

THE ECONOMICS OF SUSTAINABILITY IN MALAYSIA: CHALLENGES AND OPPORTUNITIES FOR CARBON PRICING

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ABSTRACT

Climate change presents significant challenges to global economic and environmental systems, necessitating urgent policy interventions to reduce greenhouse gas (GHG) emissions. As a developing economy and a signatory to the Paris Agreement, Malaysia is committed to achieving a 45% reduction in carbon intensity by 2030 and net-zero emissions by 2050. Carbon pricing mechanisms, including the Bursa Carbon Exchange (BCX) and the planned carbon tax, represent pivotal tools in Malaysia's strategy to integrate sustainability into its economic framework. However, the implementation of these mechanisms is not without challenges. This paper examines Malaysia's current carbon pricing landscape, highlighting the economic, social, and regulatory barriers that hinder effective implementation. High-emission industries, such as energy and manufacturing, face financial strain under carbon pricing policies, compounded by the coexistence of fossil fuel subsidies. Small and Medium Enterprises (SMEs), which make up 98.5% of Malaysia's businesses, are particularly vulnerable due to limited access to green finance and technical expertise. Social equity concerns further complicate the adoption of carbon pricing, as low-income households bear a disproportionate share of the economic burden. Additionally, international trade policies, such as the European Union's Carbon Border Adjustment Mechanism (CBAM), add pressure for Malaysia to align its policies with global carbon standards. Despite these challenges, carbon pricing offers significant opportunities for Malaysia. The focus of this paper is on the challenges and opportunities of carbon pricing, and give the recommendations for Malaysia Carbon Pricing Strategies, such as enhancing Monitoring, Reporting, and Verification (MRV) systems and addressing social equity concerns. By leveraging the economic potential of carbon pricing, Malaysia can achieve its sustainability goals while fostering inclusive economic growth, maintaining global competitiveness, and strengthening its leadership role in regional climate action.

Keywords: Carbon Pricing, Fossil Fuel Subsidies, Sustainability, Social Equity, Malaysia.

Introduction

Climate change poses a critical threat to economic and environmental systems worldwide, necessitating urgent and coordinated actions to mitigate greenhouse gas (GHG) emissions (Intergovernmental Panel on Climate Change [IPCC], 2021). In response, many countries are turning to carbon pricing mechanisms such as carbon taxes and emission trading systems as powerful policy tools to internalize the social cost of carbon pollution (World Bank, 2022). These countries have always referred as the lessons model for the emerging market in designing their carbon pricing instruments

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(Okedele et al., 2024). These mechanisms compel emitters to account for the externalities of fossil fuel consumption and have demonstrated potential for driving technological innovation and transitioning energy portfolios toward renewables (International Energy Agency [IEA], 2021).

Malaysia, as a developing economy in Southeast Asia, has pledged to reduce its carbon intensity by 45% by 2030 and achieve net-zero emissions by 2050 under the Paris Agreement (United Nations Framework Convention on Climate Change [UNFCCC], 2015; Ministry of Environment and Water [KASA], 2021). Recognizing carbon pricing as an avenue to achieve its climate goals, Malaysia has introduced the Bursa Carbon Exchange (BCX) and is considering a carbon tax framework (Ministry of Finance [MOF], 2022). However, implementing these mechanisms raises questions about potential economic burdens, social equity implications, and institutional capacity (World Resources Institute [WRI], 2020; Aziz et al., 2024).

This paper aims to assess the role of carbon pricing in Malaysia's journey toward sustainable development, with a particular focus on both the barriers and the opportunities it presents. The main research questions guiding this study are:

- **What are the principal challenges facing the implementation of carbon pricing mechanisms (BCX and carbon tax) in Malaysia?**
- **How can carbon pricing be leveraged to achieve Malaysia's sustainability targets while ensuring inclusive economic growth?**

To address these questions, the paper will examine Malaysia's carbon pricing landscape by evaluating current policies and frameworks. It will analyze key challenges across economic, social, and regulatory dimensions that affect carbon pricing implementation. The paper will investigate potential benefits, including revenue generation, technological advancement, and trade advantages. Drawing from this analysis, the paper will present preliminary policy recommendations to strengthen carbon pricing effectiveness and social acceptance in Malaysia.

Literature Review and Conceptual Framework

Carbon pricing has emerged as a globally recognized strategy for mitigating climate change by attaching a financial cost to emissions (World Bank, 2022). Two primary instruments dominate the carbon pricing space: (i) **Carbon Taxes**, where a fixed price is levied per ton of carbon dioxide equivalent (CO₂ 22e) emitted, and (ii) **Emissions Trading Systems (ETS)**, where the government or a regulatory body sets an overall emissions cap and issues allowances that can be traded among participants (Stiglitz & Stern, 2017). Empirical evidence from the European Union Emissions Trading System (EU ETS) indicates that a well-designed ETS can effectively reduce emissions, though its success heavily depends on robust governance and market oversight (European Commission, 2022).

Beyond the EU, countries like Canada and South Korea have also implemented carbon pricing to help meet their climate targets (World Bank, 2022). In most cases, successful carbon pricing hinges on effective **Monitoring, Reporting, and Verification (MRV)** systems, credible policy commitments, and socio-political acceptability (Haïtes, 2018). These factors ensure that carbon pricing mechanisms not only reduce emissions but also safeguard economic competitiveness and social welfare.

Emerging economies, particularly in the Asia-Pacific region, face unique challenges in implementing carbon pricing. High reliance on fossil fuels, presence of fossil fuel subsidies, and concerns over social equity often complicate the introduction of carbon taxes or ETS (Asian Development Bank [ADB], 2021). In some cases, policymakers fear that carbon pricing could hamper economic growth by increasing production costs (Zhang et al., 2020). However, studies also suggest that with appropriate policy design, such as gradual implementation, revenue recycling, and targeted subsidies, carbon pricing can promote green technologies and deliver pro-poor benefits (Chen, Gao, & Yuan, 2022).

In Southeast Asia, both Indonesia and Singapore have taken steps toward implementing carbon pricing. Singapore's carbon tax, introduced in 2019, applies to large emitters and aims to encourage energy efficiency improvements (Singapore National Environment Agency, 2020). Meanwhile, Indonesia recently passed legislation for carbon pricing but faces concerns about overlapping regulations and limited enforcement capacity (Parluhutan, 2024). These examples illustrate the delicate balance between economic development, social welfare, and environmental objectives in emerging economies.

Malaysia's policy framework for sustainable development is guided by the 12th Malaysia Plan (2021–2025), the National Policy on Climate Change (2009), and commitments to the United Nations Sustainable Development Goals (SDGs) (Economic Planning Unit [EPU], 2021). The government's emphasis on clean energy and sustainable resource management aligns with its commitment to

mitigating climate change (KASA, 2021). Notwithstanding these efforts, Malaysia has historically subsidized fossil fuels to stabilize energy prices and support economic growth, leading to conflicting policy signals (OECD, 2020).

The introduction of the Bursa Carbon Exchange (BCX) in 2022 signaled Malaysia's intention to create a domestic carbon trading platform, while a carbon tax is under consideration for specific sectors (MOF, 2022). These new mechanisms reflect Malaysia's aspiration to align with global climate objectives and maintain trade competitiveness. Nevertheless, the transition requires careful policy design and institutional strengthening to address prevalent barriers such as inadequate MRV systems, limited public awareness, and uncertainty about the potential economic impact (Kamarudin & Mohamed, 2022; Yue, 2024).

Drawing from the global and regional experiences, this paper employs a **multi-dimensional analytical framework** that integrates economic, social, and governance aspects (Figure 1).

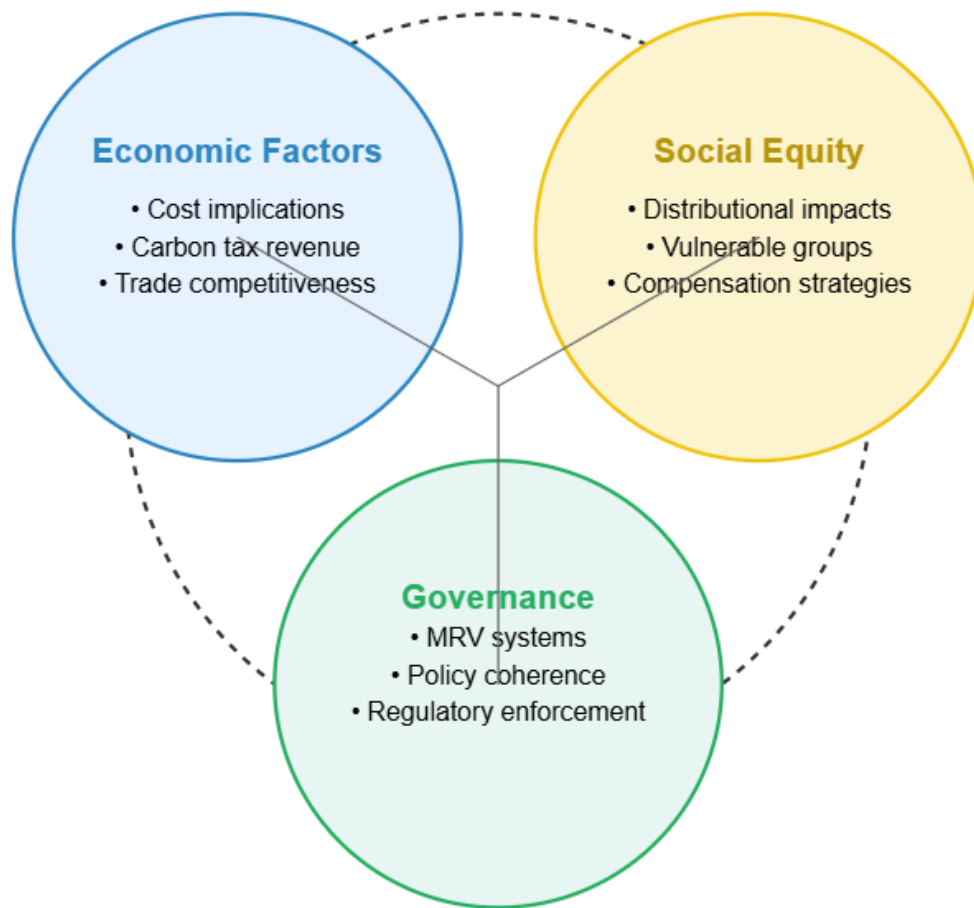


Figure 1: Multi-dimensional Analytical Framework

The framework highlights:

- **Economic Factors:** Cost implications for businesses (including SMEs), revenue potential from carbon taxes, and effects on trade competitiveness.
- **Social Equity:** Distributional impacts of carbon pricing, especially on low-income communities, and strategies for compensating vulnerable groups.
- **Governance and Institutional Capacity:** Effectiveness of MRV systems, coherence of policy instruments, and regulatory enforcement.

By examining carbon pricing through this tripartite framework, we can assess the feasibility of these mechanisms and their broader implications for sustainable development in Malaysia.

Methodological Approach

This paper adopts a **qualitative policy analysis** approach, combining a review of secondary data sources including government policy documents, academic studies, industry reports with insights from international best practices. The qualitative analysis focuses on identifying key themes, patterns, and relationships relevant to the challenges and opportunities of carbon pricing (Bryman, 2016). Given the complexity of climate policy, a multi-method strategy that includes comparative analysis (referencing experiences from other emerging economies) enriches our understanding of Malaysia's context (Creswell & Plano Clark, 2018). Data were collated from policy documents, including the 12th Malaysia Plan, the National Policy on Climate Change, official reports from the Ministry of Finance (MOF) and the Ministry of Environment and Water (KASA), and academic journals on carbon markets and climate governance. Additional sources include reports from the World Bank, Asian Development Bank (ADB), and other relevant international organizations monitoring carbon pricing developments globally. A **thematic content analysis** method was used to categorize findings under three major themes: economic implications, social equity, and governance challenges (Clarke & Braun, 2014). Each theme was further subdivided to capture sector-specific concerns (e.g., SMEs, energy sector) and cross-cutting issues (e.g., fossil fuel subsidies). This approach provides a structured way to interpret the diverse data and to synthesize the information into actionable insights for policymakers.

Malaysia's Carbon Pricing Landscape

Malaysia's approach to climate policy has evolved over the past two decades, influenced by global frameworks and domestic economic priorities (Ministry of Environment and Water [KASA], 2021). Early initiatives focused on promoting renewable energy through policy instruments like the Small Renewable Energy Programme and the Feed-in Tariff (FIT) system introduced in 2011 (Energy Commission, 2017). Despite these efforts, the presence of significant fossil fuel subsidies which aimed at stabilizing energy prices and supporting economic growth has historically dampened the impact of these green initiatives (Organisation for Economic Co-operation and Development [OECD], 2020).

Under the 12th Malaysia Plan (2021–2025), Malaysia has sharpened its emphasis on climate action by committing to a 45% reduction in carbon intensity relative to GDP by 2030 (Economic Planning Unit [EPU], 2021). This commitment dovetails with the broader national agenda to achieve net-zero emissions by 2050. Within this policy environment, carbon pricing is increasingly viewed as a critical tool for aligning Malaysia's economic trajectory with its sustainability goals (Ministry of Finance [MOF], 2024). Launched in 2022, the Bursa Carbon Exchange (BCX) represents Malaysia's first formal platform for trading carbon credits (Bursa Malaysia, 2022). Modeled partly after global exchanges, BCX aims to enhance the transparency and liquidity of carbon offset projects within the country. It primarily focuses on voluntary carbon market activities, where participating companies can trade carbon credits generated from emission-reduction or sequestration projects (e.g., reforestation, energy efficiency upgrades).

Early results indicate moderate uptake, with industrial firms and energy producers exploring the exchange to offset their emissions footprints (Bursa Malaysia, 2023). However, challenges remain. For instance, the lack of standardized Measurement, Reporting, and Verification (MRV) protocols can lead to discrepancies in carbon credit quality (Leinauer et al., 2024). Moreover, critics argue that voluntary offsets alone may not yield sufficient emission reductions unless complemented by mandatory policies and effective enforcement (Haites, 2018).

Recognizing the limitations of a purely market-based mechanism, the Malaysian government has proposed implementing a carbon tax, though detailed frameworks are still under discussion (MOF, 2022). Preliminary proposals suggest applying a tax on high-emission sectors such as power generation, manufacturing, and transportation based on a per-ton CO₂e rate. The revenue generated would potentially fund green infrastructure, research, and development (R&D) for clean technologies, and social welfare programs to alleviate the policy's regressive impacts (Yean, 2024). Nonetheless, the design of a carbon tax must address the overlapping presence of fossil fuel subsidies, which could undermine the effectiveness of the tax by keeping energy costs artificially low (Zhou et al., 2024). Additionally, policy coherence between the proposed carbon tax and the BCX market-based approach remains a concern. Industry stakeholders have called for clear guidelines on whether entities subject to the tax would also participate in BCX trading or receive exemptions (Kamarudin & Mohamed, 2022).

Beyond the BCX and the planned carbon tax, Malaysia has introduced multiple policy measures to facilitate its low-carbon transition. These include green financing options, such as the Green Technology Financing Scheme (GTFS), and various fiscal incentives for renewable energy investments (EPU, 2021). Moreover, ongoing collaborations with international partners and development banks aim to bolster technical capacity, especially for MRV and carbon accounting frameworks (ADB, 2021). However, these initiatives risk fragmentation if not integrated under a cohesive national climate strategy (Ishak & Thiruchelvam, 2024). A robust institutional structure, coupled with clear inter-ministerial coordination, is essential to harmonize disparate programs and ensure that carbon pricing forms part of a holistic policy approach.

Key Challenges in Implementing Carbon Pricing

- **Economic and Financial Barriers**

The manufacturing and energy sectors constitute a significant share of Malaysia's export and GDP. Imposing a carbon tax or mandating participation in carbon markets could increase operational costs, potentially eroding competitiveness unless counterbalanced by productivity gains and technological upgrades (IEA, 2021). These sectors also fear carbon leakage where production shifts to jurisdictions with laxer environmental regulations, if neighboring countries do not adopt comparable pricing mechanisms (Zhang et al., 2020; Simpa et al., 2024).

Malaysia's long-standing fossil fuel subsidies inflate the challenge of carbon pricing by artificially suppressing the true cost of energy (OECD, 2020). Without phased removal or reform of these subsidies, carbon pricing instruments risk sending mixed signals to investors, undermining their efficacy. Additionally, industries benefiting from lower energy costs may resist measures that diminish these advantages (World Resources Institute [WRI], 2020).

Small and Medium Enterprises (SMEs) account for 98.5% of Malaysian businesses and often operate with limited capital and technical expertise (EPU, 2021). Adopting cleaner technologies may be financially prohibitive for many SMEs, especially in the absence of accessible green financing mechanisms. Consequently, carbon pricing could exacerbate the financial strain on these enterprises, unless policy measures are introduced to provide targeted support (Kamarudin & Mohamed, 2022; Gosling & Reinhold, 2024).

- **Social Equity Concerns**

Carbon pricing can disproportionately affect low-income households, who spend a higher percentage of their income on energy (Chen, Gao, & Yuan, 2022). When industries pass on the additional costs of carbon pricing to consumers, essential services like electricity and transportation may become more expensive (ADB, 2021). Addressing these concerns requires structured policy interventions such as revenue recycling, direct subsidies, or rebate programs to minimize regressive outcomes (Stiglitz & Stern, 2017). Yet, designing equitable compensation schemes can be politically sensitive and administratively complex (OECD, 2020).

- **Regulatory and Institutional Weaknesses**

Effective carbon pricing depends on comprehensive MRV systems to ensure accurate tracking of emissions (Hailes, 2018). However, Malaysia's current data collection and reporting mechanisms remain fragmented across different agencies, creating challenges for consistent enforcement (Chan, 2024). Coordination between federal ministries and state-level authorities further complicates policy implementation, especially when environmental jurisdictions overlap or conflict (KASA, 2021).

Moreover, legal frameworks for carbon trading and taxation remain in flux. The BCX, being relatively new, lacks a long track record and robust regulatory backing (Bursa Malaysia, 2022). Without a stable and transparent institutional environment, businesses may be hesitant to make long-term investments in low-carbon technologies (IEA, 2021).

- **International Trade Pressures**

With the European Union's Carbon Border Adjustment Mechanism (CBAM) set to apply to certain imported products, Malaysia faces potential trade-related repercussions if it does not align with global carbon standards (European Commission, 2022; Chakraborty & Dey, 2024). Industries such as electronics, petrochemicals, and palm oil could see higher compliance costs and diminished export competitiveness (WRI, 2020). As a result, there is growing urgency for Malaysia to implement carbon pricing that meets international benchmarks and demonstrates credible climate action. Failing to do so could also deter foreign direct investment (FDI) from sustainability-conscious investors (ADB, 2021).

Opportunities and Benefits of Carbon Pricing

- **Revenue Generation and Reinvestment**

A well-structured carbon tax or trading system has the potential to generate substantial government revenue (Stiglitz & Stern, 2017). In the Malaysian context, these revenues could be strategically allocated to accelerate the adoption of renewable energy technologies, improve energy efficiency measures, and build resilient infrastructure (KASA, 2021). Redirecting funds into **green finance**, such as the Green Technology Financing Scheme (GTFS), could also lower borrowing costs for projects focused on clean energy or sustainable transportation (Economic Planning Unit [EPU], 2021). By doing so, Malaysia could create a self-reinforcing cycle: higher carbon prices incentivize emissions reductions, and the resulting revenues fuel the growth of green industries.

- **Technological Innovation and Capacity Building**

Carbon pricing can serve as a market signal, stimulating innovation in low-carbon technologies (International Energy Agency [IEA], 2021). When businesses anticipate higher costs for emissions-intensive processes, they are more likely to invest in R&D to develop cleaner production methods (World Bank, 2022). This dynamic could catalyze Malaysia's burgeoning green technology sector, leading to increased job opportunities and facilitating a shift in the workforce toward higher-skilled positions (Chen, Gao, & Yuan, 2022). In parallel, government-driven initiatives like the creation of specialized research hubs or tax incentives for green patents could bolster Malaysia's capacity to become a leader in ASEAN's renewable energy market (Asian Development Bank [ADB], 2021).

- **Trade Competitiveness and Market Access**

Aligning domestic carbon pricing with international benchmarks could help Malaysia preempt trade barriers such as the EU's Carbon Border Adjustment Mechanism (European Commission, 2022). By demonstrating a commitment to reducing emissions, Malaysian exporters might avoid or minimize border taxes imposed by carbon-conscious trading partners. Furthermore, *environmentally conscious investments* are on the rise globally, with investors increasingly screening portfolios based on Environmental, Social, and Governance (ESG) criteria (OECD, 2020). Establishing credible carbon pricing mechanisms may thus attract foreign direct investment (FDI) from ESG-focused funds, strengthening Malaysia's global investment appeal (WRI, 2020).

- **Positioning Malaysia in the ASEAN Green Economy**

Carbon pricing could position Malaysia as a regional pioneer in the ASEAN green economy (ADB, 2021). By aligning policy instruments such as the Bursa Carbon Exchange (BCX) and the proposed carbon tax with broader regional initiatives, Malaysia can foster cross-border carbon trade and technology sharing (Kamarudin & Mohamed, 2022). Collaborative ventures in the areas of renewable energy deployment, capacity building, and joint infrastructure projects would not only reduce regional emissions but also create economies of scale that benefit all participating ASEAN countries (EPU, 2021).

Policy Recommendations

- **Strengthening MRV Systems**

Monitoring, Reporting, and Verification (MRV) frameworks form the backbone of any carbon pricing mechanism (Haites, 2018). Malaysia could establish a centralized digital platform for emissions reporting, bolstered by standardized protocols and third-party audits. This transparency would enhance policy credibility, enable accurate allocation of carbon tax revenues, and facilitate reliable carbon credit trading through BCX (KASA, 2021).

- **Revisiting Fossil Fuel Subsidies**

A gradual restructuring or removal of fossil fuel subsidies is essential to creating a level playing field for carbon pricing (OECD, 2020). Policymakers can phase out subsidies in tandem with the introduction of carbon taxation, thereby reducing the immediate financial shock. Revenue recovered from subsidy reforms could be reinvested into social programs or used to incentivize the adoption of renewable energy technologies (Stiglitz & Stern, 2017). This approach aligns with *green fiscal policy* principles, balancing emission-reduction goals with social welfare concerns (WRI, 2020).

- **SME Support and Capacity Building**

Given that **Small and Medium Enterprises (SMEs)** dominate Malaysia's economic landscape, targeted assistance is crucial (EPU, 2021). Policymakers could:

- **Expand Green Financing:** Offer lower interest rates or guarantee schemes for SMEs investing in energy efficiency or renewable energy projects.
- **Technical Assistance Programs:** Provide training, toolkits, and advisory services to help SMEs measure their carbon footprint and develop low-carbon strategies (Kamarudin & Mohamed, 2022).
- **Innovation Grants:** Encourage R&D collaborations between SMEs, universities, and research institutes to develop cost-effective green technologies (IEA, 2021).
- **Addressing Social Equity**

To mitigate the regressive impacts of carbon pricing, policymakers should design **compensation mechanisms** for low-income groups (Chen, Gao, & Yuan, 2022). Options include:

 - **Targeted Cash Transfers:** Direct payments to households most vulnerable to energy price increases.
 - **Energy Vouchers or Subsidies:** To offset higher electricity or fuel costs, ensuring essential services remain affordable (ADB, 2021).
 - **Progressive Tax Structure:** Tiered carbon tax rates that exempt or reduce costs for small-scale emitters while imposing higher rates on large polluters (Stiglitz & Stern, 2017).
- **International Alignment and Cooperation**

Engaging in bilateral and multilateral dialogues can help Malaysia harmonize its carbon pricing mechanisms with global standards (OECD, 2020). Cooperation within ASEAN can lead to **regionally consistent** carbon markets, reducing the risk of carbon leakage and strengthening collective bargaining power in global climate negotiations (ADB, 2021). Furthermore, aligning domestic regulations with international frameworks can prepare Malaysian exporters to comply with emerging border tax adjustments like the EU CBAM (European Commission, 2022).

Conclusion

This paper has evaluated the evolving role of carbon pricing in Malaysia's quest for sustainable development. Despite facing **economic** (high-emission industries, fossil fuel subsidies, SME constraints), **social** (equity concerns), and **institutional** (weak MRV systems, fragmented regulatory frameworks) challenges, Malaysia's pursuit of carbon pricing mechanisms which embodied by the Bursa Carbon Exchange (BCX) and a planned carbon tax holds promise for catalyzing a low-carbon economy. For carbon pricing to be transformative, Malaysia must adopt an integrated approach that addresses existing policy contradictions (i.e., fossil fuel subsidies), invests in robust institutional capacities (MRV, enforcement), and ensures social inclusivity (low-income household protections). With careful design and implementation, carbon pricing could stimulate innovation, generate revenue for green infrastructure, and bolster Malaysia's trade competitiveness.

By capitalizing on the opportunities presented by carbon pricing, Malaysia can advance toward its 2030 and 2050 climate commitments, while simultaneously fostering a more resilient, inclusive, and globally competitive economy. The lessons gleaned from Malaysia's experience by balancing economic growth, social welfare, and environmental stewardship can offer valuable insights for other emerging economies grappling with similar climate policy challenges.

Limitations and Future Research

This study relied primarily on secondary data and qualitative policy analysis, offering insights into the broader challenges and opportunities associated with carbon pricing in Malaysia. However, there remains a gap in understanding public perception and political feasibility remain underexplored factors influencing carbon pricing acceptance in the Malaysian context. Future research could include survey-based or mixed-methods studies to gauge stakeholder attitudes, identify barriers to political support, and develop communication strategies that foster broader societal buy-in. Additionally, comparative studies drawing lessons from global carbon pricing cases would enrich Malaysia's policy design, allowing adaptation of proven best practices from jurisdictions with similar economic structures. These comparisons could offer guidance on setting appropriate tax rates or crafting emissions trading systems that suit local conditions. An important area of focus might be Small and Medium Enterprises (SMEs), which form the backbone of Malaysia's economy; investigating SME acceptability and exploring tailor-made financial or technical assistance would be particularly valuable. Further empirical work could adopt a sector-specific approach, employing quantitative methods such as computable general equilibrium (CGE) models to assess how different carbon pricing scenarios might impact key industries (IEA, 2021).

Such modeling would help policymakers tailor strategies that mitigate adverse effects on competitiveness while maximizing environmental benefits.

References

1. Asian Development Bank [ADB]. (2021). *Asia's journey to net-zero: Perspectives and opportunities*. ADB Publishing.
2. Aziz, A., Zaidi, S. M., & Zia, M. B. (2024). Environmental Policy and Sustainable Development: A Comparative Analysis of Impact in Developed and Developing Nations. *Insights-Journal of Life and Social Sciences*, 2(1), 37-42.
3. Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
4. Bursa Malaysia. (2022). *Launch of the Bursa Carbon Exchange (BCX)*. Retrieved from www.bursamalaysia.com
5. Bursa Malaysia. (2023). *Annual report: Carbon trading progress and outlook*. Retrieved from www.bursamalaysia.com
6. Chakraborty, D., & Dey, O. (2024). Trade, Environment and Climate Change. In *Influence of WTO and Global Dynamics on Trade Flows: A Machine-Generated Literature Overview* (pp. 289-347). Singapore: Springer Nature Singapore.
7. Chan, M. (2024). Malaysia: Digital Payments, Data Regulations, and AI as Most Promising Areas for Digital Economy Collaboration. In *The ASEAN Digital Economy* (pp. 76-96). Routledge.
8. Chen, L., Gao, Q., & Yuan, C. (2022). Carbon pricing in emerging economies: Balancing emissions reductions and social equity. *Energy Policy*, 164, 112887.
9. Clarke, V., & Braun, V. (2014). Thematic analysis. In T. Teo (Ed.), *Encyclopedia of critical psychology* (pp. 1947–1952). Springer.
10. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE.
11. Economic Planning Unit [EPU]. (2021). *12th Malaysia Plan 2021–2025*. Prime Minister's Department of Malaysia.
12. Energy Commission. (2017). *Energy Malaysia: A strategic outlook*. Retrieved from www.st.gov.my
13. European Commission. (2022). *Carbon Border Adjustment Mechanism (CBAM) factsheet*. Retrieved from <https://ec.europa.eu>
14. Gössling, S., & Reinhold, S. (2024). Accelerating small and medium sized tourism enterprises' engagement with climate change. *Journal of Sustainable Tourism*, 1-18.
15. Haites, E. (2018). Carbon taxes and greenhouse gas emissions trading systems: Linkages and interactions. *Climate Policy*, 18(1), 96–108.
16. Intergovernmental Panel on Climate Change [IPCC]. (2021). *Climate change 2021: The physical science basis*. Cambridge University Press.
17. International Energy Agency [IEA]. (2021). *Net zero by 2050: A roadmap for the global energy sector*. IEA Publications.
18. Ishak, N. F., & Thiruchelvam, V. (2024). Sustainable innovations in Malaysia's public procurement: strategic policy initiatives and coherences. *International Journal of Innovation Science*, 16(2), 338-372.
19. Kamarudin, S. K., & Mohamed, A. R. (2022). Assessment of carbon pricing potential in Malaysia: Policy design and stakeholder perspectives. *Renewable and Sustainable Energy Reviews*, 160, 112268.
20. KASA (Ministry of Environment and Water). (2021). *Malaysia Climate Action Strategy*. KASA.
21. Leinauer, C., Hanny, L., Strüker, J., & Weibelzahl, M. (2024). When Voluntary Carbon Markets Give You Lemons, Make Lemonade: A Method for Selecting Digital Technologies in MRV Processes.
22. Ministry of Finance [MOF]. (2024). *Economic outlook: Sustainability and climate finance*. MOF.

23. Okedele, P. O., Aziza, O. R., Oduro, P., & Ishola, A. O. (2024). Carbon pricing mechanisms and their global efficacy in reducing emissions: Lessons from leading economies.
24. Organisation for Economic Co-operation and Development [OECD]. (2020). *Fossil fuel support country note: Malaysia*. OECD Publishing.
25. Parluhutan, M. C. (2024). *The EU Environmental Policy's" Branching Beyond Borders": Exploring the Externalization of the EU Deforestation Regulation in Indonesia* (Master's thesis, NTNU).
26. Simpa, P., Solomon, N. O., Adenekan, O. A., & Obasi, S. C. (2024). Strategic implications of carbon pricing on global environmental sustainability and economic development: A conceptual framework. *International Journal of Advanced Economics*, 6(5), 139-172.
27. Singapore National Environment Agency. (2020). *Carbon tax in Singapore: Overview and updates*. Retrieved from <https://www.nea.gov.sg>
28. Stiglitz, J. E., & Stern, N. (2017). *Report of the High-Level Commission on Carbon Prices*. World Bank.
29. United Nations Framework Convention on Climate Change [UNFCCC]. (2015). *Paris Agreement*. Retrieved from <https://unfccc.int>
30. World Bank. (2022). *State and trends of carbon pricing 2022*. World Bank.
31. World Resources Institute [WRI]. (2020). *Carbon pricing in practice: A handbook for emerging economies*. WRI.
32. Yean, T. S. (2024). Greening China's Belt and Road Initiative in Malaysia. *Journal of Southeast Asian Economies*, 41(1), 13-27.
33. Yue, S. (2024). The Evolutionary Logic of EU Green Barriers in the Shipping Industry and China's Response. *China Legal Sci.*, 12, 24.
34. Zhang, P., Liu, L., & Wei, Y.-M. (2020). Impacts of carbon pricing on industrial competitiveness: A meta-analysis. *Applied Energy*, 260, 114236.
35. Zhou, X., Xing, S., Jin, Y., Zhang, M., & Liu, Z. (2024). Carbon price signal failure and regulatory policies: A systematic review. *Environmental Impact Assessment Review*, 105, 107444.

