 601/2012. It includes strict requirements for emissions monitoring plans, third-party verification, standardized methodologies, and centralized reporting through the Union Registry.

China's MRV system, though improving, remains heterogeneous and decentralized. MRV implementation is delegated to provincial authorities, leading to variability in verification standards, data accuracy, and enforcement. Zeng et al. (2018) highlight frequent inconsistencies in emissions data reporting and a lack of national-level coordination. Additionally, power sector MRV is affected by risks of double counting, particularly when both power producers and grid companies face obligations based on output intensity (Zeng et al., 2018).

These shortcomings reduce the credibility and verifiability of emissions data in China's ETS, complicating any attempt at permit recognition by the EU which cannot guarantee environmental integrity, a precondition in Article 25 of its ETS Directive, without legal assurances that data are accurate and harmonized procedures are in place. However, the 2024 Progress Report on China ETS observes progress in the development of national MRV guidelines, third-party verifier accreditation, and the digital reporting system. Mutual recognition would require a binding national MRV regulation that would be in line with the requirements of Article 6.2 of the Paris Agreement.

5.2.4 Enforcement and Penalties: Strict Sanctions vs. Administrative Measures

Enforcement asymmetry represents one of the most problematic legal gaps. The EU ETS includes a uniform, automatic penalty system: €100 per tone of excess CO_2 not surrendered, plus the obligation to make up the shortfall the following year.

In contrast, enforcement in China remains administrative, discretionary, and decentralized. Penalties are often symbolic and vary significantly by region. According to the *2024* Progress Report, several provinces impose non-compliance fines as low as RMB 30,000 (≈€3,800), without clear mechanisms for allowance correction or naming-and-shaming.

From a legal perspective, this gap is crucial. The principle of equivalence in enforcement mechanisms is necessary to prevent regulatory arbitrage—where firms shift operations to jurisdiction with weaker compliance expectations (Doda & Taschini, 2016). As Mehling and Haites (2009) argue, symmetric legal enforcement is a prerequisite for trust in any linked carbon market.

Reforms toward centralized enforcement rules, fixed penalties, and national compliance monitoring bodies should ideally be codified in national law and supported by institutional reforms to improve regulatory independence and bridge this gap.

5.2.5 Permit Fungibility and Legal Recognition

Permit fungibility[2],is the ultimate legal test of ETS linkage. Under Article 25 of Directive 2003/87/EC, the EU can only recognize allowances from a third country if its system ensures "equivalent stringency" in environmental ambition, MRV, and enforcement.

China's limited sectoral scope (only power generation), intensity-based cap, heterogeneous MRV, and weak enforcement make it legally incompatible with the EU framework (Shen & Feng, 2017; Mehling & Haites, 2009).

However, future linkage need not take the form of full allowance fungibility. Sectoral pilot linkages, partial mutual recognition, or credit transfers using ITMOs[3] under Article 6.2 of the Paris Agreement could provide interim pathways. Such mechanisms would still need to be coordinated by law, but would permit asymmetries in system design, if transparency, tracking, and integrity are ensured (Bodansky et al., 2016; Winkler et al., 2021).

5.3 Institutional Governance and Market Infrastructure

Beyond legal design, the feasibility of linking the EU and Chinese ETS hinges on the institutional architecture and market infrastructure that support each system. This section explores five areas of institutional alignment and misalignment: regulatory authorities, price stability mechanisms, data transparency, inter-agency coordination, and lessons from previous linkage attempts.

5.3.1 Market Oversight Authorities: DG CLIMA vs. Ministry of Ecology and Environment

Market integrity in linked systems requires institutional coordination. The EU ETS is administered by the European Commission Directorate-General Climate Action (DG CLIMA) which offers central regulatory direction, compliance regulation, and harmonization among member states. DG CLIMA is also in charge of the Union Registry and of monitoring market activity through the European Environment Agency and ESMA (the European Securities and Markets Authority).

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[2] the ability of market participants in one system to use allowances from another

[3] Internationally Transferred Mitigation Outcomes (ITMOs) are emissions reductions authorized by a country for transfer to another under Article 6.2 of the Paris Agreement. They serve as the accounting unit in cooperative approaches between Parties and must meet criteria such as environmental integrity, transparency, and avoidance of double counting.

In contrast, China has an ETS that is run by the Ministry of Ecology and Environment (MEE) which did not take full control until 2018. Although MEE has been in the lead on target-setting and national MRV guidelines, the day-to-day operation of the system has been devolved to provincial-level departments, which have significant discretion on implementation (Liu et al., 2022; Zeng et al., 2018).

One of the first steps toward institutional convergence would be to have China centralize more ETS authority in MEE, clarify intergovernmental roles, and strengthen its market monitoring and enforcement capacity. These changes are already being discussed in the context of China's move to expand the ETS beyond the power sector (Progress Report on China ETS, 2024).

5.3.2 Price Management Tools: EU's Market Stability Reserve vs. China's Emerging Instruments

Interconnected carbon markets must cope with price fluctuations without creating asymmetrical interventions that can distort the competitiveness and investor confidence. The EU ETS employs the Market Stability Reserve (MSR)[4] although it is not a price control mechanism in itself, it has an indirect effect on market prices by either restricting or increasing the supply of allowances, stabilizing expectations and minimizing the risk of extreme price volatility.

China, on the other hand, does not have many formal methods of stabilizing carbon prices. The national ETS currently lacks a comparable tool. The price of carbon in China has been rather low and stable, partly because of the low compliance expectations and excess allocation of allowances (Liu et al., 2022). A lack of a well-established mechanism to deal with market imbalances may be a risk in a linked system, particularly if Chinese allowances were to water down the EU price signal.

Institutionally, China might be required to come up with a stabilization mechanism in the market in the form of a reserve or price corridor that can be run in a transparent and predictable manner via administrative intervention or rule-based adjustment.

5.3.3 Data Transparency and Capacity Gaps

Accurate emissions data and transparent market information are foundational to ETS functioning. The EU ETS benefits from centralized data reporting, accessible public registries, and harmonized verification procedures, which enable real-time market monitoring and cross-country comparisons. Transparency obligations are embedded in law and enforced across member states.

[4] Market Stability Reserve (MSR) is a rule-based system that automatically increases or decreases the amount of allowances auctioned depending on the overall amount of allowances in circulation.

In China, data reporting is improving but remains fragmented and inconsistent. While MEE has issued national MRV guidance, the actual collection and verification of data still relies heavily on provincial authorities. Several provinces lack digital infrastructure, skilled verifiers, or standardized procedures, resulting in discrepancies in emissions data quality and delays in publication (Zeng et al., 2018; Progress Report on China ETS, 2024).

Bridging capacity asymmetry will require targeted institutional investment in digital MRV platforms, verifier training, and centralized auditing procedures. International cooperation programs, including existing EU–China technical exchanges and ICAP dialogues, can support this capacity-building process.

5.3.4 Inter-Agency Cooperation: Existing Linkages and Dialogues

Despite these differences, institutional cooperation between the EU and China on carbon markets is not new. Since 2010, the two parties have engaged in regular climate policy dialogues, including the EU–China ETS Cooperation Project, funded under the EU's Partnership Instrument. These initiatives have promoted technical knowledge sharing, regulator exchanges, and capacity-building efforts.

In addition, both sides participate in international fora such as the International Carbon Action Partnership (ICAP) and the Article 6 Implementation Partnership, which provide platforms for aligning methodologies and discussing convergence challenges.

Such initiatives form the diplomatic and institutional preconditions to future linkage by building trust, a common language and common technical standards. Nevertheless, such alliances are largely advisory and non-binding.

Besides intergovernmental collaboration, the involvement of the private stakeholders is another complementary and largely unexplored avenue of promoting operational convergence among ETSs. The exchange of best practices, compliance tools, and digital solutions between European and Chinese companies can be established through transnational technical platforms, carbon clubs, and industrial alliances, including those that are promoted under the EU's Industrial Alliance for Clean Energy. Major Chinese state-owned enterprises (SOEs), particularly in the energy and manufacturing sectors, also play a central role in implementing the national ETS and could contribute to the standardization of MRV procedures and risk management practices[5].

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[5] A concrete example is the EU–China Carbon Market Cooperation project (Phase II), which includes technical training and capacity-building components involving state-owned enterprises and industry associations, particularly in the power and manufacturing sectors. The initiative has promoted private-sector engagement through workshops, simulation exercises, and pilot MRV harmonization activities. See:

5.3.5 Case Studies: Lessons from EU–Swiss Linkage and EU–Australia Failure

Comparative experiences offer valuable lessons on the institutional preconditions for ETS linkage. The EU–Switzerland ETS linkage, operational since 2020, succeeded due to several enabling conditions: a common cap type, MRV equivalence, mutual enforcement provisions, and a detailed bilateral agreement. Importantly, the Swiss ETS was already closely modeled on the EU ETS, reducing legal and institutional asymmetries.

By contrast, the planned EU–Australia linkage was cancelled in 2014 due to political turnover in Australia, regulatory uncertainty, and the absence of a finalized legal framework. Although both systems were committed to cap-and-trade, institutional misalignment and political volatility undermined trust and delayed the signing of key protocols (Evans & Wu, 2021).

5.4 Role of International Legal Frameworks: Article 6 of the Paris Agreement

The Paris Agreement creates opportunities for worldwide carbon market connections through mechanisms such as ITMOs under Article 6.2. Nations can freely work together to fulfill their NDCs by sharing emission reduction results between national borders. The provision establishes flexible legal parameters to support system compatibility, which becomes essential for ETS interconnection between jurisdictions with different regulatory paths. Parties must guarantee environmental integrity combined with robust accounting systems and transparency standards as essential requirements for their cooperation.

In principle, both the EU and China could authorize the use of ETS-generated allowances as ITMOs, if these are clearly accounted for and that corresponding adjustments are made to prevent double counting — a key safeguard enshrined in paragraph 2 of Article 6.

However, this pathway is legally and institutionally demanding. According to the ICAP 2025 Status Report, implementing Article 6.2 requires alignment not only of registries and accounting systems, but also of MRV frameworks, governance structures, and approval procedures — many of which are still under development in China.

China's national ETS, still in its formative stage, faces challenges in meeting Article 6.2 requirements. The 2024 Progress Report on the Chinese ETS acknowledges advancements in MRV enforcement, data transparency, and third-party verification, but also emphasizes gaps in legal standardization across provinces. Moreover, the permit allocation system remains grounded in administrative discretion and lacks the legal clarity typical of the EU ETS.

European Commission (2021), *EU–China Emissions Trading System Cooperation Project – Phase II*, https://climate.ec.europa.eu.

Nevertheless, Chinese policy documents — such as the 14th Five-Year Plan and the 2023 White Paper on Climate Policy — have increasingly referenced international cooperation and carbon market integration. This signal growing institutional intent to align with global frameworks, possibly through pilot ITMO projects under Article 6.2 to build technical capacity and trust.

In contrast, the EU ETS is widely considered "Article 6.2-ready." The MRV regulation (EU Regulation No 2018/2066), the Registry Regulation (No 389/2013), and the Governance Regulation (No 2018/1999) already reflect high legal precision in accounting and reporting. Moreover, the EU has actively shaped international ITMO rules under the UNFCCC and has experience linking with Switzerland — a precedent that established legal models for bilateral recognition of units and adjustments.

However, political hesitancy remains. The European Commission, particularly DG CLIMA, has emphasized the importance of environmental integrity and legal reciprocity — conditions that may not yet be fully met by the Chinese ETS. Yet, as the CEPS (2022) report argues, a phased approach starting with limited Article 6-compatible cooperation could build the legal and institutional trust needed for fuller integration later.

The question of whether Chinese carbon allowances (CCERs or allowances from the national ETS) can qualify as ITMOs under Article 6 is not settled. For such eligibility, each Party must authorize the transfer and apply robust accounting methods, including adjustments to its emissions balance. As per Article 6.2 and decision 2/CMA.3, ITMO units must be "real, verified, and additional." Given the intensity-based cap in China and the evolving state of MRV, there is a legal and technical hurdle to satisfying these conditions in the short term (UNFCCC, 2021).

Article 6 of the Paris Agreement serves as a legally enabling but not self-executing framework. It allows and encourages linkage but does not mandate it. The pathway to using ITMOs between the EU and China requires domestic legal reforms in China, harmonization of MRV and registry systems, and sustained intergovernmental cooperation. However, its very flexibility -particularly under 6.2- makes it a vital legal anchor for soft and phased forms of linkage that could evolve into a more integrated system.

While the current asymmetry in legal infrastructure remains a barrier, the Paris Agreement's architecture encourages iterative cooperation. If carefully leveraged, Article 6 could play a pivotal role in gradually enabling a legally credible and environmentally robust linkage between the EU and Chinese ETSs.

5.5 Conclusion

This chapter has examined the legal and institutional feasibility of linking the EU and Chinese emissions trading systems. Key divergences remain in five areas: cap types, allocation methods, MRV frameworks, enforcement regimes, and permit recognition. These are reinforced by institutional asymmetries in governance capacity, transparency, and market maturity.

Based on this analysis, the feasibility of the linkage depends on addressing three following challenges.

Foundational legal incompatibilities (e.g., cap type mismatch, legal enforcement asymmetry): as they directly affect environmental integrity, legal reciprocity, and permit fungibility. Without resolutions formal legal recognition under EU law is not possible.

Institutional and procedural misalignments (e.g., registry interoperability, MRV alignment, verifier accreditation): these are technical challenges that can be addressed through reform and cooperation. While important for trust and efficiency, they do not forbid linkage, especially if temporary safeguards or transitional agreements are in place.

Politically sensitive but negotiable asymmetries (e.g., allowance allocation methods, lack of auctioning): these do not create legal incompatibility per se. While they may raise fairness concerns and competitiveness issues, they could be tolerated in a phased linkage. These issues require diplomatic negotiation rather than full regulatory convergence.

In sum, legal and institutional alignment will not be enough to such linkage, the chances of a credible and functioning linkage will also rely on political circumstances, diplomatic policies and the wider geopolitical interests that will be discussed in the following chapter.

Chapter 6: POLITICAL CHALLENGES: WHO SUPPORTS, WHO BLOCKS AND WHY IT MATTERS

6.1 Introduction

This chapter explores the geopolitical and political dimensions of ETS linkage—factors that are difficult to predict or regulate. Coordination between governments and institutions with disparate political systems, regulations, and priorities is necessary.

The differences are striking; China's system is centrally managed and designed for control and development objectives, whereas the EU ETS incorporates supranational, national, and society players. These institutional differences heighten political uncertainty, especially where mutual trust is needed and redistribution affects trade and competitiveness.

As a result, linkage may face resistance from domestic and international actors concerned about its strategic or normative implications. Political dynamics cannot be dismissed as background noise because they are essential to comprehending whether and how linking could progress from a policy idea to a policy reality.

This chapter offers a more realistic assessment of the factors that will ultimately determine the chances for ETS connection in the upcoming ten years by reorienting the focus from institutional structure to political agency. It demonstrates that although political barriers are substantial, they are not insurmountable, particularly if participants on both sides of the linking equation identify common interests and actively manage risks through gradual collaboration and measures to foster confidence.

6.2 Political Conditions in the EU

The EU presents itself as a global climate leader, with the EU ETS at the core of its decarbonization and climate diplomacy strategy—particularly through DG CLIMA's push for international carbon market cooperation. However, support for ETS linkage beyond Europe, and especially with China, is far from uniform across EU institutions and Member States.

At the supranational level, the Commission views ETS linkage as a potential instrument to enhance market liquidity, reduce abatement costs, and project EU regulatory influence. This viewpoint is supported by prior experiences, such as the fruitful connection with Switzerland. However, worries about laxer enforcement and transparency requirements in non-EU systems temper enthusiasm even inside EU institutions.

The European Parliament tends to be more careful, especially when linking nations with diverse governance forms, because it is frequently more sensitive to political symbolism and stakeholder scrutiny.

Among Member States, the landscape is fragmented. Western and Northern countries, such as Germany, the Netherlands, and Sweden, tend to be more supportive of carbon market innovations and multilateral cooperation. These countries typically have mature ETS implementation, high climate ambition, and relatively carbon-efficient industries that stand to gain from expanded market access. In contrast, many Eastern and Southern Member States, including Poland, Hungary, and parts of Southern Europe, are more hesitant. Their concerns center on economic competitiveness, distributional impacts, and the potential loss of national control over climate policy instruments.

Importantly, perspectives within the private sector do not always mirror those of policymakers. According to Salvatore Ricci, Public Affairs Specialist at the International Copper Association Europe, many industrial actors are open to future ETS linkage with China.

From the perspective of trade-exposed and energy-intensive industries, this link would be a useful tool for controlling compliance expenses and reestablishing a sense of competitive equilibrium. According to Ricci, EU producers would embrace linkage if China extended its ETS coverage to metals like copper and enacted a stronger cap—as long as enforcement and transparency improve. However, trustworthy governance, equitable carbon price, and a staged strategy incorporating cooperative pilot projects, communication, and mutual learning continue to be prerequisites for industry support.

Overall, there are several cleavages that influence political support for ETS linkage inside the EU, including public-private, supranational-national, and East-West. Although DG CLIMA and some industry segments encourage connection exploration, Member State coalitions and proactive risk management are necessary for actual success.

6.3 Political Conditions in China

Launched in 2021, China's ETS is the world's largest by covered emissions but differs significantly in structure and governance from the EU ETS—understanding its political foundations is key to assessing linkage feasibility.

At the core of China's ETS lies a strategic logic: it is not merely a climate policy, but an industrial policy tool aligned with the country's broader green development agenda. The ETS supports China's "dual carbon" goals—to peak emissions by 2030 and reach neutrality by 2060—as part of its long-term green development strategy. As noted in the joint CGTN–IEEP report *Powering the Twin Engines*, the ETS is seen as a way to internalize environmental costs while incentivizing technological upgrading and energy efficiency across strategic sectors.

Moreover, the limited independence of regulatory bodies and the broader opacity of environmental governance create uncertainty for external actors evaluating the system's robustness.

Nevertheless, the political foundations of the Chinese ETS indicate the features of the Party-state: the tendency to centralized control and local adaptability. The national carbon market has formal responsibility in the Ministry of Ecology and Environment, but enforcement and data collection are frequently left to subnational governments. The result of this decentralization is a wide disparity in capacity, quality of monitoring and political will among provinces. The system's current sectoral scope also constrains linkage feasibility.

As of 2025, China's ETS only covers the power sector. While expansion to heavy industries, including cement, aluminum, and steel, is planned, progress has been uneven. According to Salvatore Ricci, this narrow scope remains a barrier to engagement for EU-based sectors like copper. However, Ricci also notes that if China expands coverage and applies a stricter cap, European industry will view linkage more favorably—not only to level the competitive playing field but also to broaden the carbon price signal in global markets.

Crucially, the political acceptability of ETS linkage in China would depend on high-level endorsement. The MEE can pursue capacity building and policy experimentation, but formal linkage with an external system, would require high-level approval from the State Council or Party leadership, as linkage signals regulatory trust—an especially sensitive issue in today's geopolitical climate.

The Chinese government also values flexibility and control in climate governance. This poses a challenge for linkage, which typically requires harmonization of key design features such as cap-setting, allocation methods, and monitoring rules.

Even while China has made significant strides in MRV infrastructure, it is unlikely to implement external oversight or legal harmonization like that of the EU. With a view toward international recognition but without sacrificing sovereignty, the focus is still on progressively fortifying the system on China's terms.

In conclusion, even though China's ETS represents a calculated move toward carbon pricing, there are significant barriers to immediate EU integration due to its political climate, narrow scope, disjointed governance, and state-driven reasoning. However, the system's long-term direction and China's ambition to lead the green industrial sector, indicate that alignment might increase over time, particularly if it is handled through progressive cooperation as opposed to quick integration.

6.4 EU–China Climate Cooperation: Fragile but Functional

Despite tensions over trade, technology, and human rights, EU–China climate cooperation endures—serving both the EU's leadership goals and China's commitment to multilateralism and green development.

Climate cooperation dates back to the early 2000s, including joint policy work, emissions trading research, and capacity-building. The 2020 launch of the EU–China High-Level Environment and Climate Dialogue formalized this collaboration despite growing diplomatic friction. According to the 2025 *Powering the Twin Engines* report, the fifth conversation round placed a strong emphasis on sharing expertise on adaptation, green finance, and carbon markets.

However, the nature of this collaboration has been growing weaker. According to the Centre for European Reform (CER), the EU tends to treat climate policy as a compartment, but China sees it as part of the overall strategic relations. In the case of Beijing, climate engagement cannot be separated from the overall strategic relationship. This discrepancy limits the level of collaboration: what the EU can present as a practical and stand-alone attempt to harmonize emissions trading, China can see as a larger political gesture, which can be appreciated, but is also delicate.

Furthermore, there is little mutual trust. Both sides are cautious even if their shared long-term objectives are acknowledged. From the EU side, concerns persist about the transparency, reliability, and ambition of China's ETS. China sometimes sees instruments like the EU's Carbon Border Adjustment Mechanism (CBAM) as unilateral or protectionist, despite their climate rationale. These tensions complicate efforts to move from dialogue to integration.

ETS linkage has symbolic value since it conveys long-term trust to industries and leadership in global carbon pricing to governments. However, despite shared interests, cooperation is still weak and susceptible to outside shocks and political changes. Therefore, gradual, technically focused partnerships are necessary to maintain efforts to foster confidence. Cooperation in lower-risk areas can help maintain momentum and lay the groundwork for future, more ambitious initiatives.

The cooperative framework must change from fragile diplomacy to a stronger basis of regulatory trust and strategic alignment for ETS connection to become politically viable.

6.5 External Political Pressures: The US Factor

It is impossible to discuss the issue of connecting the EU ETS with China's ETS separately. It takes place in a larger geopolitical context that is becoming more and more characterized by rivalry between China and the United States. Deeper cooperation with China has been limited by the EU's alliance with the U.S. on trade, green technology, and regulatory norms, particularly since the Trump administration, despite the EU's desire to act independently in climate diplomacy.

Over the past ten years, international industrial and strategic rivalries have entangled climate policy. The U.S. Inflation Reduction Act (IRA) that allocates hundreds of billions of dollars to clean technology subsidies and domestic manufacturing has changed the rules of the green transition.

Meanwhile, the U.S. policy toward China has grown more confrontational and China has been more and more positioned as an economic rival and a systemic competitor in clean energy innovation and rulemaking. The EU is also taking its own regulatory direction, such as CBAM and GASSA, but these actions tend to be in a geopolitical environment that positions China as a competitor.

This geopolitical triangulation raises challenges for ETS linkage. A move to connect with China's carbon market could be interpreted by U.S. policymakers and domestic stakeholders as a dilution of the EU's climate leadership. There is a real risk that such a linkage might be seen not as a multilateral step forward, but as a breach of transatlantic solidarity, especially if it is viewed through the lens of green industrial competition.

Furthermore, the legacy of mistrust in U.S. climate policy, such as the Trump administration's withdrawal from the Paris Agreement, also influences EU calculations. As illustrated in *Bruegel Blueprint 34* and recent Politico reporting[6], EU leaders are increasingly aware that the continuity of transatlantic climate cooperation cannot be taken for granted, particularly in the wake of the 2025 U.S. election. This uncertainty may make the EU more hesitant to engage in politically sensitive initiatives with China that could be difficult to reverse.

That said, the logic of ETS linkage and transatlantic coordination are not inherently incompatible. A carefully designed linkage, framed not as a concession but as a step toward global carbon market integration, could be consistent with EU climate diplomacy—especially if paired with high transparency standards and conditional safeguards. According to the *Kleinman Center* report, the U.S. policy community is increasingly interested in assessing carbon pricing mechanisms that could ultimately be consistent with other systems such as those in the EU and Asia.

But in this political climate, the risk of misperception is high. Without a clear communication strategy and a shared diplomatic framing, ETS linkage with China could be framed by critics

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[6] Karl Mathiesen, "Trump's Green Legacy: China Ramps up Climate Fight," *Politico*, May 22, 2025, https://www.politico.eu/article/trump-china-energy-green-renewable-xi-jinping/.

inside and outside the EU as undermining climate ambition or empowering a strategic competitor. External political pressures, particularly those of the United States, limit the political feasibility of EU-China ETS linkage. Although these pressures are not necessarily codified, they shape EU policymakers' risk calculations and reinforce the imperative of strategic coherence in the EU's global climate diplomacy.

6.6 Conclusion

In this chapter, the political feasibility of connecting the EU and Chinese ETSs was evaluated in terms of domestic, bilateral, and geopolitical considerations. Although the preceding chapters have revealed that ETS linkage is economically desirable and legally feasible under specific circumstances, its actualization depends on the ability to maneuver a complex and fragmented political environment. Within the EU, political support is uneven.

The European Commission and some parts of the private sector, especially energy intensive and trade exposed industries, are cautiously interested in expanding carbon market cooperation, but Member States are divided. In an interview for this thesis, Michele Emiliano, President of Italy's Puglia Region, warned that a poorly regulated linkage could pressure local industries like Taranto's steel plant and trigger "green delocalization".

At the same time, Emiliano emphasized that regions like Puglia could become hubs for green investment if ETS linkage is paired with harmonized governance standards and robust support for low-carbon infrastructure. His remarks highlight the importance of subnational dynamics in political feasibility assessments. Institutional leadership, while ambitious, cannot override these divergences without broader coalition-building and trust-building measures.

Future alignment is possible, especially if China expands its system and reinforces its cap, although any formal connection with the EU would require high level political endorsement and firm guarantees of regulatory equivalence. Currently, these conditions are not operational but aspirational.

On the bilateral level, climate policy is one of the few areas of functioning EU-China cooperation, but it is becoming more and more vulnerable to strategic mistrust and different diplomatic norms. Linkage is a pragmatic extension of climate diplomacy for the EU, and more political and symbolic for China. This means that even technical cooperation is influenced by the broader geopolitical climate.

The picture is further complicated by external pressures. With U.S.–China rivalry heating up, the EU is caught between its desire to lead on climate multilaterally and its strategic alignment with transatlantic partners. While not necessarily determinative, these geopolitical dynamics add a layer of caution to any discussion of formal linkage.

COP30 in Belém will be a key moment for global climate diplomacy. As the EU and China are likely to present revised NDCs, the summit may redefine ETS linkage as a pillar of Article 6.2, rather than a bilateral experiment. The following chapter discusses how policymakers and stakeholders on either side can realize the long-term potential of ETS linkage.

Chapter 7: STRATEGIC PATHWAYS TO EU-CHINA ETS LINKAGE: A CONDITIONAL ROADMAP

7.1 Purpose of This Chapter

This chapter translates the preceding feasibility analysis into a set of strategic policy recommendations that are grounded in theory and responsive to the realities of global climate governance. The core message is that long-term ETS linkage is both possible and desirable—but only if stakeholders respond strategically to the conditions they face.

To guide this framing, the chapter draws on two complementary theories of international relations. Keohane and Nye's concept of *complex interdependence*[7] and Schelling's *strategic realism*[8]. Together, these frameworks support a vision of ETS linkage as a governance process, less about harmonization than about managing asymmetries and building structured reciprocity over time.

7.2 Strategic Pathways in a World of Fragmented Order

This section assesses three scenario-specific strategies for advancing carbon market integration under varying external conditions.

Scenario One assumes a high level of political trust and regulatory convergence between the EU and China. In this context, emissions trading becomes a tool of climate diplomacy, and full legal and operational integration appears mutually beneficial. China would shift to absolute emissions caps in key sectors, replacing its intensity-based system, and align its MRV frameworks with internationally recognized standards, supported by digital tracking and enhanced verifier accreditation.

These reforms would enable the EU to initiate the Article 25 recognition process, conditionally accepting Chinese allowances as equivalent to EU ETS units. A joint governance body would oversee the integrated market. Cooperation could also include co-issued green bonds, supported by institutions such as the Network for Greening the Financial System (NGFS). The 2025 ICAP Report describes this "next-generation alignment" as a growing trend among mature ETS systems—leveraging carbon markets to demonstrate climate leadership and enhance cross-border collaboration.

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[7] Keohane, R. O. and Nye, J. S. (1977) *Power and Interdependence: World Politics in Transition*. Boston: Little, Brown. It explains how cooperation can emerge despite limited trust, particularly when the costs of non-cooperation rise with economic and environmental integration

[8] Schelling, T. C. (1980). *The strategy of conflict: With a New Preface by the Author*. Harvard University Press. It underscores the role of credible commitments and sequencing in enabling cooperation under uncertainty.

Scenario Two envisions limited diplomatic alignment but strong technical and economic conditions for cooperation. Here, a phased sectoral pilot linkage offers the most viable approach. A pilot in the power sector could implement joint emissions caps and price collars to manage volatility. Rather than relying on full legal convergence, the arrangement would use Article 6.2 of the Paris Agreement, with ITMOs and equivalent adjustments ensuring environmental integrity. The EU could incentivize cooperation through partial CBAM exemptions for sectors aligning with EU carbon standards. Domestic policies on both sides would mitigate adjustment costs and generate political support. This phased approach reflects ICAP's concept of "pilot diplomacy," where technically capable but politically cautious jurisdictions engage in bounded cooperation to build trust and test compatibility.

Scenario Three assumes a fragmented or adversarial geopolitical environment, where formal legal linkage is infeasible due to rivalry, weak institutions, or normative divergence. In such a setting, the goal shifts from integration to resilience and institutional foundation. Officials might launch blockchain-based MRV pilots in select provinces to build transparency. Registry interoperability may be considered in common maritime emissions registries, particularly in major shipping routes. Technical platforms such as ICAP, CEPS, and sectoral forums (e.g. copper or cement) might be opened to regulators, industries and observers, with a view to developing a common epistemic community.

The strategic goal in this case is not short-term integration but keeping engaged and preparing the groundwork towards future alignment. In conditions of uncertainty, as Schelling said, flexible commitments and early coordination lower the cost of future cooperation and render strategic alignment more plausible.

Collectively, these scenarios demonstrate that ETS linkage does not represent a straight line, but rather a sequence of adaptive decisions made in response to structural constraints and changing incentives. Each of the pathways represents a different political reality and offers instruments to deal with risk management and maintain feasible cooperation.

7.3 Conditions for Credible Cooperation

Across all three scenarios outlined in the previous section, the success of any pathway toward ETS linkage rests on a common foundation of enabling conditions. These are not optional enhancements but strategic necessities—preconditions for trust-building, functional alignment, and policy credibility. From the perspective of Schelling's strategic realism, these elements serve as commitment devices: they constrain opportunistic behavior, reduce uncertainty, and raise the reputational costs of defection.

At the same time, complex interdependence theory emphasizes that such technical infrastructure enables the gradual institutionalization of cooperative norms, routines, and expectations—thus forming the bedrock of regime durability.

A first and foundational condition is the existence of verifiable, transparent, and compatible MRV systems. The EU ETS Handbook describes MRV as a “non-negotiable cornerstone” of emissions trading and outlines a multi-tiered verification process supported by independent accredited verifiers, standardized monitoring plans, and annual compliance reports. In particular, the development of digital MRV tools, including blockchain-enabled registries and real-time emissions tracking, has emerged as a critical innovation for both compliance systems and Article 6.2 frameworks.

Closely tied to MRV is the issue of registry interoperability[9]. The European Union’s Union Registry, which governs account management under the EU ETS, already incorporates some features that enable future linkage, such as harmonized account types and automated allowance tracking. For linkage with China to be viable, registry reform would need to include both back-end compatibility and secure data-sharing interfaces to support transparent cross-border transactions.

Another key condition for credible cooperation is the availability of independent verification and capacity-building mechanisms. This requires both legal frameworks and technical expertise—particularly in jurisdictions where verification markets are still nascent. According to the ICAP 2025 Report, the most successful cases of ETS cooperation to date (e.g., California–Québec, EU–Switzerland) have relied on joint or mutually recognized accreditation bodies to oversee verifier standards. For the EU and China, cooperation could include the establishment of joint verifier training programs, shared accreditation benchmarks.

Lastly, permanent dialogue forums need to be institutionalized to handle complexity, develop common technical terminology, and ensure strategic agility. These forums, whether organized by ICAP, CEPS, UNFCCC working groups or regional think tanks, must include not only regulators, but also industry participants, civil society and technical specialists. Even in politically restricted settings, such forums can act as “epistemic buffers” to isolate cooperation against the volatility of diplomacy and ensure continuity of institutions. As noted in CEPS’s guidance on EU–China

[9] The ability to track, transfer, and surrender allowances across systems depends on compatible registry infrastructure, including synchronized account structures, clear ownership rules, and common transaction protocols

cooperation, such platforms are particularly valuable in settings where formal legal alignment is stalled but technical engagement remains politically permissible.

In sum, the credibility of any linkage strategy depends not only on political will, but on the availability and robustness of a shared technical and institutional architecture. MRV convergence, registry interoperability, verifier trust systems, and multi-level dialogues are the scaffolding of long-term cooperation.

Whether the path forward involves deep legal integration or soft, phased interaction, these foundational elements will determine whether the EU and China can transform political uncertainty into structured, adaptive climate governance.

7.4 Time as a Strategic Variable

In the context of EU–China ETS linkage, time is not a neutral background condition but an instrument of governance that can be actively managed to reduce risk, build credibility, and structure cooperation. In terms of strategic realism, time allows actors to order reforms in a manner that makes commitments more credible without necessarily demanding premature convergence. Likewise, in the logic of complex interdependence time enables the interconnected actors to slowly adapt their expectations, institutional forms, and domestic constituencies to the emerging cooperation.

Such conception of time is particularly applicable in a fractured international order, where the instant legal harmonization is politically unattainable. What is needed is not a fixed policy roadmap but a modular and branching policy timeline; a timeline that acknowledges the contingent reality of trust, institutional preparedness, and external geopolitical indicators. These timelines reduce the political cost of participating early by letting states hedge against failure or delay.

When applied to EU-China ETS cooperation, this would involve envisioning the 2025-2035 period as a loosely structured framework of stepwise convergence. As an illustration, pilots under Article 6.2 of the Paris Agreement may be initiated as early as 2026-2027, with a narrow scope, e.g., electricity generation only, or maritime emissions only. Such pilots may involve equivalent adjustments and confirmed mitigation transfers and would enable real-world testing of registry interoperability and MRV compatibility without fully legal recognition of allowances. These experiments could be enabled by the existing EU infrastructure, namely the Union Registry and Market Stability Reserve, in a way that preserves environmental integrity and market predictability.

As of 2030 and based on the success of these pilots and the overall political environment, the two parties may take cooperation to the next level by mutually recognizing allowance in a few chosen sectors, backed by conditional CBAM exemptions and joint governance instruments. Success would create the foundation of a formal Article 25 process and the incremental legal integration of allowance markets in the early 2030s. In contrast, should political tensions flare or technical alignment stagnate, the fallback position would preserve soft-linking arrangements.

What this sequencing model illustrates is that adaptation over time is not a second-best strategy—it is the core logic of credible ETS cooperation.

Long-term architecture of climate governance includes pilot linkages and staged institutional reforms. They enable both sides to try out various designs, adapt according to results, and they also present cooperation not as a dichotomy (linked or unlinked) but as a spectrum of growing integration. Time, in this sense, acts as a learning, coalition and risk-sharing medium.

In addition, strategic time can transform the perceptions of success held by the stakeholders. Even in a highly interdependent system, short-term partial alignment can be re-framed as a stepping-stone versus failure, especially when backed up by transparent benchmarks, evaluation periods, and believable signaling. By doing so, this strategy would allow actors to address the tension between domestic political limitations and the demands of transnational climate collaboration, making incrementalism a strength rather than a weakness.

In short, the recognition of time as a variable of strategy converts the roadmap, as a deterministic path, into a contingent mechanism of governance, a scaffold that keeps many futures open, but along which the alignment of institutions can proceed. In a world of uncertainty, this may be the most powerful tool policymakers have.

7.5 Reframing Linkage as Governance Strategy

This chapter has argued that EU–China ETS linkage should be conceived as a governance strategy unfolding within a complex, asymmetrical, and politically fluid international system. Whether pursued through full legal integration, sectoral pilots, or soft-linking mechanisms, the essence of successful linkage in credibility, flexibility, and strategic logic of cooperation under uncertainty.

Drawing on Schelling's insights, we have seen that the credibility of climate commitments is a function of the sequencing, framing, and risk management strategies that actors employ in the face of unknown futures. From this perspective, phased alignment, conditional commitments, and verifiable technical interoperability are not signs of compromise, they are signs of design. They enable trust to be built incrementally, coalitions to be cultivated domestically, and institutional convergence to emerge through practice rather than decree.

The theory of complex interdependence, as articulated by Keohane and Nye, reinforces this perspective. In an interconnected world where economic, environmental, and technological systems are deeply entwined, cooperation is no longer a matter of choice but of necessity. Linkage becomes attractive not because it is easy, but because the costs of non-cooperation—economic inefficiency, regulatory fragmentation, and climate inertia—are rising.

Reframing linkage in this way also means decentering the question of "when" and "how much," and instead focusing on "how well." The effectiveness of ETS cooperation must be gauged in the clarity of its rules, the strength of its verification mechanisms and the reputation of its institutional structures. In that regard, the preparatory work to create MRV harmonization, registry changes, training verifiers, and bilateral dialogue platforms could prove to be more indicative of long-term success than the act of legal connection itself. The EU's evolving infrastructure—including the expansion of ETS2, integration of digital registries, and alignment with Article 6 mechanisms—demonstrates that the internal capacity to adapt is increasingly viewed as a precondition for external integration.

With this re-conceptualization, linkage is not an all-or-none choice. It is a spectrum of cooperative arrangements that differ in depth, scope and legal formality. The important aspects are the deliberateness with which these arrangements are prepared and the strategic vision they demonstrate. The objective is not merely to "connect markets," but to build a shared governance infrastructure that can evolve over time—one that is robust enough to manage shocks and flexible enough to accommodate asymmetries.

As this chapter has shown, such an approach is not only feasible but necessary. This is the governance that the times require in a period of climate crisis and geopolitical division.

Chapter 8: CONCLUSION

This thesis has explored the feasibility and strategic implications of linking the European Union Emissions Trading System (EU ETS) with China's national ETS. It has maintained that although complete linking is not now operationally feasible, a progressive and flexible approach to integration is still both feasible and desirable by combining comparative legal analysis, economic modeling synthesis, and stakeholder-informed research.

Three dimensions might be used to summarize the main findings. First, linking offers significant efficiency improvements with the potential for cost reductions, price stabilization, and higher climate ambition, as confirmed by economic modeling. These advantages, however, are not equally distributed and are heavily influenced by the cap structures, trading restrictions, and market regulations. Second, basic disparities in cap types, allowance allocation techniques, MRV frameworks, and enforcement mechanisms are shown by legal and institutional analysis. Many of these gaps can be closed with cooperation and reform, but some are structural and call for political will to close.

Third, linkage is as much a matter of diplomacy and trust as it is of technical design, as the political and geopolitical analysis emphasizes. The immediate chances for formal integration are limited by different political systems, geopolitical sensitivities, and outside forces, especially China's sovereignty concerns and the EU's transatlantic commitments.

However, this thesis has shown that linkage does not have to be thought of as a binary decision. Rather, it should be viewed as a process of strategic governance that may be progressively implemented through technical cooperation based on Article 6 of the Paris Agreement, sectoral pilots, and soft-linking mechanisms.

A time-sensitive, scenario-based approach that strikes a balance between ambition and realism is described in Chapter 7's suggested conditional roadmap. In addition to reducing risk, this tiered method allows for political flexibility, allowing parties to transition from conversation to integration without requiring excessive convergence.

This thesis' main contribution is to reframe ETS linking as a dynamic, context-sensitive process rather than a static policy endpoint. Economic attractiveness, legal viability, and political plausibility are all combined to create a multifaceted evaluation that more accurately captures the intricate reality of international climate governance. By doing this, it gives the academic discussion of market integration more depth and offers useful advice to decision-makers attempting to negotiate the changing nexus between international politics and climate policy.

While limitations exist—including reliance on secondary modeling and partial access to Chinese institutional perspectives—the thesis offers a robust foundation for future research and policy experimentation.

Further studies could examine bottom-up sectoral cooperation, test pilot linkages, or explore the impact of evolving EU-China trade dynamics on ETS alignment. Ultimately, the path to ETS linkage will depend on the political choices made by both parties. Yet, as this thesis argues, those choices can be structured, sequenced, and supported by governance strategies that make cooperation not only more likely, but more effective.

In an era of urgent decarbonization and growing geopolitical fragmentation, forging durable bridges between carbon markets is not merely a technical challenge but a diplomatic necessity. The EU-China ETS linkage, if carefully pursued, could serve as a model of adaptive, equitable, and strategically grounded climate cooperation—a step forward for global climate governance.

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ACKNOWLEDGMENTS

I would like to express my deepest gratitude to all those who, in various ways, made it possible for me to complete this thesis and bring this academic journey to a close.

First and foremost, I thank my supervisor, Sonja Peterson, for her expert guidance, constant availability, and the invaluable advice that enriched my research path. Her attention to detail and scientific rigor have been a great source of inspiration.

A special thanks also goes to Michele Emiliano, President of the Puglia Region, and Salvatore Ricci, expert in public affairs, EU politics, and raw materials at the International Copper Association, who kindly agreed to participate in the interviews for this thesis: their expertise and insights were essential in deepening the subject and offering a concrete and up-to-date perspective.

I want to express my deepest gratitude to my family. There won't be a single day in which I will not continue to thank my mother, father, sister and nonna Nunzia for believing in my abilities and supporting me with unconditional love—my true source of strength. I hope the path I have taken so far has made you a little proud of the person I am and the one I am becoming. Thank you for always being there for me (and for being patient), together with my uncles and aunts.

My heartfelt thanks also go to Laura, Mauro, and my little cousin Lucrezia—an unspoken bond that has always been strong and proved real when I needed it most. Your help and your sincere, heartfelt welcome are a reason for deep gratitude, affection, and a life example to me.

I also want to thank Elvis—my "always-informed engineer", ever-present yet never intrusive. I love it when you tease me because I can't remember certain words in Italian anymore. Despite the miles between us, you've been my anchor and my infinite love. Every difficulty I faced became ours the moment I shared it with you. You are love, friendship, and the kind of person I always want by my side. Thank you for encouraging me throughout this journey, you saw something in me when I couldn't, and you followed me around Europe putting aside your own commitments because you considered me more important.

I also thank my "Forlì" friends and my roomies. None of them are actually from Forlì, but to me, that's where they belong. These are the dear friends I met during the SID programme, in my heart's special place, who never let me feel alone this year and always pushed me to give my best. I think of you every day. A year after our last encounter, I still hope to carry you with me and share the adventures yet to come. Only you remember that I chose my life's path because of our microeconomics professor—and the mosquito nets in Africa—during our very first year at university.

And now, a well-deserved thank you to my travel companions Margherita, Giuliano, Eliyab, and Gibran, who never let me feel alone.

To Margherita, for a bond that was immediate and genuine. We stood by each other from the very first moment we met. Your kind soul, intelligence, and humor make me proud to call you my friend. I shared everything with you, and I hope to share much more in the future. You always motivated me during this Master, and I hope I gave back at least a fraction of what you've given me. I'll always be ready to support you in your achievements, just as I know you will with mine, you truly are part of my family.

To Giuliano, who, along with Marghe, Lirian and Maria made up my Berlin home—a city I found amazing and you found... debatable. Your humor and dreams will stay with me always.

Now, I absolutely must thank the first guy who became my friend, and the last one who did.

Eliyab, on October 14, 2024, we sat next to each other without knowing one another. My being "initially introverted" didn't stop you from wanting to get to know me. Your steady presence, kindness, and intelligence accompanied me throughout this experience. I know I've found a friend who can understand my feelings with a single look and who, depending on the moment, can make me laugh—or bring me food. These are all things I cherish, and they truly helped me this year. Thank you for being there and always pushing me to give my best.

Finally, Gibran. Our friendship began in Rome on the very last day of class, after the LPA simulation. I walked out of the classroom discouraged, and even though we didn't know each other well, you came after me to give me a hug and some comfort. That's when I knew you'd always be there for me, as I would be for you. Your friendship has been invaluable. You believed in me when I didn't, and you introduced me to many things—like *Kaamelott*—that I'll never forget. You are a genuine friend, a kind soul, and a true gentleman. Thank you for being there for me during this chaotic year.

Thank you to all my colleagues who shared moments with me this year especially Blerta, Michelle, Adeline and Rossana—from lunch breaks to evening outings—you made this journey more enjoyable.