THE CENTER TO COMBAT
CORRUPTION AND CRONYISM

Malaysia's Steel Industry & Climate Commitments

Governance, Gaps, and Pathways

Malaysia's Steel Industry and Climate Commitments: Governance, Gaps, and Pathways
The Center to Combat Corruption and Cronyism (C4 Center)

Authors
Nabila Zulkeflee
Pushpan Murugiah

Editor
Arief Hamizan

Contributor
Prishanth Linggaraj

Cover, Layout, and Graphics
Asyraf Abdul Samad
Benjamin Tiong

March 2026

C Four Consultancies Sdn Bhd
Unit A707, Pusat Dagangan Phileo Damansara 1,
No. 9, Jalan 16/11, Off Jalan Damansara,
46350 Petaling Jaya, Selangor, Malaysia.
www.c4center.org
Email: contact@c4center.org
Telephone: +603-7660 5140

About the Center to Combat Corruption and Cronyism

The **Center to Combat Corruption and Cronyism (C4 Center)** is a leading Malaysian civil society organisation dedicated to strengthening integrity, transparency, and accountability in public governance, operating at both national and regional levels.

C4 Center is recognised for its rigorous, evidence-based research and policy analysis, which underpin its advocacy to shape public discourse, influence institutional reform, and promote meaningful citizen participation in governance. Its work is driven by a multidisciplinary team of investigative researchers, legal professionals, and experienced private-sector practitioners, and guided by a Board comprising respected figures in anti-corruption and governance who provide strategic direction and institutional credibility.

Committed to inclusive and gender-responsive programming, C4 Center integrates gender considerations across its work and prioritises balanced representation. The organisation actively engages a wide range of stakeholders—including youth, public officials, private-sector actors, government-linked companies (GLCs), indigenous communities, environmental advocates, and residential community groups—to ensure that anti-corruption and governance reforms are grounded, participatory, and socially responsive.

Guided by the principles of **CLEAN, COMPETENT, CONSCIOUS, and CREDIBLE** governance, C4 Center is an independent, non-partisan, non-profit organisation. Its mission is to foster open government policies at the national, state, and local levels, primarily through public sector reform and strengthened citizenship governance.

Selected Publications

- *Who Holds the MACC Accountable? Improving Oversight of the Malaysian Anti-Corruption Commission (2026)*
- *Whistleblower Protection or Suppression? A Decade of Section 203A of the Penal Code (2025)*
- *Navigating Reform: Challenges and Opportunities in the National Anti-Corruption Strategy 2024–2028 (2025)*
- *Ending Waste Colonialism, Governing Plastic Pollution: Japan's Opportunity to Lead Asia out of the Plastic Crisis (2024)*
- *Structuring the Malaysian Ombudsman Office (2024)*
- *Policy Proposal to the Malaysian Government: The Procurement Act (2025)*
- *COVID-19 and Governance: A Qualitative Study on Government Aid with Communities from Bentong, Pahang and Selayang (2023)*

Our Services

- HRDF-claimable training programmes
- Consultancy services on integrity, governance, and anti-corruption
- Speaking engagements and expert briefings
- Seminars and workshops on integrity, good governance, and anti-corruption

Malaysia's Steel Industry and Climate Commitments

Governance, Gaps, and Pathways

The Center to Combat Corruption and Cronyism

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AGC: Attorney General's Chambers
BAT: Best Available Technique
BF-BOF: Blast Furnace-Basic Oxygen Furnace
BOF: Basic Oxygen Furnace
BRI: Belt and Road Initiative
BUR4: Fourth Biennial Update Report
CAGR: Compound annual growth rate
CCA: Climate Change Act
CCM: Companies Commission of Malaysia
CCUS: Carbon Capture, Utilisation, and Storage
CEMS: Continuous Emission Monitoring Systems
CO: Carbon Monoxide
CO_2: Carbon Dioxide
CO_2e : Carbon Dioxide Equivalent
DOE: Department of Environment
DRI: Direct Reduced Iron
EAF: Electric Arc Furnace
ECER: East Coast Economic Region
ECRL: East Coast Rail Link
EPF: Employees Provident Fund
EQA: Environmental Quality Act
ESG: Environmental, Social, and Governance
FDI: Foreign Direct Investment
G2G: Government-to-government
GDP : Gross Domestic Product
GHG : Greenhouse gas
GLC: Government-linked company
GLIC: Government-linked investment company
HBI: Hot Briquetted Iron
HICOM: Heavy Industries Corporation of Malaysia
IF: Induction Furnaces
IPCC: International Panel on Climate Change
ITA: Investment Tax Allowance
KWAP: Retirement Fund Incorporated
LRF: Ladle Refining Furnaces

LT-LEDS: Long-Term Low Emission Development Strategy
LTAT: Armed Forces Fund Board
LULUCF: Land Use, Land-Use Change and Forestry
MCKIP: Malaysia–China Kuantan Industrial Park
MIDA: Malaysian Investment Development Authority
MISIF: Malaysian Iron and Steel Industry Federation
MITI: Ministry of International Trade and Industry
MoF Inc.: Minister of Finance Incorporated
MRT2: Mass Rapid Transit Line 2
$MtCO_2e$: million tonnes of CO_2 equivalent
Mtpa: million tonnes per annum
NDA: Non-disclosure Agreement
NDC : Nationally Determined Contribution
NDC RAP: Nationally Determined Contribution Roadmap and Action Plan
NETR: National Energy Transition Roadmap
NIMP: New Industrial Master Plan
NO_2: Nitrogen Dioxide
NRES: Ministry of Natural Resources and Environmental Sustainability
PLC: Public Listed Company
PM: Particulate Matter
PNB: Permodalan Nasional Berhad
RTI: Right to Information
SST: Sales Tax and Service Tax
SC: Securities Commission Malaysia
SDG: Sustainable Development Goal
SEDG: Simplified ESG Disclosure Guide
SEZ: Special Economic Zone
SME: Small and Medium-sized Enterprise
SO_2: Sulphur Dioxide
SOE: State-owned enterprise
UNCAC: United Nations Convention against Corruption
UNFCCC: United Nations Framework Convention on Climate Change

Executive Summary

Malaysia has committed to strengthening its climate ambition through Nationally Determined Contributions (NDCs) since 2016. Although the ambition has been progressively revised and enhanced over the years, significant challenges from hard-to-abate industries remain—particularly from the steel industry. While steel plays a critical role in national development—supporting construction, manufacturing, employment, and Gross Domestic Product (GDP)—it is also among Malaysia's largest industrial sources of greenhouse gas (GHG) emissions.

The iron and steel industry have emerged as the primary GHG contributor within the manufacturing and construction subsector, accounting for 30% of the subsector emissions by 2021.[1] From 2005 to 2021, emissions from the industry grew at a compound annual growth rate (CAGR) of 0.69%,[2] underscoring its persistent growth in emissions. This trend poses a significant risk to Malaysia's ability to meet its NDC commitments if current business practices continue.

At the same time, Malaysia's climate governance—particularly its GHG reporting framework in the steel industry—remains underdeveloped. The legislation of a Climate Change Act (CCA) has faced continuous delays and existing voluntary compliance mechanisms are largely inconsistent. There is

[1]. Ministry of Natural Resources, Environment and Climate Change, Malaysia. (December 2024). *Malaysia's First Biennial Transparency Report under the United Nations Framework Convention on Climate Change*. Available at https://unfccc.int/documents/645171

[2]. ibid

no mandatory requirement for all steel producers—especially small and medium enterprises (SMEs) and foreign-owned companies operating through private corporate structures—to publicly disclose emissions data, exposing national reporting to underreporting.

Moreover, the presence of political influence and government-to-government (G2G) arrangements in the industry further exacerbates the challenges in climate governance. Though often framed as strategic planning to boost the industry's growth, certain preferential policies have created market imbalances that increase pressure on domestic players, while allowing foreign-owned companies to operate with limited transparency and insufficient scrutiny on environmental compliance.

Given this context, this report examines the governance framework surrounding Malaysia's steel industry and assesses how continued high-emission practices undermine the country's climate objectives. The study further examines existing governance loopholes in the steel industry with particular focus on disclosure requirements, emissions governance, and political interference.

Key Findings:

- Malaysia's steel industry lacks mandatory, publicly accessible company-level GHG emissions data and reporting, undermining the credibility of national emissions reporting.
- Industry reluctance to disclose data reflects systemic opacity and minimal regulatory pressure for transparency.
- Existing environmental regulations do not impose enforceable GHG limits on steel producers, and disclosure requirements across corporations is uneven, allowing high-emission practices to continue largely unchecked, and creating accountability gaps across the industry.
- Fragmented mandates across ministries and agencies weaken policy coordination and stifle effective emissions governance.
- Foreign-owned steel producers increasingly dominate the sector while operating carbon-intensive technologies with limited public scrutiny.

This report recommends the following actions to address the governance gaps and emissions challenges in Malaysia's steel industry:

- Mandate public, standardised, and verified GHG emissions disclosure for all steel producers—public listed, private limited, domestic, and foreign-owned—to close transparency gaps and strengthen national emissions accounting.
- Enact and implement a binding CCA that establishes enforceable emissions thresholds, reporting obligations, and penalties for non-compliance in hard-to-abate industries such as steel.
- Strengthen institutional coordination by establishing a central climate governance mechanism to align industrial, energy, and climate policies across ministries and regulatory agencies.
- Introduce a Right to Information (RTI) law and an independent Malaysian Ombudsman to guarantee public access to environmental data and provide oversight over regulatory failures.
- Reform investment incentive frameworks to ensure tax benefits, industrial approvals. Special Economic Zone (SEZ) privileges must be conditional on verified emissions performance and compliance with climate obligations.
- Address political–business influence by requiring publicly accessible beneficial ownership disclosures, independent audits, and transparent governance for all strategic industrial projects.
- Establish a dedicated Just Transition Fund, financed through carbon pricing and environmental penalties, to support technological upgrading, workforce reskilling, and equitable decarbonisation in the steel sector.

Introduction

In 2015, 195 countries—including Malaysia—adopted the Paris Agreement, committing to a shared global goal of limiting rising temperatures and strengthening climate resilience.[3] Each signatory pledged to establish its own climate target known as the Nationally Determined Contribution (NDC). Malaysia's current NDC 3.0 sets an absolute emissions reduction tar-

[3]. United Nations Framework Convention on Climate Change (UNFCCC). (2015). The *Paris Agreement*. United Nations. Available at https://unfccc.int/process-and-meetings/the-paris-agreement

get of 15 to 30 million tonnes of carbon dioxide equivalent ($MtCO_2e$) by 2035 from the country's peak emissions level.[4]

A major challenge to achieving this commitment lies in emissions from the industrial sector, particularly hard-to-abate[5] industries. In Malaysia, the steel industry is one of the largest emitters of greenhouse gas (GHG) emissions, accounting for around 4.5% of national GHG emissions in 2020.[6] At the same time, the sector plays a critical role in national development, supporting construction, automotive, and manufacturing industries, and contributing both to employment and Gross Domestic Product (GDP).

This dual role—economic backbone and carbon-intensive emitter—creates a central tension in Malaysia's climate pathway. If left unaddressed, rising emissions from steel production could undermine progress towards NDC targets and heighten the country's vulnerability to climate impacts such as extreme weather, sea-level rise, and resource insecurity.

In 2024, the sector contributed RM28.42 billion to GDP, and, as of February 2025, the sector employed approximately 283,000 workers.[7] It remains highly carbon intensive and has long struggled with governance gaps, excess capacity, and limited deployment of low-carbon technologies. The growing presence of foreign investors, particularly major Chinese steel companies, has also raised concerns on industrial oversight, domestic policy alignment, and industrial sovereignty, as production decisions may not fully align with Malaysia's climate commitments.

This report therefore examines the governance, regulatory, and policy gaps surrounding GHG emissions in Malaysia's steel industry, including aspects of foreign control and limited transparency. The research identifies

---

[4]. United Nations Development Programme. (2025, August 1). *Malaysia. Climate Promise*. Available at https://climatepromise.undp.org/what-we-do/where-we-work/malaysia

[5]. *Hard-to-abate sectors* refer to industries that are particularly difficult to decarbonise due to their high energy intensity, reliance on the use of fossil fuels, and limited low-carbon technology alternatives such as cement, steel, and chemical production (International Energy Agency [IEA], 2022).

[6]. Hishan, R.N.D., Asmawi, A., & Ahmad, A. A. (2024). *Breaking the carbon shackles: Navigating the path to decarbonising the Malaysian steel sector.* Energy Research & Social Science. Available at https://www.sciencedirect.com/science/article/pii/S221462962400029X?ref=pdf_download&fr=RR-2&rr=9b3b35a0e86164ad

[7]. Malaysian Iron and Steel Industry Federation (MISIF) and Malaysia Steel Association (MSA). (2025). *Forging a Sustainable and Resilient Future for Malaysia's Iron and Steel Industry*. Available at https://misif.org.my/wp-content/uploads/2025/05/MISIF-MSA-Joint-Press-Statement-on-Forging-a-Sustainable-and-Resilient-Future-for-Malaysias-Iron-and-Steel-Industry.pdf

weaknesses in data disclosure, enforcement, and corporate accountability that hinder the nation's decarbonisation pathway. Additionally, it further reviews existing government initiatives and potential best practices for integrating climate responsibility within the industrial policy.

In doing so, this study provides a foundation for evidence-based recommendations that balance Malaysia's climate goals with the steel industry's vital role in economic development.

Research Background

Research Objectives

Considering the steel industry's significant environmental impacts and its potential to detract from Malaysia's climate targets, this research has the following objectives:

1. To examine how the steel industry in Malaysia contributes to environmental pollution, particularly GHG emissions, and its impact on the nation's ability to achieve its NDC target.
2. To examine loopholes in the existing governance of the steel industry in Malaysia, with particular regard to corruption vulnerabilities and its environmental impact.
3. To identify the sources of emissions from steel industry players, including small and large corporations, as well as foreign corporations that have no obligation to declare their emissions under current Bursa regulations.
4. To suggest recommendations to mitigate GHG emission issues within the industry.

Research Methodology

The desk research involved an extensive review of academic literature, industry reports, national policies, regulatory frameworks, and available guidelines.

Supplementing the desk research, outreach efforts were made to engage key industry stakeholders through interview and site visit requests to gather further insights into the industry practices.

This research has compiled over 97 steel related companies operating in Klang Valley and Sarawak from multiple sources, including the Malaysian Iron and Steel Industry Federation (MISIF) member list available online,[8] as well as additional companies identified during the research. Of these:

- 22 companies did not respond to initial contact attempts,
- 36 companies explicitly declined interview requests,
- 36 initially expressed interest, but later did not respond to follow-up communications, and
- 3 companies participated in answering the research questions.

Research Limitations

A limitation encountered in this research is the limited availability of relevant data. There is a notable lack of specific and disaggregated data on GHG emissions directly attributed to the steel industry.

In addition to data scarcity, the research also faced challenges related to transparency, particularly among private businesses operating within the steel industry. Efforts were made to engage with relevant steel industries, focusing on companies operating in Klang Valley. Outreach beyond this region was limited. However, one company based in Sarawak was contacted following recommendations from other interviewees.

Approximately 97 companies were contacted and invited to participate in interviews to better understand their operations and compliance

[8]. Malaysian Iron and Steel Industry Federation. (n.d.) *Directory – All members*. Available at https://misif.org.my/directory/

with GHG emission reporting and environmental governance.[9] However, most declined to participate. Some cited non-disclosure agreements (NDAs), while others appeared unfamiliar or unwilling to engage.

This limited access reduced the depth of qualitative insights for this study and reflects broader issues of inadequate transparency and data availability in the environmental governance, particularly in GHG emissions reporting from the steel industry.

Report Structure

Part One provides an overview of the steel industry's role in global and national economic development, highlighting its role in supporting construction, infrastructure, manufacturing, and other related activities. It also examines the environmental impact of steel production, showing how the industry's high energy use and GHG emissions are addressed under existing environmental laws, regulations, and policies. The section further explores the tension between the nation's pursuit of economic growth and its climate commitments, and how economic opportunities attract political interests and state-state agreements have often taken precedence over environmental concerns.

Part Two examines the corporate landscape of Malaysia's steel industry. It maps out the composition of the industry players, distinguishing between each type of corporation, including government-linked companies (GLCs), public listed companies (PLCs), private limited companies, and foreign-owned companies. Through case studies, this section illustrates how state involvement and Foreign Direct Investment (FDI) have reshaped the industry over time. It further analyses how G2G arrangements, preferential incentives, and Special Economic Zones (SEZs) have created unequal regulatory conditions, contributing to foreign dominance, limited transparency, and weak accountability—particularly among large, high-emission steel producers.

Part Three summarises the key findings of the research, highlighting systemic governance loopholes that undermine effective GHG emissions

[9]. Refer to Appendix 1 for the list of attempted interviewees and Part 3 on the analysis on the companies' non-participation.

control in Malaysia's steel industry. This part identifies the specific legislative and institutional gaps that impede the enforcement of environmental standards and discusses how these regulations undermine Malaysia's ability to meet its NDC targets. The analysis highlights issues such as inconsistent policy alignment, weak enforcement capacity, limited data transparency, and lack of industry accountability, which calls for urgent institutional reforms. This part also presents recommendations aimed at strengthening transparency, closing regulatory gaps, improving institutional coordination, and ensuring equal accountability across corporations, in supporting Malaysia's ability to meet its climate goals.

Part 1

1.1 Malaysia's Steel Industry: Background and Development

Malaysia's shift from a plantation-based economy to an industrial and manufacturing-driven economy provides important context for the role and structure of the steel industry today. In the early post-independence era, economic development relied heavily on commodities such as rubber and tin.[10] As Malaysia developed, industrial and manufacturing sectors expanded rapidly, creating sustained demand for industrial inputs—most notably steel.

This development served as the backbone for various key sectors including automotive, infrastructure, oil and gas, heavy machinery, as well as production of daily essentials. The industry supports these sectors by providing essential materials of crude steel through a full range of processes, including steelmaking, hot and cold rolling, and the fabrication of finished products.

The distribution of steel use across industries provides insight into Malaysia's industrial structure and growth model. Malaysia's steel demand, driven mainly by the construction and manufacturing sectors, reached

[10]. Malaysian Investment Development Authority. (n.d.). *Malaysia's major economic transformation since 1957*. Available at https://www.mida.gov.my/mida-news/malaysias-major-economic-transformation-since-1957/#:~:text=In%20the%20years%20following%20independence,of%20both%20rubber%20and%20tin.

its peak in 2018 at 9.78 million tonnes.[11] In 2021, as shown in Figure 1, the construction sector remained the dominant consumer of steel. Malaysia's reliance on this sector was significantly higher, with 63% of total steel use compared to the global average of 52%.

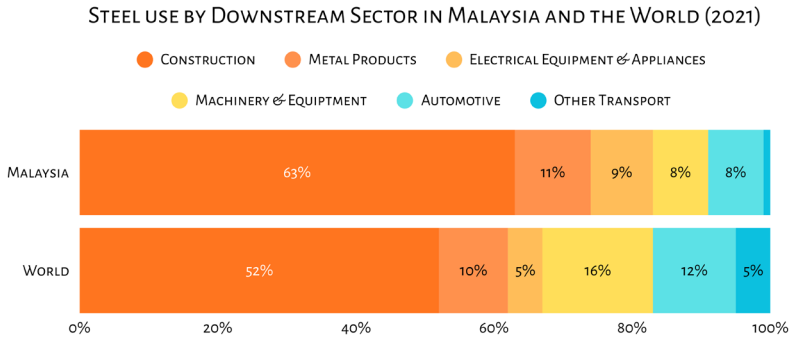

Figure 1: Steel use by downstream sector in Malaysia and the world in 2021

Source: Ministry of International Trade and Industry (MITI, 2025), *Steel Industry Roadmap 2035*

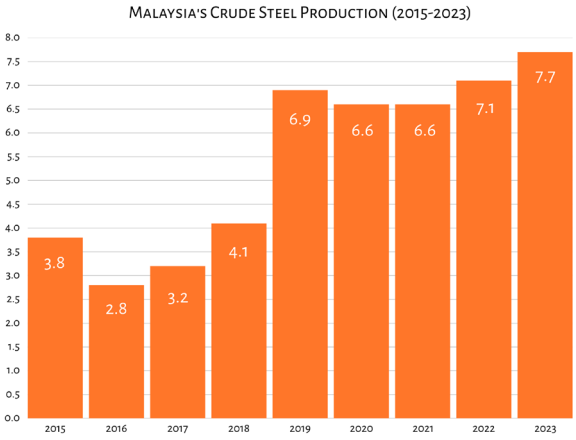

Figure 2: Malaysia's crude steel output growth between 2015 and 2023

Source: MITI, 2025, Steel Industry Roadmap 2035

[11]. Transition Asia. (2025, February 13). *Malaysian Iron and Steel Sector Overview–the Challenges of Decarbonisation*. Available at https://transitionasia.org/challenge-of-decarbonisation-malaysia/

Figure 2 illustrates how Malaysia's crude steel production experienced a rising trend between 2015 and 2023, showing steady industrial capacity expansion within the domestic steel sector. Additionally, 13 operational iron and steelmaking plants in Malaysia collectively produced 7.7 million tonnes of crude steel in 2023, positioning the country as the 25th largest steel producer globally and the 15th largest exporter of finished steel, accounting for approximately 0.4% of global annual production.[12]

Together, Figures 1 and 2 demonstrate both the scale and trajectory of Malaysia's steel industry. The rising trend of Malaysia's steel output underscores the nation's growing contribution to the international steel market, supported by increasing domestic demand, while also highlighting the need for strategic decarbonisation to maintain sustainability in the global low-carbon transition.

Furthermore, these trends also reflect Malaysia's continued infrastructure-led growth, where large scale projects drive demand for steel. Major ongoing projects during this period—namely the East Coast Rail Link (ECRL), the Pan-Borneo Highway, and the Mass Rapid Transit Line 2 (MRT2)[13]—exemplify the extensive use of steel within the country's construction sectors.

Based on the 15th Report on the Status & Outlook of the Malaysian Iron and Steel Industry 2024/2025 published exclusively by MISIF, in 2023, the steel industry accounted for 4.7% of total manufacturing employment in

[12]. Ministry of International Trade and Industry (MITI, 2025), *Steel Industry Roadmap 2035*. Available at https://www.miti.gov.my/miti/resources/E-VERSION_STEEL_INDUSTRY_ROADMAP_2035_V11_FAOL.pdf

[13]. These large-scale infrastructure projects were under active construction around 2021 and may have contributed to Malaysia's heightened demand for steel during this period. ECRL, relaunched in 2019, was reported to be currently proceeding on track as of July 2021. See Tham Siew Yean & Zhang, K. (2021, July 6). *Assessing challenges facing the ECRL's Economic Accelerator Projects (EAPs) (ISEAS Perspective 2021/90)*. ISEAS – Yusof Ishak Institute. Available at https://www.iseas.edu.sg/articles-commentaries/iseas-perspective/2021-90-assessing-challenges-facing-the-ecrls-economic-accelerator-projects-eaps-by-tham-siew-yean-and-kevin-zhang/. The Pan-Borneo Highway continued its implementation phases across Sabah and Sarawak See Global Highways. (2020, August 10). *Malaysia's massive road building project is advancing the use of technology*. Global Highways. Available at https://www.globalhighways.com/feature/malaysias-massive-road-building-project-advancing-use-technology. Meanwhile, MRT2 (also known as Putrajaya Line) had achieved 90% completion by mid-2020. See Mass Rapid Transit Corporation Sdn Bhd (MRT Corp). (2021, July 7). *Media release – MRT Putrajaya Line Phase One to open in November 2021*. Available at https://www.mymrt.com.my/wp-content/uploads/2021/07/MEDIA-RELEASE_-MRT-PUTRAJAYA-LINE-PHASE-ONE-TO-OPEN-IN-NOVEMBER-2021-1.pdf

the country. Basic metals, including steel, contributed 2.5% of the nation's GDP.[14] This demonstrates the industry's central role in supporting the construction and manufacturing sectors, which heavily rely on steel as a critical resource material. Overall, these figures reinforce the steel industry's status as a strategic pillar of Malaysia's economic growth and industrial resilience.

Given the steel industry's contribution to Malaysia's economy, it also attracts strong political and economic interest. The government may pursue state-state agreements to secure higher profits, capital returns, and sometimes gain political advantages. Such priorities may distract from climate commitments and environmental protection, particularly as steel manufacturing remains a hard-to-abate industry where controlling GHG emissions requires strong and equitable regulatory enforcement, regardless the type of corporations involved.

1.2 NDC Obligations

The Paris Agreement, adopted in 2015 by 195 countries under the United Nations Framework Convention on Climate Change (UNFCCC) represents the cornerstone of global climate governance. It establishes a collective framework to limit the rise in global average temperature to below 2°C and pursuing efforts to restrict it to 1.5°C.[15] Beyond mitigation, the agreement emphasises adaptation, climate resilience, and the alignment of financial and policy systems to support a sustainable, low-carbon global transition.[16]

Each signatory is required to prepare, communicate, and maintain successive NDC targets to reflect its highest possible ambition. These targets serve as the primary instrument for countries to outline their emission reduction targets, adaptation strategies, and mechanisms for transparency and accountability.

For Malaysia, the Paris Agreement has become a key reference point

[14]. Malaysian Investment Development Authority (MIDA). (2024, July 30). *Mapping Malaysia's steel sector journey.* Available at https://www.mida.gov.my/mida-news/mapping-malaysias-steel-sector-journey/#:~:text=Industry%20Performance&text=Iron%20and%20steel%20exports%20went,and%20Vietnam%20(825%2C952%20MT).

[15]. United Nations Framework Convention on Climate Change (UNFCCC). (2015). The *Paris Agreement*. United Nations. Available at https://unfccc.int/process-and-meetings/the-paris-agreement

[16]. ibid

in shaping national climate policy and environmental governance. Malaysia submitted its first NDC in 2016, committing to reduce GHG emissions intensity of GDP by 35% by 2030 (compared to 2005 levels). This commitment was revised in 2021, enhancing the ambition by increasing the carbon intensity reduction to 45%.[17] The latest NDC 3.0, which was revised in 2025, marks a significant shift with an absolute emissions reduction approach, and places greater emphasis on inclusive reporting emissions, credible environmental governance, and effective enforcement across high-emitting industries.

1.3 Malaysia's Climate Commitments

At present, Malaysia does not have a dedicated federal law that directly regulates GHG emissions. The closest existing regulatory mechanism that addresses emissions is the Environmental Quality Act (EQA) 1974. Under this, the Environmental Quality (Clean Air) Regulations 2014 regulates air pollution, including emissions related to industrial activities. In practice, the enforcement relies heavily on Continuous Emission Monitoring Systems (CEMS), a mechanism designated to control pollution sources of industrial premises, particularly from stacks and chimneys. While the EQA 1974 focuses on controlling conventional pollutants—including air pollutants—it does not directly regulate GHG emissions.

In relation to the steel industry, and to complement prior regulatory efforts, the Department of Environment (DOE) developed the Best Available Technique (BAT) Guidance Document on Iron & Steel Industry, which provides technical recommendations for cleaner production and improved energy efficiency.[18] However, the BAT guidance is non-binding and relies on voluntary adoption, limiting its effectiveness as a decarbonisation tool. In addition, while steel companies are required to submit periodic emissions data to DOE—including monthly notifications under EQA 1974 requirements—these reports are not publicly disclosed, limiting transpar-

[17]. United Nations Framework Convention on Climate Change. (2021, July). *Malaysia's update of its first nationally determined contribution*. Available at https://unfccc.int/sites/default/files/NDC/2022-06/Malaysia%20NDC%20Updated%20Submission%20to%20UNFCCC%20July%202021%20final.pdf

[18]. Department of Environment, Malaysia (n.d.). *Best Available Technique (BAT) Guidance Document on Iron & Steel Industry*. Available at https://www.doe.gov.my/wp-content/uploads/2021/08/BEST-AVAILABLE-TECHNIQUES-GUIDANCE-DOCUMENT-ON-IRON-STEEL-INDUSTRY.pdf

ency and public scrutiny.

In response to climate regulation gaps, the Ministry of Natural Resources and Environmental Sustainability (NRES) took steps to develop a Climate Change Act (CCA). The stated aim of this law is to provide a legal basis for implementing mitigation and adaptation measures, strengthen climate governance, and ensure sustainable and resilient development.[19]

Initially, the bill was targeted for tabling in the third quarter of 2025. However, this did not materialise. In November 2025, Acting NRES Minister Johari Ghani announced that a draft bill had been submitted to the Attorney General's Chambers (AGC) for review and is now expected to be tabled in Parliament in 2026.[20] Newly appointed NRES Minister Arthur Joseph Kurup confirmed this timeline, stating that the law will be tabled in Parliament by March 2026.[21]

Meanwhile, in support of NDC goals, several ministries have introduced policies relating to decarbonisation, utilising a net-zero emissions approach. These include NRES's Nationally Determined Contribution Roadmap and Action Plan (NDC RAP) alongside the Long-Term Low Emission Development Strategy (LT-LEDS), the Ministry of Economy's National Energy Transition Roadmap (NETR) 2023, and the Ministry of Investment, Trade and Industry's (MITI) New Industrial Master Plan (NIMP) 2030 and Steel Industry Roadmap. While these documents signal policy intent, they lack enforceable mechanisms and clear lines of responsibility, raising questions as to whether commitments made across different ministries are being implemented in a coordinated, measurable, and accountable manner within the steel sector.

---

[19]. The Edge Malaysia. (2025, November 6). *Climate Change Bill slated for first Parliament sitting of 2026, says Johari Ghani*. Retrieved from https://theedgemalaysia.com/node/777534

[20]. ibid

[21]. The Star. (2026, January 15). *Environs Ministry to table first National Climate Change Bill in Parliament by March, says Arthur.* Retrieved from https://www.thestar.com.my/news/nation/2026/01/15/environs-ministry-to-table-first-national-climate-change-bill-in-parliament-by-march-says-arthur

Table 1 below summarises the key laws, regulations, and policy frameworks relevant to emissions governance in Malaysia's steel sector.

Table 1: Summary of Existing Laws, Regulations, and Policy Frameworks Relevant to Emissions Governance in the Malaysian Steel Sector

Policy / Regulation	Lead Government Agency	Year Introduced / Published	Brief Description and its Relevance to Steel Industry
Environmental Quality Act (EQA) 1974	DOE, NRES	1974	Earliest environmental law governing pollution control and environmental quality. Regulates emissions from industrial activities, including steel manufacturing. Focuses on conventional pollutants but does not directly regulate GHGs.
Environmental Quality (Clean Air) Regulations 2014	DOE, NRES	2014 (first introduced in 1978, latest amendment revised in 2014)	Establishes emission limits for industrial air pollutants such as Particulate Matter (PM), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), and Carbon Monoxide (CO). Applicable to steel mills and other major industrial facilities. Aims to control conventional pollutants but excludes GHGs. Provides the legal basis for CEMS and BAT requirements.
Continuous Emission Monitoring Systems (CEMS)	DOE, NRES	2014 (under Clean Air Regulations)	Requires designated facilities, including steel mills, to install and operate CEMS for real-time monitoring of stack emissions. Ensures compliance through DOE audits, inspections, and enforcement actions for non-compliance.

Policy / Regulation	Lead Government Agency	Year Introduced / Published	Brief Description and its Relevance to Steel Industry
Best Available Techniques (BAT) Guidance Document for Iron & Steel Industry	DOE, NRES	2016	A non-binding technical guide promoting cleaner and more energy-efficient steel production. Recommends process optimisation, low-emission technologies, and advanced pollution control systems to reduce particulate and gaseous emissions.
Bursa Malaysia Sustainability Reporting Framework	Bursa Malaysia	2015	Mandates PLCs to disclose sustainability performance in annual reports, including Scope 1 and 2 GHG emissions. Scope 3 reporting remains voluntary.
Simplified ESG Disclosure Guide (SEDG)	Securities Commission Malaysia (SC), Capital Markets Malaysia (CMM)	2023	Voluntary ESG disclosure guide for SMEs to align with sustainability practices. Assists smaller firms—including those in the steel value chain—in measuring and reporting ESG performance across five pillars: Environment, Social, Governance, Economic, and Sustainability Management.
National Energy Transition Roadmap (NETR)	Ministry of Economy	2023	National framework to drive energy transition and industrial decarbonisation. Promotes low-carbon steelmaking through electrification, renewable energy adoption, Electric Arc Furnace (EAF) technology, and readiness for carbon pricing mechanisms.
Nationally Determined Contribution Roadmap and Action Plan (NDC RAP)	NRES	2025	Outlines Malaysia's strategy to achieve a 45% reduction in GHG intensity by 2030. Identifies the steel industry as a major emitter and encourages circular economy practices, increased EAF usage, and deployment of Carbon Capture, Utilisation, and Storage (CCUS) technologies.

Policy / Regulation	Lead Government Agency	Year Introduced / Published	Brief Description and its Relevance to Steel Industry
Long-Term Low Emission Development Strategy (LT-LEDS)	NRES	2025	Provides a long-term policy vision toward net-zero emissions by 2050. Reinforces industrial decarbonisation through hydrogen use, carbon pricing, and innovation in green steel production.
New Industrial Master Plan (NIMP) 2023	MITI	2023	Framework to drive Malaysia's industrial transformation, including steel sector, toward higher value, resilience, and sustainability. It supports net zero commitments and requires all economic sectors to realign their strategies and policies to meet the climate-related obligations.
Steel Industry Roadmap 2035	MITI	2025	Serves as the strategic blueprint for modernising and decarbonising Malaysia's steel industry. Focuses on EAF adoption, circular economy principles, and preparation for carbon pricing integration to enhance competitiveness and sustainability.

1.4 Malaysia's Steel Industry: Major GHG Emitters

Globally, the iron and steel industry alone accounts for approximately 8% of total annual GHG emissions.[22] In the Malaysian context, the steel industry stands out as one of the largest and most carbon-intensive industrial emitters, underscoring its classification as a hard-to-abate sector within the national economy. The significant GHG emissions generated by Malaysia's steel industry pose a major challenge to the nation's climate commitments.

As shown in Table 2, the Malaysia's Fourth Biennial Update Report (BUR4) reported that Malaysia recorded 330 $MtCO_2e$ of emissions, ex-

[22]. International Energy Agency. (2025). *Iron & steel – Industry*. Available at https://www.iea.org/energy-system/industry/steel

cluding Land Use, Land-Use Change and Forestry (LULUCF) removals. Approximately 80% of these emissions were attributed to energy-related subsectors, including power, transport, oil and gas production, industrial energy use, and other energy emissions.

Table 2: Summary of Malaysia's GHG inventory in 2019

Sector	GHG Emission/Removal (Gg CO2 eq.)
Energy	259,326.11
IPPU	32,853.80
AFOLU-Agriculture	9,921.71
AFOLU-LULUCF	-214,714.54
Waste	28,256.59
Total (Excluding LULUCF)	330,358.21
Total (Including LULUCF)	115,643.68

Source: Malaysia's Fourth Biennial Update Report[23]

Within the energy sector, the iron and steel industry stood out as the highest-emitting manufacturing industry and construction subsector in 2019. In that year alone, the industry produced 9,461.08 Gg CO_2e, as listed in Table 3 below.

Table 3: Summary of Total GHG Emissions for Energy Sector in 2019

Sub-sector	2019 Emissions (Gg)			$GgCO_2eq.$ (Gg)
	CO_2	CH_4	N_2O	
GWP	1	25	298	
1A Fuel Combustion Activities	**234,858.054**	**25.126**	**4.558**	**236,844.49**
1A1 Energy Industries	**131,274.340**	**2.290**	**1.356**	**131,735.68**
1A1a Main Activity Electricity and Heat Production	109,349.306	1.709	1.265	109,768.85
1A1b Petroleum Refining	8,200.816	0.336	0.067	8,229.21

[23]. Ministry of Natural Resources, Environment and Climate Change, Malaysia. (December 2022). *Malaysia's Fourth Biennial Update Report under the United Nations Framework Convention on Climate Change*. Available at https://unfccc.int/sites/default/files/resource/MY%20BUR4_2022.pdf

Sub-sector	2019 Emissions (Gg)			$GgCO_2eq.$ (Gg)
	CO_2	CH_4	N_2O	
GWP	**1**	**25**	**298**	
1A1c Manufacture of Solid Fuels and Other Energy Industries (Liquified Natural Gas)	13,724.219	0.245	0.025	13,737.62
1A Manufacturing Ind. & Construct.	**33,482.535**	**1.372**	**0.206**	**33,578.18**
1A2a Iron and Steel	9,446.934	0.214	0.030	9,461.08
1A2b Non-Ferrous Metal	311.656	0.006	0.001	311.96
1A2c Chemicals	3,625.717	0.092	0.014	3,632.2
1A2d Pulp, Paper and Print	982.933	0.028	0.005	984.99
1A2e Food Processing, Beverage and Tobacco	6,323.682	0.120	0.013	6,330.61
1A2f Non-Metallic Minerals	7,945.639	0.746	0.113	7,991.87
1A2g Transport Equipment	2,729.513	0.105	0.021	2,738.28
1A2h Machinery	256.474	0.010	0.002	257.34
1A2i Mining (excluding fuels) and Quarrying	IE, NE	IE, NE	IE, NE	IE, NE
1A2j Wood and Wood Products	487.355	0.018	0.003	488.83
1A2k Construction	IE, NE	IE, NE	IE, NE	IE, NE
1A2l Textile and Leather	852.277	0.021	0.003	853.71
1A2m Non-specified Industry	520.357	0.013	0.002	521.31
1A3 Transport	**63,576.387**	**20.752**	**2.946**	**64,973.10**
1A3aii Domestic Aviation	1,276.231	0.009	0.036	1,287.09
1A3b Road Transportation	54,225.950	19.075	2.630	55,486.57
1A3c Railways	46.693	0.003	0.018	52.13
1A3dii Domestic Water-borne Navigation	5,650.377	0.534	0.153	5,709.17
1A3eii Off-road	2,377.136	1.132	0.110	2,438.15
1A4 Other Sectors	**6,036.981**	**0.698**	**0.035**	**6,064.92**

Sub-sector	2019 Emissions (Gg)			$GgCO_2eq.$ (Gg)
	CO_2	CH_4	N_2O	
GWP	**1**	**25**	**298**	
1A4a Commercial/ Institutional	1,700.361	0.21	0.011	1,708.56
1A4b Residential	1,650.078	0.12	0.003	1,654.21
1A4c Agriculture/ Forestry/ Fishing/ Fish Farms	2,686.542	0.30	0.022	2,702.15
1A5 Non-Specified	**487.761**	**0.01**	**0.015**	**492.59**
1A5b Mobile	487.761	0.01	0.015	492.59
1B Fugitive Emisison from Fuels	**4,600.245**	**714.626**	**0.053**	**22,481.62**
1B1 Solid Fuels	0.000	0.950		23.75
1B1a Coal Mining & Handling	0.000	0.950		23.75
1B2 Oil and Natural Gas	4,600.245	713.676	0.053	22,457.87
1B2a Oil	4,335.704	430.036	0.050	15,101.46
1B2b Natural Gas	264.542	283.640	0.003	7,356.41
Total	**239,458.249**	**739.752**	**4.611**	**259,326.11**

Source: Malaysia's Fourth Biennial Update Report[24]

Furthermore, according to Malaysia's First Biennial Transparency Report released in 2024, total GHG emissions from the iron and steel industry increased to approximately 10,139.36 Gg CO_2e. Over the 2005 – 2021 period, the report also indicated that emissions increased at a compound annual growth rate (CAGR) of 0.69%,[25] indicating a persistent contribution to the national emissions rather than a short-term fluctuation.

Figure 3 illustrates the long-term emissions trajectory across manufacturing industries and construction from 1990 to 2021. While most subsectors show relatively moderate growth, emissions from the iron and steel industry have visibly risen since 2017. From that year onward, the industry has consistently remained the highest-emitting subsector within the manufacturing

[24]. ibid. Refer page 41-42.

[25]. Ministry of Natural Resources, Environment and Climate Change, Malaysia. (December 2024). *Malaysia's First Biennial Transparency Report under the United Nations Framework Convention on Climate Change*. Page 27. Available at https://unfccc.int/documents/645171

industries and construction category, maintaining this position through 2021. By 2021, the industry alone accounted for approximately 30% of the total emissions under the subsector.[26]

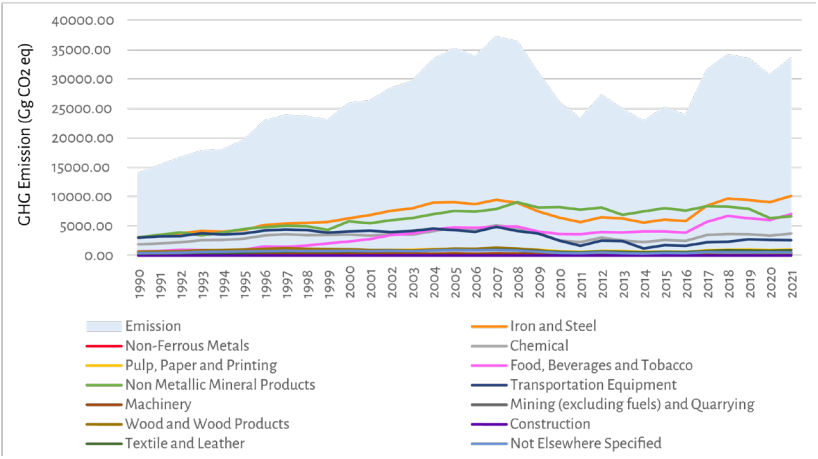

Figure 3: The trend of GHG emissions in manufacturing industries and construction by manufacturing subsectors, 1990-2021[27]

As the industry continues to expand in the coming years, its GHG emissions are expected to rise correspondingly. The expansion is largely driven by Malaysia's ongoing industrialisation and infrastructure development, supported by major national initiatives under the 13th Malaysia Plan (13MP), spanning 2026 to 2030.[28] Growing demand for steel in construction, transportation, renewable energy projects, and manufacturing is expected to sustain production growth within the sector. Hence, this trajectory underscores the urgent need for the government to closely monitor and regulate emissions from the sector.

[26]. ibid
[27]. ibid
[28]. Rancangan Malaysia Ke-13 (RMK13). (2025, October 16). *Pamphlet RMK*. Malaysia Economic Planning Unit, Prime Minister's Department, Malaysia. Available at https://rmk13.ekonomi.gov.my/wp-content/uploads/2025/10/PamphletRMK_16102025.pdf

1.5 Overview of Steelmaking Processes

There are significant differences in emissions intensity across steelmaking technologies, underscoring the steel industry's contribution to national emissions and the need to progressively phase out conventional high-emission technologies in favour of less carbon-intensive processes, as reflected in Malaysia's steel industry policy direction. As shown in Table 4, the amount of carbon emissions produced by steelmaking technologies vary according to the production process and type of raw materials used.

Blast Furnace-Basic Oxygen Furnace (BF-BOF) processes produce the highest average emissions at 2.33 tonnes of CO_2 per tonne of steel. In comparison, EAF emits an average of 0.68 tonnes of CO_2 per tonne of steel, while IF—which operates entirely on scrap feedstock—emits slightly less, at below 0.68 tonnes of CO_2 per tonne of steel. This illustrates how various steelmaking technologies directly influence emission intensity in the industry.

Table 4: Steel Production Technology and Carbon Emissions per tonne of Steel Produced

Technology	Type of Steelmaking	Raw Materials	Avg. Carbon Emissions
Blast furnace-basic oxygen furnace (BF-BOF)	Primary	Iron ore: 85% Scrap: 15%	2.33 tCO2
Electric arc furnace (EAF)	Secondary	Mostly scrap: up to 100%	0.68 tCO2
Induction furnace (IF)	Secondary	Scrap: 100%	<0.68 tCO2

Source: MITI Steel Industry Roadmap 2035[29]

These emission levels provide a practical baseline for assessing carbon performance of steel producers and identifying opportunities for decarbonisation. The continued dominance of BF-BOF technology among major

[29]. Ministry of International Trade and Industry (MITI, 2025), *Steel Industry Roadmap 2035*. Available at https://www.miti.gov.my/miti/resources/E-VERSION_STEEL_INDUSTRY_ROADMAP_2035_V11_FAOL.pdf

producers highlights a key challenge. Its high level of emission, combined with limited transparency and regulatory oversight, raises the risk of under-reported—or omitted—emissions within the sector.

In Malaysia, most local steel producers rely primarily on scrap-based steelmaking process, particularly EAF.[30] The BAT Guidance Document also notes that EAF plays a critical role in domestic steelmaking,[31] reflecting the dominance of lower emission technology preference among local producers. In contrast, the conventional BF-BOF technology is uncommon among the local players, given its high energy demand and need for consistent iron ore supply and is instead largely concentrated among foreign-owned steel producers,[32] as further illustrated in Part 2.

An interview with a local private limited steel producer revealed that despite the company possessing both BF and IF technologies, they prefer to produce steel through IF method. According to the interviewee, the IF method is significantly less energy-intensive than the BF process, and operating a BF is not economically viable for their scale of production.

1.6 Economic Value at the Expense of Environmental Consequences

As Malaysia's steel industry strongly contributes to the nation's GDP, it attracts strong political attention. Policymakers view this sector as strategically important due to its heavy market demands. The steel industry is also a strong draw for FDI, as investors seek to leverage Malaysia's strategic geographical location, developed infrastructure, as well as tax benefits. These investments are often framed as catalysts for industrial expansion, job creation, and technology transfer, reinforcing the perception of steel as a cornerstone of economic progress.

However, this strong emphasis on economic value and competitive-

[30]. Shanghai Metal Market. (2025, August 21). *Malaysian Steel Market Analysis*. Available at https://www.metal.com/en/newscontent/103490978

[31]. Department of Environment, Malaysia (n.d.). *Best Available Technique (BAT) Guidance Document on Iron & Steel Industry*. Available at https://www.doe.gov.my/wp-content/uploads/2021/08/BEST-AVAILABLE-TECHNIQUES-GUIDANCE-DOCUMENT-ON-IRON-STEEL-INDUSTRY.pdf

[32]. Shanghai Metal Market. (2025, August 21). Malaysian Steel Market Analysis. Available at https://www.metal.com/en/newscontent/103490978

ness has come with significant environmental trade-offs. As a hard-to-abate industry, steel production is inherently energy-intensive. The prioritisation of the industry growth has often overshadowed the environmental costs associated with steelmaking, particularly GHG emissions. Policy and investment decisions often consider environmental sustainability to be less important to economic imperatives, especially where stricter environmental regulations are perceived as potentially restraining industrial growth or discouraging investment.

This highlights a structural tension within Malaysia's development pathway. While the steel industry delivers significant economic value, it also contributes disproportionately to industrial emissions. Continued expansion without aligned investment in cleaner technologies, emission reporting transparency, and regulatory enforcement may very well undermine Malaysia's broader climate objectives.

Part 2

2.1 The Structure of the Steel Industry in Malaysia

In Malaysia, the steel industry is structured into three main stages; upstream, midstream, and downstream.[33] Each stage has its own distinct functions and processes, producing different types of steel products that serve various applications across the overall value chain.

Table 5 provides a summary of each stage of the value chain, which include its key processes, types of product outputs, and their applications. Upstream operations often utilise BF-BOF, EAF, or a combination of both methods to produce crude steel, which is the initial, unrefined form of steel.[34] The upstream stage also includes the casting of crude steel into semi-finished steel forms such as slabs, billets, and blooms, which serve as raw material for further processing. Other than that, more advanced technologies such as Ladle Refining Furnaces (LRF) and electric Induction Furnaces (IF) are also used at the upstream level.

Midstream operations of the steel industry involve processing crude

[33]. Yu, S. M., Wong, S. Y., Fedotova, E., Ahmad, M. S., & Abd Rahim, N. (2025). *Prospect of green hydrogen in Malaysian iron and steel industry: Techno-economic assessment and energy modelling using PyPSA-Earth*. Renewable and Sustainable Energy Reviews. Available at https://www.sciencedirect.com/science/article/pii/S1364032125003387#:~:text=Malaysia%20iron%20and%20steel%20production%20is%20divided%20into%20upstream%2C%20midstream,iron%20scrap%20in%20the%20EAF.

[34]. ibid

steel into semi-finished, usable steel products such as steel bars, rods, coils, and sheets, and more.[35] These products are mainly used for key sectors such as construction, infrastructure, and automotive parts, highlighting the role of the companies operating in the midstream phase performance for the national development as their products are used for urban development, transportation systems, highways, and other uses.

Lastly, downstream steel operations in Malaysia focus on producing finished steel products tailored for end-use applications.[36] These products include steel pipes, roofing sheets, wire mesh, and other fabricated steel items used across consumer sectors. The downstream operation involves processing semi-finished steel into market-ready products through cutting, shaping, and welding. This phase plays an important role in adding value to the steel supply chain by providing versatile steel products that meet many demands.

Table 5: Overview of the Steel Industry Structure

Stage	Key Processes	Main Applications	Product Examples
Upstream	Production of crude steel and casting into semi-finished products.	Raw materials for further processing.	Crude steel, slabs, billets, blooms.
Midstream	Processing and refining crude steel into usable products through continuous casting process.	Construction, infrastructure, automotive.	Steel bars, rods, coils, sheets, wire rods, plates.
Downstream	Casting and rolling as part of fabrication of finished steel products tailored for end use.	Construction, infrastructure, machinery, consumer goods.	Steel pipes, roofing sheets, wire mesh.

[35]. ibid
[36]. ibid

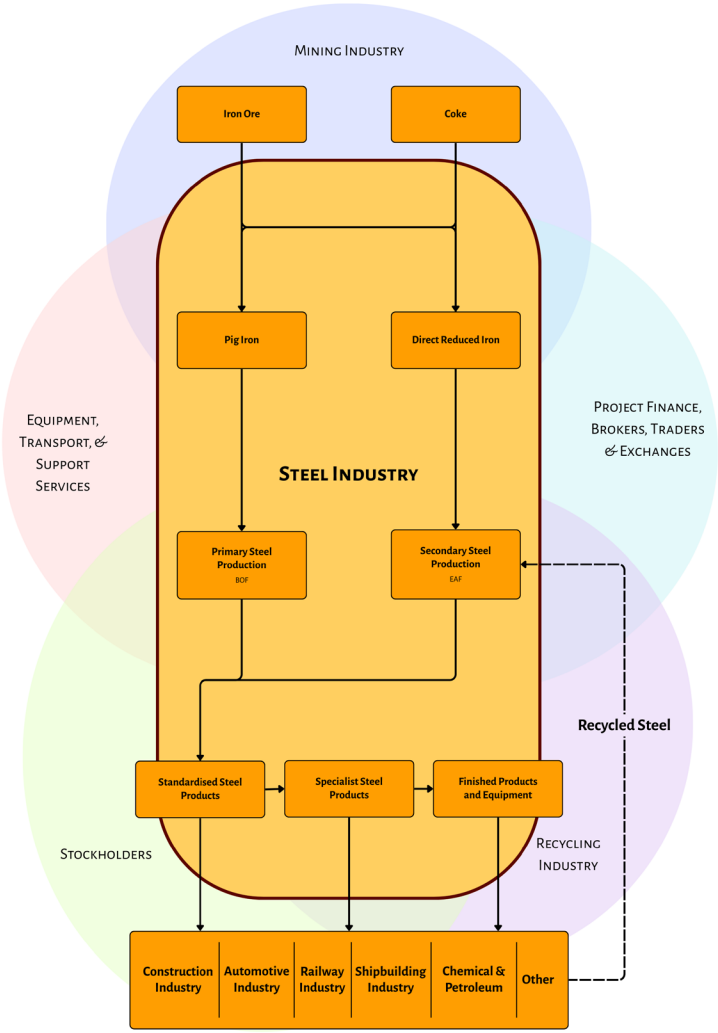

Figure 4: Overview of the steel supply chain and its interconnected industries

Source: Jalil & Mahmud, 2015[37]

[37]. Figure 4 was adopted from Jalil, A.Z.A, & Mahmud, Z., (2015). *An alloy of steel and information communication technology (ICT): Does it facilitate trade? International Journal of Economics and Financial Issues, 5(Special Issue), 153-161*. Available at https://www.researchgate.net/publication/280385583_An_Alloy_of_Steel_and_Information_Communication_Technology_ICT_Does_It_Facilitate_Trade

Additionally, Figure 4 describes the overall flow of the steel supply chain across the three key stages. The diagram illustrates the integrated flow of steel materials and processes beginning upstream, where raw materials such as iron ore and coke are extracted from the mining industry. These primary resources are subsequently converted into pig iron and Direct Reduced Iron (DRI), which serve as critical inputs for steelmaking processes in the following midstream level through BF-BOF and EAF processes, and are later fabricated into finished products.

2.2 Corporate Landscape of Malaysia's Steel Industry

The private-sector players in Malaysia's steel industry comprise a wide range of operations across the value chain, with both PLCs and private limited companies contributing across different segments of the value chain.

According to MISIF, there were approximately 139 registered steel manufacturing and processing facilities in Malaysia in 2020, which increased to 158 in 2021.[38] While an exhaustive official list of all steel companies in Malaysia is not readily available for public view—and noting that not all steel-related companies are registered under MISIF[39]—this research presents a compilation of companies associated with the steel industry, drawing from open sources such as the MISIF membership directory, company disclosures, and other publicly available information.

The identified companies reflect a diverse ownership and operational landscape within the steel value chain. Through the research, a total of 160 companies were identified across Malaysia.[40] The chart below illustrates the general composition of the companies, which is composed of 12 PLCs and 148 private limited companies, with no GLCs identified in this sample. This distribution highlights the predominant role of private limited companies in driving Malaysia's steel industry, particularly in manufacturing and

[38]. Yu, S. M., Wong, S. Y., Fedotova, E., Ahmad, M. S., Fioriti, D., & Rahim, N. A. (2025). *Prospect of green hydrogen in Malaysian iron and steel industry: Techno-economic assessment and energy modelling using PyPSA-Earth. Renewable and Sustainable Energy Reviews*. Available at https://www.sciencedirect.com/science/article/pii/S1364032125003387?ref=pdf_download&fr=RR-2&rr=99d78afffb42164f

[39]. Note that MISIF publishes a directory of 155 member companies as of 2025 which are involved in the steel manufacturing and other affiliated services. Adopted from MISIF. (2025). *About Us*. Available at https://misif.org.my/about-us/

[40]. Refer to Appendix I for the compilation of the 160 companies.

downstream activities.

In addition, this figure is broken down below into foreign-owned companies, and their respective country of origin. Based on available information, out of 160 companies, 40 companies are identified to be historically and currently owned by foreign entities through major investment and joint ventures. The countries with the most steel-related companies in Malaysia are Japan (13 companies), followed by China (6 companies) and South Korea (3 companies). Other countries that own or invest in Malaysia related to the steel industry include the United States, the United Kingdom, South Korea, and Singapore, among others.

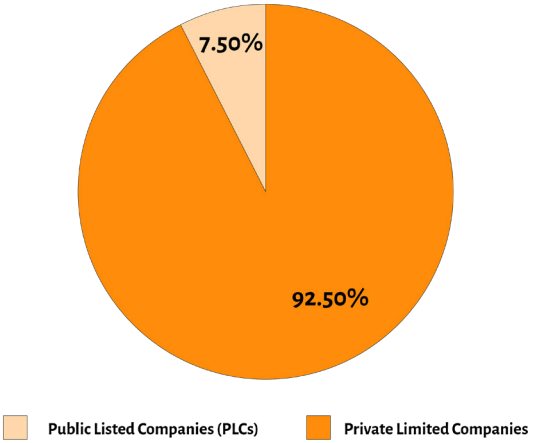

Figure 5: Breakdown of the type of corporations in Malaysia's steel industry

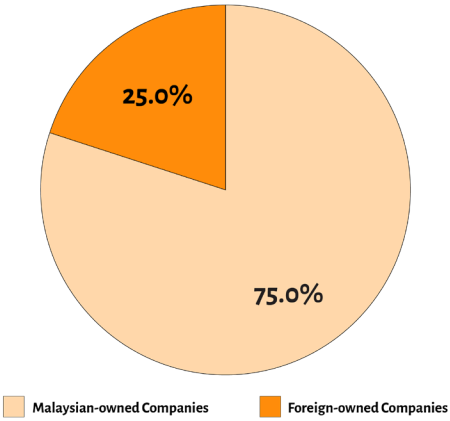

Figure 6: Percentage of Malaysian-owned companies vs foreign-owned companies

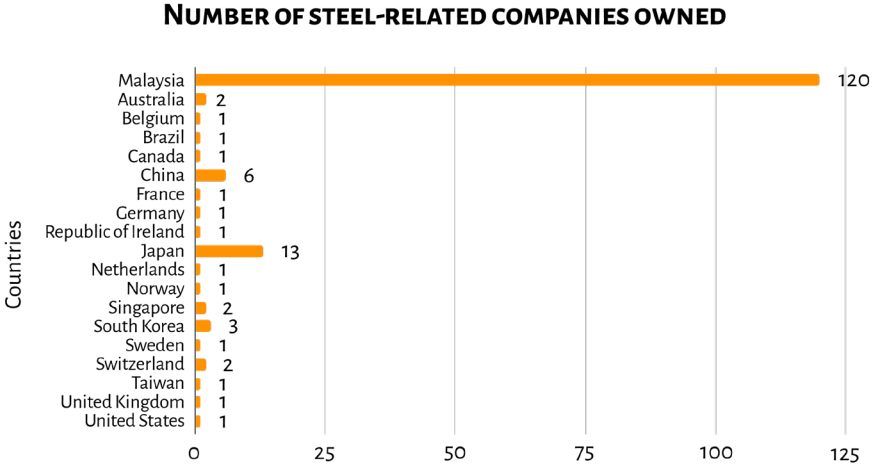

Figure 7: Numbers of steel-related companies owned by countries

Table 6 provides an overview of the different reporting obligations and regulatory requirements that apply across the corporate landscape.

Table 6: Overview of GHG-related reporting obligations across corporate landscape in Malaysia's steel industry

Corporate Type	Type of GHG / Emissions Reporting	Reporting Authority
Government-linked companies (GLCs)	Sustainability Reporting (if listed under Bursa); Emissions Reporting under EQA 1974 (CEMS)	Bursa ,Malaysia; DOE
Public Listed Companies (PLCs)	Sustainability Reporting; Emissions Reporting under EQA 1974 (CEMS)	Bursa ,Malaysia; DOE
Private Limited Companies	Emissions Reporting under EQA 1974 (CEMS); SEDG	DOE; SC & CMM
Foreign-owned Companies	Emissions Reporting under EQA 1974 (CEMS); SEDG	DOE; SC & CMM

2.2.1 Government-linked companies (GLCs)

The Organisation for Economic Co-operation and Development (OECD) defines GLCs in the Malaysian economy as companies that primarily have commercial objectives and in which the Malaysian government has a direct controlling stake.[41] GLCs have traditionally been instrumental in driving Malaysia's industrialisation agenda by investing in strategic and capital-intensive sectors, including energy, transportation, and heavy manufacturing.

[41]. The Organisation for Economic Co-operation and Development (OECD) defines GLCs in the Malaysian economy as companies that primarily have commercial objectives and in which the Malaysian government has a direct controlling stake. Definition adopted from Organisation for Economic Co-operation and Development. (2021). *OECD Competition Assessment Reviews: Logistics sector in Malaysia (OECD Competition Assessment Reviews)*. Available at https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/10/oecd-competition-assessment-reviews-logistics-sector-in-malaysia_0618136b/81b94b08-en.pdf

Government-linked investment companies (GLICs) refer to investment institutions in which the federal government has influence over the management through appointed board members and senior management, who in turn report directly to the government. The government may also provide funds for operations or to guarantee capital—or some cases—incomes, placed by unit holders.[42] The government classifies seven institutions as GLICs: include Minister of Finance Incorporated (MoF Inc.), Lembaga Tabung Haji, Kumpulan Wang Persaraan Diperbadankan (KWAP), Permodalan Nasional Berhad (PNB), the Employees Provident Fund (EPF), the Armed Forces Fund Board (LTAT), and Khazanah Nasional Berhad.[43]

The role of GLCs and GLICs in Malaysia's steel industry has been strategic and politically important, as steelmaking required long-term investments and state support during Malaysia's early industrialisation efforts.

Case Study: Perwaja Steel

Perwaja Steel was established in the 1970s under the majority ownership of Heavy Industries Corporation of Malaysia (HICOM)—a corporation set up by the government to diversify manufacturing activity[44]—with remaining shareholders including a consortium of Japanese companies led by Nippon Steel of Japan with 30% stake, and the Terengganu state government with 19% stake.[45]

Once hailed as a symbol of Malaysia's industrial ambitions, it ultimately became one of its most costly governance failures. As one of the flagship industrialisation projects under then-Prime Minister Mahathir Mohamad, Perwaja Steel was expected to support national development by strengthening domestic steelmaking capacity and reducing reliance on steel imports.[46]

---

[42]. ibid

[43]. Gomez, E. T., Padmanabhan, T., Kamaruddin, N., Bhalla, S., & Fisal, F. (2017). *Minister of Finance Incorporated: Ownership and Control of Corporate Malaysia*. Palgrave Macmillan.

[44]. Lall, S. (1995). *Malaysia: Industrial success and the role of the government*. J. Int. Dev., 7: 759-773. Available at https://doi.org/10.1002/jid.3380070506

[45]. Yap, C. Y., & Poon, J. M. L. (2010). *Perwaja Steel: Case and Instructor's Manual (Unpublished conference paper)*. Universiti Malaysia Pahang Institutional Repository. Available at https://umpir.ump.edu.my/id/eprint/1230/1/Chui_Yan_Yap.PDF

[46]. The Edge Malaysia. (2014, December 29–January 4). *Cover Story: A steel furnace with no fire. The Edge Malaysia Weekly*. Available at https://theedgemalaysia.com/article/cover-story-steel-furnace-no-fire

Hence, the company experienced a period of rapid expansion, producing almost 1.5 million tonnes of steel annually.[47]

However, by the mid-1990s, it had accumulated nearly RM3 billion in losses and over RM6.9 billion in liabilities, despite earlier narratives of success.[48] Independent audits and parliamentary debates revealed widespread financial mismanagement, creative accounting, related-party deals, and misuse of public funds—including loans sourced from EPF.[49] While its politically connected managing director, Eric Chia, was eventually charged,[50] no political actors were held accountable, and he was acquitted on technical grounds, reinforcing a deep public cynicism about impunity for elite-led scandals.

The collapse of Perwaja did not result in transparent winding down or full institutional reckoning. Instead, it was quietly "rescued" and privatised in 2003,[51] with control handed to politically linked entities—Maju Holdings and Kinsteel—through a structure that socialised public losses and transferred valuable assets into private hands.[52-53] This pattern of crony bailouts and opaque restructuring entrenched a political-industrial logic where strategic failures were absorbed by the state, while control was quietly passed to favoured actors.

Perwaja became a prototype of state-enabled rent-seeking, and an emblem of how political discretion, weak procurement oversight, and beneficial-ownership opacity could undermine both industrial growth strategy and public trust. Beyond its financial and institutional cost, the Perwaja scandal left a structural legacy: it normalised the idea that heavy-industry projects could operate outside transparent rules, and be justified on "strate-

[47]. ibid

[48]. Gan, S. (2002, February 27). *The Untouchables*. Malaysiakini. Available at https://www.malaysiakini.com/editorials/22744

[49]. Khair, A. H. A. (2015). *Personalisation of power, neoliberalism and the production of corruption. Crime, Law and Social Change*. Available at https://www.sciencedirect.com/science/article/abs/pii/S0155998215000253

[50]. Free Malaysia Today. (2024, October 6). *How Perwaja Steel fiasco caused Anwar-Mahathir blow-up*. Available at https://www.freemalaysiatoday.com/category/nation/2024/10/06/how-perwaja-steel-fiasco-caused-anwar-mahathir-blow-up

[51]. Barrock, J. & Aziz, A. (2019, July 11). *Cover story: Abu Sahid's second bite at the cherry.* The Edge Malaysia. Available at https://theedgemalaysia.com/article/cover-story-abu-sahids-second-bite-cherry

[52]. ibid

[53]. Teng. L. J. (2015, April 30) Cover story: A stainless future for Perwaja. The Edge Malaysia. Available at https://theedgemalaysia.com/article/cover-story-stainless-future-perwaja

gic" or nationalistic grounds while avoiding meaningful oversight.

The pattern continues today in a more globalised form as foreign-owned companies linked to G2G arrangements benefit from tax incentives, pioneer status, and bilateral industrial diplomacy, operating within similar opacity and governance asymmetries. These companies often enjoy subsidised foreign capital, preferential policy treatment, and minimal public scrutiny of emissions, beneficial ownership, or contract terms. Domestic producers, by contrast, are bound by Bursa disclosure rules, face higher borrowing costs, and operate without the same access to state backing.

2.2.2 Public Listed Companies (PLCs)

PLCs in Malaysia are companies whose shares are traded on Bursa Malaysia and are therefore required to comply with the listing requirements under the Securities Commission Malaysia (SC)[54] and Bursa Malaysia Berhad.[55] These regulations mandate the disclosure of financial performance, corporate governance, and sustainability practices, ensuring transparency and accountability to investors and the public.

As a result, PLCs operate under higher transparency requirements, reflecting their larger scale and market influence. While such disclosure requirements are necessary, uneven reporting obligations across different types of corporations in the industry have created growing pressure on local PLCs, resulting in a structural market imbalance.

Case Study: Ann Joo Resources Berhad

Ann Joo Steel Berhad, under its holding company, Ann Joo Resources Berhad (Ann Joo Resources)—has been listed on Bursa Malaysia since 1996.[56] Originating as a scrap metal dealer in its early days, the company has

[54]. Securities Commission Malaysia. (n.d.). *Approval Process for Main Market Initial Public Offerings of Corporations in Malaysia*. Available at https://www.sc.com.my/about/client-charter/business-processes/approval-process-for-main-market-initial-public-offerings-of-corporations-in-malaysia

[55]. Bursa Malaysia. (n.d.). *Listing Criteria – Get Listed*. Available at https://www.bursamalaysia.com/listing/get_listed/listing_criteria

[56]. Ann Joo Resources Berhad. (2025). *Group profile.* Available at https://www.annjoo.com.my/corporate-profile/

transformed into a major upstream steel value chain.[57] Ann Joo Resources's ownership is dominated by Ann Joo Corporation Sdn. Bhd, followed by family-linked entities—namely Lim Chee & Sons Sdn. Bhd and LSQ & Sons Sdn. Bhd.[58] Additionally, the company is associated with GLIC investors, past and present, including EPF and Lembaga Tabung Haji.[59] The presence of both family ownership and involvement of GLICs shows how long-established PLCs operated within a period when the government participation in major local firms was seen as essential in order to build industrial capacity.

In 2019, Ann Joo Resources and Southern Steel Berhad (Southern Steel) entered into a Memorandum of Understanding (MoU) to combine and streamline their steel operations through a joint venture, with Ann Joo Resources holding a 55% stake in the new entity.[60] Under the proposal, Ann Joo Resources would dispose of its entire equity interests in Ann Joo Integrated Steel Sdn. Bhd., Ann Joo Steel Berhad, and Saga Makmur Industri Sdn. Bhd. to the joint-venture company for RM907.5 million.[61] Southern Steel, in turn, would sell its entire interests in Southern Steel Rod Sdn. Bhd., Southern Steel Mesh Sdn. Bhd., Southern PC Steel Sdn. Bhd., and Danstil Sdn. Bhd., along with its steel billet and rebar manufacturing, sales and trading businesses, and several land parcels, to the joint-venture entity for RM742.5 million.[62]

As both companies stated in their Bursa Malaysia filings:

> *"These proposals are intended to result in the joint-venture company becoming a 55 per cent subsidiary of Ann Joo and a 45 per cent associated company of Southern Steel, through the issuance of new shares in the joint-venture entity."*[63]

When Ann Joo Resources and Southern Steel proposed their RM1.65

[57]. The Edge. (2010, October 19). *Ann Joo Steel Berhad company overview.* Available at https://theedgemalaysia.com/article/ann-joo-resources-bhd
[58]. iSaham Sdn. Bhd (2025). *ANN JOO RESOURCES BERHAD stock overview.* Available at https://www.isaham.my/stock/annjoo
[59]. ibid
[60]. NST Business. (2019, October 8). *Ann Joo and Southern Steel plans for RM1.65b partnership*. New Straits Times. Available at https://www.nst.com.my/business/2019/10/527882/ann-joo-and-southern-steel-plans-rm165b-partnership
[61]. ibid
[62]. ibid
[63]. ibid

billion joint venture in 2019,[64] the deal was widely seen as the long-awaited response to repeated government calls to consolidate Malaysia's fragmented steel sector. The plan aimed to create a larger, integrated steel company that could leverage economies of scale, streamline operations and reduce overlapping production across both firms.

Crucially, the timing and structure of the joint venture must be viewed with the rise of foreign-invested Chinese companies. The joint venture, by combining assets under a unified domestic "national champion," represented an effort to restore a semblance of balance to ensure that long-product steel for Malaysia's construction and infrastructure needs would continue to be produced by domestic stakeholders, rather than ceded entirely to foreign-owned mega-mills benefiting from preferential financing and state linkages.

However, that consolidation bid never materialised. In May 2020, Southern Steel and Ann Joo Resources mutually terminated their planned joint-venture of long-steel operations—citing "uncertain market conditions caused by the COVID-19 pandemic".[65] The collapse of the deal underscores how fragile domestic consolidation attempts are when faced with external shocks. It also highlights how vulnerable Malaysia's local steel producers remain in a landscape dominated by large foreign-backed producers with more capital and stronger political-industrial support.

Case Study: Malaysian Steel Works (KL) Bhd

Another example of a steel PLC is Malaysian Steel Works (KL) Bhd, also known as Masteel. Established in 1971, it has evolved into a large-scale integrated steel manufacturing company covering upstream and downstream processes, and has been recognised for its leadership in sustainability. Masteel became one of the first Malaysian companies to adopt EAF technology, and for its downstream operations, Masteel is also the first steel mill

[64]. ibid

[65]. The Edge Communications Sdn. Bhd. (2020, May 27). *Southern Steel and Ann Joo abort partnership in long-steel products given uncertain market.* The Edge Malaysia. Available at https://theedgemalaysia.com/article/southern-steel-and-ann-joo-abort-partnership-long-steel-products-givenuncertain-market

in Malaysia to implement "Hot Charging and Direct Rolling" technology,[66] which is reported to bypass conventional reheating processes, reducing GHG emissions and energy consumption.[67]

As a PLC, Masteel's ownership structure comprises a diverse mix of past and present individual investors, privately owned companies, and institutional shareholders, including a government-owned trustee company. Notably, one of its shareholders is Yayasan Guru Tun Hussein Onn.[68] This reflects a mix of individual, corporate, and foundation-based stakeholders within its shareholding profile.

PLCs in Malaysia's steel industry play a critical role in advancing sustainable industrial practices and setting the governance benchmarks. As entities listed on Bursa Malaysia, such companies are required to publish annual reports and sustainability reports. Their compliance with Bursa Malaysia's Sustainability Reporting and disclosure requirements not only strengthens corporate accountability but also positions the sector to align more effectively with national and global decarbonisation goals.

However, disclosure alone is insufficient to drive meaningful emissions reductions. Robust and enforceable climate governance—such as through the legislation of a strong CCA—remains necessary to support effective decarbonisation efforts across all types of corporations, including establishing GHG emission limits and clear accountability for non-compliance.

2.2.3 Private Limited Companies

Private limited companies form a substantial segment of Malaysia's small and medium-sized enterprise (SME) ecosystem; as of 2021, SMEs represented 97% of total business establishments.[69] These companies are pri-

[66]. "Hot Charging and Direct Rolling" is a downstream rolling-mill process in which newly cast steel billets are transferred to the rolling mill while still hot—or rolled directly from casting—thus eliminating or greatly reducing the need for reheating furnaces. Source from Zhao, R.-J., Fu, J.-X., Wu, Y.-X., Yang, Y.-J., Zhu, Y.-Y., & Zhang, M. (2015). *Representative technologies for hot charging and direct rolling in global steel industry*. ISIJ International, 55(9), 1816–1821. Available at https://www.jstage.jst.go.jp/article/isijinternational/55/9/55_ISIJINT-2015-175/_html/-char/en

[67]. Malaysia Steel Works (KL) Bhd. (2022). *History & Milestones*. Available at https://www.masteel.com.my/history-milestones/

[68]. Information on shareholdings is sourced from a commercial database platform, supplemented by disclosures in the company's annual report.

[69]. The Essential Guide for SMEs in Malaysia. (2024, April 2). *Small and Medium-sized Enterprises (SMEs) in Malaysia*. Clear Tax. Available at https://www.cleartax.com/my/en/sme-malaysia

vately held, meaning their shares are not traded publicly on Bursa Malaysia, and their ownership is typically restricted to a smaller group of shareholders. They are required to submit annual returns and financial statements to the Companies Commission of Malaysia (CCM) but are not obligated to make public disclosures such as annual or sustainability reports.

Within the steel industry, private limited companies constitute a substantial and dynamic segment, particularly active in midstream and downstream activities such as rolling, fabrication, finishing, and customized steel product manufacturing. Many operate in niche markets, supplying specialized steel components for sectors including construction, automotive, and consumer goods. In contrast to PLCs that often dominate large-scale production, these privately owned firms contribute agility and specialization to the national supply chain.

Although required to submit annual returns and financial statements to CCM, these documents are not publicly accessible. A similar opacity exists in environmental governance: pollution data submitted to the Department of Environment (DOE) under the Environmental Quality Act 1974 is not disclosed publicly, restricting transparency beyond regulatory authorities.

The introduction of the Simplified ESG Disclosure Guide (SEDG) in 2023 marked a preliminary step toward improving sustainability practices among SMEs. However, its voluntary nature and limited industry awareness have constrained its impact.

While less visible in public disclosures, private limited companies collectively underpin a significant portion of Malaysia's steel supply chain, offering flexibility and specialized capabilities that complement the scale and reach of larger public listed entities.

2.2.4 Foreign-owned Companies

Foreign-owned steel companies operating in Malaysia are legally required to comply with the same domestic laws and regulations applicable to the local steel industry. They must obtain necessary licenses, adhere to environmental standards, meet safety requirements, and comply with trade and export regulations.

However, this research finds that foreign-owned companies operating

within SEZs benefit from additional incentives, as a part of strategic investment arrangements aimed at boosting economic growth. In supporting this, the government—through collaboration between MITI and Malaysian Investment Development Authority (MIDA)—has introduced a range of incentives to attract and support foreign investors.[70] This includes, but is not limited to:

1. **Pioneer Status**, which allows companies to receive a partial or total exemption from income tax for five years, extendable in certain cases;
2. **Investment Tax Allowance (ITA)**, which provides tax deductions based on qualifying capital expenditure;
3. **Relocation Incentives**, which offer special tax relief for **(a)** new companies to receive 0% tax rate for ten or fifteen years with a minimum investment of RM300 million or RM500 million respectively; and **(b)** existing companies to receive income tax exemptions equivalent to the ITA for relocating overseas manufacturing facilities to Malaysia, provided a minimum investment of RM300 million in a new business segment; and
4. **Special Incentives in SEZs**, offering tax relief tailored to specific zones, including tax exemptions, investment tax allowances, import duty exemptions, and stamp duty exemptions.

While these incentives are meant to attract investments, they have also created a market imbalance within the steel industry. Foreign-owned companies that receive these incentives may outperform local producers, especially when such companies are able to use more energy-intensive steelmaking methods while operating with less scrutinised environmental compliance. This also raises concerns that efforts to promote investment may negatively impact efforts toward of Malaysia's environmental goals and standards.

[70]. Azmi & Associates. (2024, October 16). *Expanding opportunities: Malaysia's 2024 investment incentives for foreign investors.* Available at https://amcham.com.my/wp-content/uploads/Expanding-Opportunities-Malaysias-2024-Investment-Incentives-for-Fore.pdf

Case Study: Alliance Steel (M) Sdn. Bhd. and Eastern Steel Sdn. Bhd.

Despite an overall lack of publicly available stakeholder information for steel companies, it was found that several key entities in the steel industry are majority-owned or controlled by foreign entities. Among them are Alliance Steel (M) Sdn. Bhd. (Alliance Steel) and Eastern Steel Sdn. Bhd. (Eastern Steel), which are majority-owned by stakeholders from China.

Table 7: Production Capacity of Key Steel Producers in Malaysia

Company Name	Location	Production Process	Main Product	Capacity (mtpa)
Alliance Steel	Pahang	BF-BOF	Long	3.5
The Lion Group	Selangor	EAF	Long	3
Eastern Steel	Terengganu	BF-BOF	Flat	2.7
Southern Steel	Penang	EAF	Long	1.4
Ann Joo Resources	Penang	EAF	Long	1.32
Masteel	Selangor	EAF	Long	1.23

Source: MISIF and MSI, as reported by Shanghai Metal Market (2025)[71]

The selection of Alliance Steel and Eastern Steel as representative cases were guided by their prominent production scale, ownership structure, and strategic relevance within Malaysia's steel manufacturing sector. In terms of scale, based on Table 7, Alliance Steel has an annual production capacity of 3.5 million tonnes per annum (Mtpa) is the largest steel producer in Malaysia, while Eastern Steel, with a capacity of 2.7 Mtpa, also ranks among the country's top producers.

This research further examined corporate ownership structures of Alliance Steel and Eastern Steel using a data-mapping platform that consolidates official company records. Figures 8 and 9 illustrate the corporate

[71]. Shanghai Metal Market. (2025, August 21). *Malaysian Steel Market Analysis*. Available at https://www.metal.com/en/newscontent/103490978

and individual control relationships in both firms, identifying several large upstream steel producers operating as private limited companies with direct foreign ownership links, particularly to Chinese corporate entities.

The identification of Chinese ownership highlights wider governance gaps linked to FDI in the steel sector. Operating as private limited companies, these foreign-owned firms face limited public disclosure requirements, increasing the risk of emissions underreporting and weak environmental oversight. This raises concerns about whether foreign investors are meaningfully supporting Malaysia's climate commitments, particularly in the absence of clear and enforceable emissions obligations.

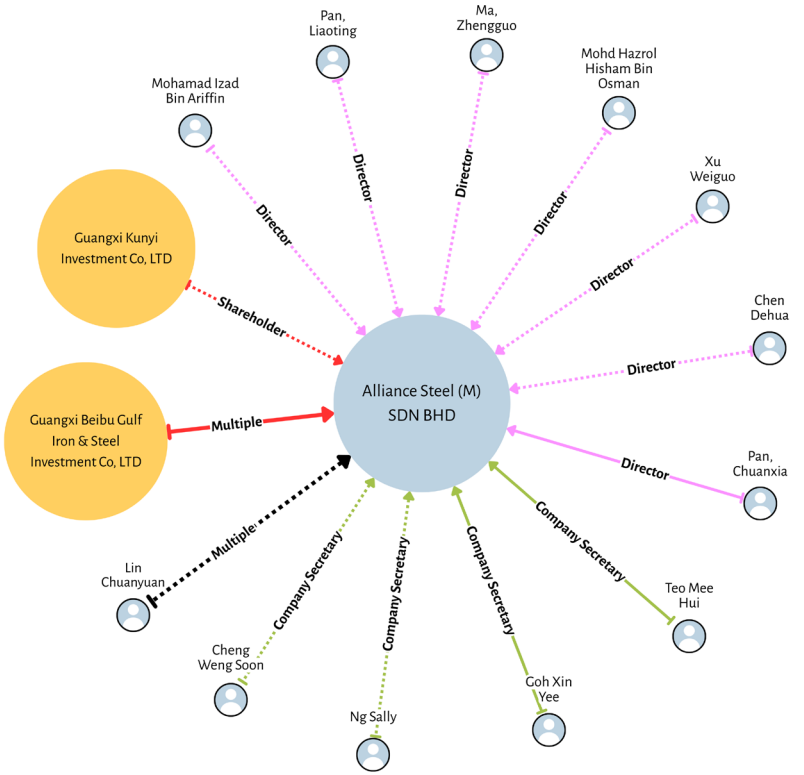

Figure 8: Corporate ownership and directorship structure of Alliance Steel (M) Sdn. Bhd.

Table 8: The breakdown of the shareholders of Alliance Steel (M) Sdn. Bhd.

No	Name / Entity	Role / Position	Type of Ownership	Relationship Status (Current/ Past)
1	Guangxi Beibu Gulf Iron & Steel Investment Co., Ltd.	Shareholder	Corporate (Foreign)	Past
2	Guangxi Kunyi Investment Co., Ltd.	Shareholder	Corporate (Foreign)	Current
3	Lin Chuanyuan	Multiple	Individual	Past
4	Ma, Zhengguo	Director	Individual	Past
5	Mohammed Izad bin Ariffin	Director	Individual	Past
6	Pan, Liaoting	Director	Individual	Past
7	Xu, Weigo	Director	Individual	Past
8	Mohd Hazrol Hisham bin Osman	Director	Individual	Past
9	Pan, Chuanxia	Director	Individual	Current
10	Chen Dehua	Director	Individual	Past
11	Ng Sally	Company Secretary	Individual	Past
12	Teo Mee Hui	Company Secretary	Individual	Current
13	Cheng Weng Soon	Company Secretary	Individual	Past
14	Goh Xin Yee	Company Secretary	Individual	Current

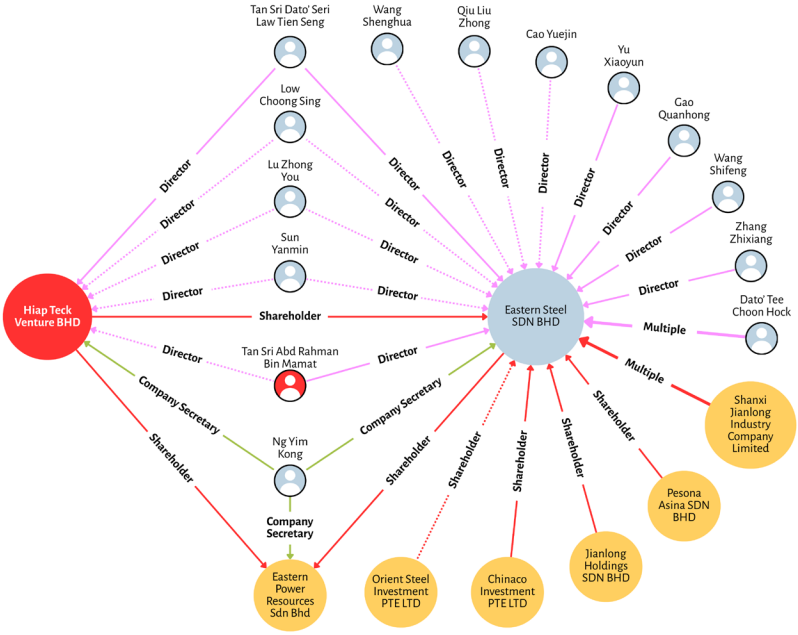

Figure 9: Corporate ownership and directorship structure of Eastern Steel Sdn. Bhd.

Table 9: The breakdown of the shareholders of Eastern Steel Sdn. Bhd.

No	Name / Entity	Role / Position	Type of Ownership	Relationship Status (Current/ Past)
1	Shanxi Jianlong Industry Company Limited	Multiple	Corporate (Foreign)	Current
2	Pesona Asli Sdn. Bhd.	Shareholder	Corporate (Local)	Past
3	Jianlong Holdings Sdn. Bhd.	Shareholder	Corporate (Local)	Current
4	Chinaco Investment Pte. Ltd.	Shareholder	Corporate (Foreign)	Current

No	Name / Entity	Role / Position	Type of Ownership	Relationship Status (Current/ Past)
5	Orient Steel Investment Pte. Ltd.	Shareholder	Corporate (Foreign)	Past
6	Eastern Power Resources Sdn. Bhd.	Shareholder	Corporate (Local)	Current
7	Hiap Teck Venture Bhd	Shareholder	Corporate (Local)	Past
8	Dato' Tee Choon Hock	Multiple	Individual	Current
9	Tan Sri Dato' Seri Law Tien Seng	Director	Individual	Current
10	Tan Sri Abd Rahman bin Mamat	Director	Individual	Current
11	Sun Yanmin	Director	Individual	Past
12	Lu Zong You	Director	Individual	Past
13	Cao Yuenjin	Director	Individual	Past
14	Wang Shenghua	Director	Individual	Past
15	Gao Quanhong	Director	Individual	Current
16	Zhang Zhixiang	Director	Individual	Current
17	Wang Shifeng	Director	Individual	Current
18	Yu Xiaoyun	Director	Individual	Current
19	Qiu Liu Zhong	Director	Individual	Past
20	Low Choong Sing	Director	Individual	Past
21	Ng Yim Kong	Company Secretary	Individual	Current

Case Study: Alliance Steel and Malaysia–China Kuantan Industrial Park (MCKIP)

In 2024, The Edge Malaysia reported growing concerns over the operations of Alliance Steel, one of Malaysia's largest FDIs in the steel sector, established with an estimated RM 6.5 billion investment within the Malaysia–China Kuantan Industrial Park (MCKIP)[72,73]

The creation and expansion of MCKIP cannot be separated from the political context of Prime Minister Najib Razak's administration, which positioned Malaysia as an early Belt and Road Initiative (BRI) partner and actively brokered Chinese industrial entry into strategic sectors.[74] The park itself was jointly owned by Malaysian and Chinese government-linked entities, meaning political decision-makers sat on both sides of the table.

What makes MCKIP uniquely problematic from a governance perspective is its G2G structure places significant aspects of its operation outside Malaysia's standard transparency and oversight mechanisms. Decisions on land, tax incentives, infrastructure funding, and environmental compliance conditions are influenced by bilateral committees and joint authorities, rather than by open parliamentary processes or standard government oversight.

This structure allows MCKIP to operate with a level of opacity unavailable to ordinary industrial investors, as key terms of Chinese investments—financing arrangements, tax treatment, beneficial ownership structures, and performance obligations—are embedded in diplomatic agreements that are not publicly disclosed. The result is a governance vac-

[72]. MCKIP is a joint industrial park between Malaysia and China located in Gebeng, Pahang. The park has housed various Chinese enterprises since 2013, and the Twin Parks initiative has generated over RM117 billion in cumulative gross industrial output since then. See The Star. (2025, August 22). *Bilateral parks drive growth*. Available at https://www.thestar.com.my/metro/metro-news/2025/08/22/bilateral-parks-drive-growth and Malaysia-China Business Council. (n.d.). *Malaysia-China Kuantan Industrial Park (MCKIP)*. Available at .https://www.mcbc.com.my/mckip/

[73]. The Edge Malaysia. (2024, January 16). *Long steel players urge close scrutiny of Alliance Steel*. Available at https://theedgemalaysia.com/node/696725

[74]. MCKIP was formalised during Najib's state-level negotiations with the Guangxi provincial government giving it a level of political endorsement rarely granted to industrial zones. See ECERDC. (n.d.) *Malaysia-China Kuantan Industrial Park (MCKIP) development achieves significant progress: construction works by ECERDC, IJM Land and Sime Darby Property announced as new jobs at MCKIP and CMQIP projects*. Available at https://www.ecerdc.com.my/media_releases/malaysia-china-kuantan-industrial-park-mckip-development-achieves-significant-progressconstruction-works-by-ecerdc-ijm-land-and-sime-darby-property-announced-as-n/

uum where foreign industrial interests can leverage political agreements to circumvent the scrutiny, environmental conditions, or disclosure requirements that Malaysian firms must comply with, entrenching a systemic asymmetry in power, influence and accountability.

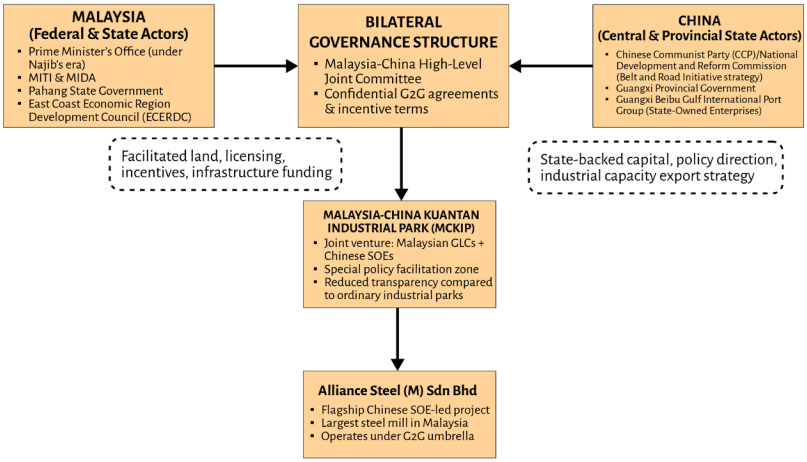

Figure 10: The mapping above shows the China-Malaysia bilateral investment framework

While the venture has significantly contributed to Malaysia's industrial capacity, export performance, and employment generation, it has also sparked controversy regarding market conduct and regulatory oversight. Media has reported allegations that Alliance Steel had breached the terms of its manufacturing licence and distorted domestic market dynamics through large-scale production and potential dumping of excess long steel products, intensifying the issue of overcapacity among local producers.[75]

Furthermore, the same report highlighted issues of transparency and governance, noting the absence of public clarification from regulatory authorities such as MITI and MIDA, despite a formal letter from other major steel companies calling for greater scrutiny of Alliance Steel.[76]

[75]. The Edge Malaysia. (2024, January 16). *Long steel players urge close scrutiny of Alliance Steel*. Available at https://theedgemalaysia.com/node/696725
[76]. ibid

This lack of visible enforcement or disclosure raised questions about policy consistency and whether foreign investors are being held to the same operational and environmental standards as domestic steel manufacturers. The situation underscores a broader policy dilemma in balancing investment promotion with industrial fairness and sustainable market competition—a recurring tension in Malaysia's approach to managing strategic FDIs in heavy industries.

Rather than addressing the concerns raised and reported on January 8, MIDA issued a news release later in the same month, highlighting a record investment performance in the East Coast Economic Region (ECER).[77] As one of Malaysia's SEZs, the ECER—which includes MCKIP—featured a RM7.7 billion expansion of Alliance Steel as its 2024 key highlight.[78] This emphasises the government's broader strategy of prioritising foreign-led investment as a driver for the nation's economic growth.

The growing dominance of foreign-owned, high-emission steel producers has reshaped Malaysia's industrial landscape, exposing deep governance and transparency gaps. While FDI has revitalised national production capacity and export competitiveness, it has also created unequal control, opaque ownership structures, and allegations of selective regulatory compliance.

Case Study: Alliance Steel and Eastern Steel (Financial Performances)

The financial performance comparison between foreign-owned and Malaysian-owned companies from 2019 to 2024, as shown in Table 10, provides compelling evidence of the growing dominance of foreign investors in Malaysia's steel industry.

Table 10A lists majority Chinese-owned steel companies, namely Alliance Steel and Eastern Steel, which recorded a cumulative profit of approximately RM 3.72 billion during the observed period. In contrast, Table 10B shows that Malaysian-owned steel companies—such as Ann Joo Resources, Masteel, Lion Industries Corporation Berhad, and Southern Steel—collectively experienced combined losses of around RM 1.99 billion.

[77]. Malaysian Investment Development Authority (MIDA). (2025, January 20). *ECER attracts 56pct more realised investments to RM13.4bil in 2024*. Available at https://www.mida.gov.my/mida-news/ecer-attracts-56pct-more-realised-investments-to-rm13-4bil-in-2024/

[78]. ibid

Table 10: Financial Performance of Chinese-owned steel companies and Malaysian-owned steel companies from 2019 to 2024[79]

A. Chinese owned steel companies financial performance with Blast Furnace Technology (2019 - 2024)								
No	Companies	Financial Performance (RM, '000)						Total
		2019	2020	2021	2022	2023	2024	
1	Alliance Steel (M) Sdn Bhd	2454	201026	531065	773099	709147	493895	2710686
2	Eastern Steel Sdn Bhd	-81122	136051	331008	72860	154000	404109	1016906
Total Combined Gain (RM'000)								3727592

B. Malaysian-owned steel companies financial performance with Electirc Arc Furnace Techonogy (2019-2024)								
No	Companies	Financial Performance (RM, '000)						Total
		2019	2020	2021	2022	2023	2024	
1	Ann Joo Resources Berhad	-89860	-99987	242929	-133141	-7120	-296646	-383825
2	Malaysia Steel Works (KL) Bhd	-8326	-14726	32503	19071	2404	16990	47916
3	Lion Industries Corporation Berhad	-163045	-395792	533156	-316096	-404959	-85925	-832661
4	Southern Steel Berhad	-118909	-466915	48284	-94503	-141725	-55622	-829390
Total Combined Losses (RM'000)								-1997960

In other words, Chinese-owned steel companies outperformed Malaysian-owned companies, capturing nearly all the sector's financial gains. These profits were led mainly by Chinese-owned companies which utilise the BF–BOF method, known to be efficient and high-capacity but also very carbon-intensive. Malaysian-owned steel companies, in contrast, rely

[79]. Financial data were adopted from multiple sources, including companies' annual reports, SSM reports, news articles, and investment portals.

mostly on EAF technology, which is less energy intensive yet more costly to operate.

Historically, Chinese steel producers preferred the use of BF-BOF as it is well-suited to China's large market and complex value chain.[80] Around 90% of China's crude steel is still produced via BF-BOF, with EAF making up only about 10%.[81] This preference has also extended to Malaysia. Additionally, their operations are strengthened by strategic geographical advantages—situated close to trading hubs and adjacent to Kuantan and Kemaman ports, both Alliance Steel and Eastern Steel benefit from efficient access to imported raw materials and products for steelmaking.[82]

As a result, local companies face tightening profit margins, rising energy costs, and limited policy support, while foreign investors continue to benefit from generous tax incentives and other investment privileges. Additionally, these foreign-owned steel mills remain profitable through conventional, high-emission operation, leveraging on an industrial framework that is still lacking specific GHG regulations.

2.3 Key Takeaways

The problems discussed in Part 2 highlight how governance weaknesses in Malaysia's steel industry are closely linked to existing private corporate structures. Most steel companies in Malaysia are private limited companies. With 148 out of 160 identified companies operating as private limited entities, the majority of steel producers are not subject to mandatory public disclosures of GHG emissions reporting or sustainability performance. As a result, a substantial portion of the sector's environmental footprint remains opaque, increasing the risk of underreporting and weakening the credibility of national emissions data.

---

[80]. Hasanbeigi, A., Springer, C., & Sibal, A. (2025). *China's Steel Transformation: From Blast Furnaces to Electric Arc Furnaces.* Global Efficiency Intelligence. Available at https://static1.squarespace.com/static/5877e86f9de4bb8bce72105c/t/67efeaa0d84993542b2c82b0/1743776474910/China+EAF+study-+3.27.2025rev.pdf

[81]. Wei, Z., Xue, K., Hu, G., Wu, Y., & Wang, Y. (2024). *The Decarbonizing Strategies of China's Iron and Steelmaking Industry: A Comprehensive Perspective*. Sustainability, 16(24), 11268. Available at https://www.mdpi.com/2071-1050/16/24/11268

[82]. Shanghai Metal Market. (2025, August 21). *Malaysian Steel Market Analysis*. Available at https://www.metal.com/en/newscontent/103490978

These transparency gaps are further compounded by uneven regulatory obligations across different types of corporations. PLCs are bound by Bursa Malaysia's disclosure requirements and commercial financing constraints, while large private and foreign-owned producers operate outside equivalent public scrutiny. This asymmetry undermines fair competition and reduces incentives for voluntary compliance, particularly in an industry where emissions intensity varies significantly by technology choice.

This problem is more pronounced among the foreign-owned steel companies operating through private corporate structure. Major foreign players such as Alliance Steel and Eastern Steel rely mainly on conventional BF–BOF technology. Despite operating with higher emissions, these companies benefit from G2G arrangements with incentives, while facing limited public scrutiny over emission disclosure.

Taken together, these dynamics have entrenched structural imbalances that undermine transparency, accountability, and fair competition within the steel industry. More critically, they weaken Malaysia's ability to accurately track, regulate, and reduce industrial emissions in line with its climate commitments. These structural conditions set the foundation for the governance, enforcement, and political–business challenges examined in the next section, which assesses how these weaknesses translate into systemic risks for Malaysia's decarbonisation pathway.

Part 3

Parts 1 and 2 illustrate how Malaysia's steel industry is both a major contributor to national GHG emissions and a sector shaped by different types of ownership structures with fragmented regulatory oversight. Part 3 brings these strands together by examining how structural features of the steel industry enable continued high-emission activities and impedes the nation's climate commitment.

This research finds that Malaysia's climate commitments are at risk of being undermined by existing structural weaknesses embedded within the steel industry. These weaknesses are driven by overarching issues including a **lack of disclosure requirements, fragmented emissions governance, and the entrenched political interference**. Together, these factors enable high-emissions practices to continue largely unchecked, weakening Malaysia's ability to achieve its climate goals.

3.1 Key findings

1. Lack of Publicly Accessible Data on GHG Emissions and Reporting

The research identified a persistent lack of publicly accessible and standardised emissions data, particularly among private sector players in Malaysia's steel industry. Although Malaysia reports national GHG emissions under the Paris Agreement framework, there is no legal obligation for company-level disclosure. While certain facilities are required to submit emissions data and periodic notifications to regulatory agencies, these reports are not made publicly available.

Major high-capacity steel producers—including Alliance Steel, Eastern Steel, Ann Joo Resources, Masteel, and Southern Steel—operate within this fragmented reporting landscape, where scrutinised GHG data remains largely inaccessible. Unfortunately, there is no comprehensive and officially consolidated public list of all steel companies operating in Malaysia, further complicating efforts to assess the sector's total emissions footprint.

This absence of granular data prevents stakeholders—including policymakers, civil society, and investors—from independently verifying industry contributions to national emissions or assessing progress toward Malaysia's NDC targets.

2. Lack of Transparency and Oversight Evasion: Evidence-Based Findings

For this report, attempts were made to conduct interviews with 97 companies. However, only 3 participated. Most companies, when contacted, showed unwillingness to participate in this research. This should not be seen as a mere limitation, but a finding that highlights the systemic opacity of Malaysia's steel sector. Refusal and unwillingness from industry players to participate in disclosing operational or emissions data signifies a potential issue with the entire sector, as one that does not prioritise transparency and accountability. This lack of engagement suggests the following:

1. The leniency of the existing regulatory framework imposes minimal institutional or legal pressure to disclose emissions or compliance data.

2. Some companies may avoid participation or transparency to conceal non-compliance or environmental breaches, thereby avoiding accountability.
3. With no public data obligations, companies dictate what information reaches regulators and researchers, thereby controlling the narrative surrounding the industry.
4. Some firms may also be reluctant to engage because greater transparency could expose beneficial ownership ties to politically connected actors and elites within the political–business nexus.

3. Regulatory Gaps Allowing Business-as-Usual Practices

Malaysia's environmental regulatory system still lacks enforceable emission limits, clear phase-out timelines, or legal penalties for non-compliance. Existing laws such as the EQA 1974 and the Clean Air Regulations 2014 remain focused on conventional air pollutants and industrial particulates, which don't include GHG emissions[83] within enforcement coverage.

Meanwhile, voluntary and non-binding guidelines such as DOE's BAT guidance document and SC-CMM SEDG only provide limited regulatory mechanisms over emissions reduction, technological improvement, and sustainability reporting.

Additionally, while Bursa Malaysia mandates sustainability disclosures for PLCs, private limited companies—including some of Malaysia's largest industrial emitters—are not subject to equivalent reporting standards. The delayed introduction of the CCA is also holds back the implementation of legal framework that enforces equitable mandatory disclosure, verified emission baselines, and deterrent penalties for continued non-compliance.

4. Lack of Policy Coordination and Institutional Cohesion

Malaysia's climate governance is hindered by fragmented institutional mandates and limited coordination across key ministries and regulatory

[83]. Under Malaysia's NDC framework, there are seven types of GHG covered: Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbon (PFCs), Sulphur hexafluoride (SF_6) and Nitrogen trifluoride (NF_3). See United Nations Development Programme. (2025, August 1). *Malaysia. Climate Promise*. Available at https://climatepromise.undp.org/what-we-do/where-we-work/malaysia

agencies. The Ministry of Economy, MITI, NRES, and DOE each pursue objectives that—while legitimate—often operate in parallel rather than in concert.

This fragmentation has resulted in delayed implementation, overlapping responsibilities, and inconsistent regulatory priorities, particularly in emission reporting monitoring, industrial licensing, and enforcement actions. While multiple roadmaps and policy frameworks refer to decarbonisation, there is no single enforcement body clearly accountable to ensure that these commitments are carried out effectively. As a result, policy ambitions are not always reflected in practice, weakening Malaysia's overall climate governance framework.

5. Malaysia's Steel Industry at the Edge of Foreign Monoply

Malaysia's steel industry, once among the most dynamic in Southeast Asia, is now facing a structural shift toward foreign dominance. Between 2019 and 2024, foreign-owned companies significantly outperformed local companies through preferential SST 5% tax incentives, subsidised energy tariffs, and strategic land allocations in industrial zones such as the Malaysia–China Kuantan Industrial Park (MCKIP). Major players such as Alliance Steel and Eastern Steel primarily operate BF-BOF technology—among the most carbon-intensive pathways—while benefiting from strategic facilitation that domestic producers can hardly access.

Meanwhile, local companies listed on Bursa Malaysia are required to comply with sustainability disclosures, while large private limited, foreign-owned companies remain outside the same transparency and accountability frameworks.

A critical environmental concern arising from the growing dominance of foreign-owned steel companies in Malaysia is the omission of industrial emissions from official reporting and monitoring mechanisms.

3.2 Key Takeaways

The findings of this research reveal systemic governance gaps within Malaysia's steel industry that collectively hinder progress towards the nation's climate goals. These gaps manifest through weak transparency, insufficient and incohesive regulation, and foreign dominance, all of which undermine the practicability of Malaysia's emission-reduction commitments.

While national-level frameworks such as the NETR, NIMP, NDC RAP, LT-LEDS, and Steel Industry Roadmap signal policy ambition, the mechanisms that underpin accountability, data integrity, and enforcement remain underdeveloped. The result is a fragmented governance landscape that relies on self-reporting and discretionary compliance—all of which conceal the true scale of industrial emissions.

The absence of mandatory, standardised, and publicly accessible GHG emissions data limits the ability to establish credible baselines and design an effective targeted decarbonisation pathways for hard-to-abate industries. Moreover, fragmented institutional mandates have allowed investment-driven policies to advance, disregarding the climate commitments.

These findings suggest that without decisive reforms to address these issues, Malaysia's steel industry will continue to pose a structural challenge to achieve the NDC targets, as well as safeguarding Malaysia's industrial sovereignty by ensuring a balanced and equitable regulatory environment in which local and foreign-owned companies are subject to the same transparency, compliance and enforcement standards.

3.3 Recommendations

1. Building a Culture of Transparency and Public Oversight

Malaysia's governance challenges are institutional, rooted in limited transparency and weak public access to information. True accountability and good governance requires empowering journalists, civil society, and academics to participate meaningfully in environmental oversight—but this is not possible without access to information

These weaknesses became more profound in large state-state owner-

ship projects such as ECRL and major steel ventures within MCKIP. The ECRL's inflated costs under Najib Razak's administration and the absence of a transparent auditing mechanism shows how closed-door negotiation can lead to long term financial problems. Similar patterns can be seen in the past failures such as Perwaja Steel, which involved bailouts and political influence.

To this end, Malaysia should align its governance reforms with the principles of the Sustainable Development Goals (SDGs)—particularly Goal 16 (Peace, Justice and Strong Institutions) and Goal 12 (Responsible Consumption and Production). SDG 16 promotes transparent, accountable, and participatory institutions, while SDG 12 encourages companies to disclose sustainability information and adopt responsible production practices. Embedding these principles into Malaysia's emission governance framework would help ensure that industrial data—such as emissions, compliance records, and licensing information—is publicly accessible and independently verified.

Additionally, Malaysia should operationalise Article 13 of the United Nations Convention against Corruption (UNCAC), which promotes active participation of society in governance and to enhance public access to information. As a State Party, Malaysia is required to implement UNCAC's principles within the domestic environmental and industrial governance framework. Doing so would strengthen integrity and reduce opportunities for regulatory lapses by ensuring that emissions data, industrial licences, and compliance records are open to public scrutiny.

To institutionalise these principles, the government must also expedite the enactment of a Right to Information (RTI) law that guarantees and facilitates public access to information. In the current absence of any such legislation, information held by the government is often inaccessible to the public and disclosed on the discretion of bureaucrats. The indiscriminate use of the Official Secrets Act 1972 (a broadly worded law which enables practically any document to be classified as an official secret) compounds this issue further. By granting the public a legal right to request verified environmental information held by the government, independent monitoring and informed participation in climate decision-making can be facilitated.

Furthermore, the government must establish an independent Malay-

sian Ombudsman office to act as an investigation and complaint resolution body for complaints made against government entities. The Malaysian public complaints management framework currently is fragmented, with several different agencies and commissions tasked with oversight of different government entities and conferred differing levels of power. A single consolidated office with broad powers of investigation and clear follow-up procedures to check on the implementation of recommendations will ensure that public complaints against regulatory agencies can be resolved in an efficient and effective manner.

These broader governance reforms would guarantee and facilitate the public's right to access verified environmental information and hold both corporations and regulators accountable, close the current transparency gap and ensure that environmental governance operates with openness, impartiality, and trust.

2. Enhancing the Existing and Developing Climate Governance

Malaysia's industrial decarbonisation efforts will remain unattainable unless the structural gaps and weak accountability mechanisms in its environmental governance framework are effectively resolved. In addressing environmental risk and emission omission, the challenge lies in the absence of verifiable, transparent, and enforceable systems to accurately measure, monitor, and disclose emissions.

Hence, to build a credible low-carbon pathway, Malaysia must move beyond aspirational targets and develop a governance system mandating transparency, public participation, and public accountability. Institutionalising these principles would strengthen both regulatory integrity and public trust, ensuring that industrial expansion aligns with national decarbonisation objectives and the country's NDC commitments.

A CCA must therefore be designed not simply as a reporting tool, but as a safeguard against discretionary decision-making and the political–business networks that have historically shaped Malaysia's strategic industrial investments. Malaysia also urgently needs a CCA to close existing legislative gaps and make climate obligations enforceable. While repeatedly delayed, the CCA remains central to uniting industrial, energy, and climate policies

under a unified legal framework.

To be truly effective, a legally enforceable climate framework should include these key provisions:

- Mandatory emission thresholds for hard-to-abate industries, with requirements for all relevant companies to measure and report their GHG emissions periodically using a standardised and credible method.
- Comprehensive reporting obligations applicable to all emitters across all types of companies—domestic and foreign—with periodic verification processes to prevent manipulation or omission.
- Establishment of a secretariat to coordinate and implement the climate commitments and policies across relevant ministries and agencies.
- Clear and enforceable penalties for non-compliance, including failure to report or falsification of emissions data, including fines, suspension of operations, or licence revocation.

These measures shall ensure that all companies are equally accountable and that accurate, verified reporting becomes a non-negotiable standard for operating in Malaysia.

3. Political–Business Nexus: A Structural Barrier to Climate Accountability

The absence of enforceable disclosure rules, weak institutional mandates, and fragmented oversight in the domestic environmental governance landscape co-exist with a longstanding political–business nexus that shapes how strategic industries operate. Historically, public investments in heavy industries show that decisions are negotiated with little regard for regulation, transparency, or accountability. In practice, this model has concentrated decision-making among political elites, encouraged state-backed commercial ventures, and created closed channels through which investment terms, ownership structures, and incentive packages are negotiated away from public visibility.

This governance pattern has continued in newer forms through G2G investment arrangements, especially within BRI industrial projects such as

MCKIP. Large Chinese steelmakers now control a significant share of Malaysia's upstream and midstream steel capacity under bilateral frameworks that sit outside normal transparency expectations. While domestic firms, bound by Bursa disclosure rules and commercial financing costs, operate under a different regulatory reality, foreign-owned mills are able to benefit from subsidised capital and opaque incentive regimes facilitated by the political elite.

The result is a systemic information asymmetry: companies benefiting from political insulation face minimal pressure to disclose emissions data, beneficial ownership structures, or compliance records, while regulators lack the mandate and access to verify the accuracy of reported information. In some cases, reluctance to participate in public reporting or research may reflect a desire to avoid exposure of politically connected ownership arrangements that could complicate regulatory enforcement or raise conflict-of-interest concerns. This nexus between political influence and corporate opacity creates a structural barrier to climate accountability—one that cannot be solved solely through technical improvements in reporting systems.

Addressing Malaysia's industrial emissions therefore requires more than better monitoring tools; it requires breaking the cycle of discretionary, personality-driven industrial policy. Legally enforceable disclosure obligations, mandatory beneficial ownership transparency, and independent auditing must be implemented and enforced, ensuring that decisions affecting national emissions are not shaped by private networks of influence. Hence, key structural reforms are needed to address these issues:

- Amending the existing Companies (Amendment) Act 2024 by enforcing a mandatory public disclosure to beneficial ownership data, and
- Regulating a Political Financing Act, which must be included with mandatory reporting of all political funds.

Without confronting the political–business nexus, Malaysia risks repeating the governance failures of past mega-industrial projects under new geopolitical configurations, with high-emission infrastructure locked in for decades and decarbonisation targets reduced to aspirational rhetoric.

4. Financing a Just Transition to a Low-Emission Industry

Many local steel companies lack access to capital for upgrading to cleaner, more efficient technologies. Malaysia's financial policies must therefore be redesigned to drive deep, sustained decarbonisation, rather than supporting short-term or surface-level improvements.

Rather than relying on costly and uncertain pathways—such as large-scale CCUS technology or speculative carbon market mechanisms that risk becoming tools of greenwashing rather than genuine emission reduction—Malaysia should prioritise real, structural change. Implementing a progressively escalating carbon tax would create a clear economic signal to cut emissions while generating public revenue that can be transparently re-invested into the transition process.

The funds collected through carbon taxes, levies, and environmental penalties should be channelled into a dedicated Just Transition Fund to support industrial green transformation, renewable energy integration, and technological innovation. This fund should also be used to upskill and reskill workers, empower women's participation in green industries, and provide social protection for vulnerable or displaced communities affected by the phase-out of high-emission, hard-to-abate sectors.

Access to public or concessional funds under this framework must be conditional on verified emissions reporting, independent audits, and transparent compliance, ensuring that financial support flows only to firms demonstrating real, measurable progress in reducing carbon intensity and contributing to Malaysia's broader goals of low-carbon, inclusive, and gender-responsive development.

3.4 Conclusion

Malaysia stands at a critical juncture in shaping its climate future. The steel sector—long regarded as a pillar of national development—now reveals serious governance weaknesses: weak enforcement, fragmented regulatory mandates, opaque ownership structures, and a growing influence of large foreign-owned companies operating through G2G arrangements with limited oversight. These vulnerabilities have allowed hard-to-abate industries to expand under loose scrutiny, undermining Malaysia's ability to achieve

its NDC ambitions.

More importantly, the current landscape reflects a structural imbalance of power. Domestic steel producers are subject to reporting compliance, commercial financing costs, and Bursa-linked disclosure requirements for publicly listed companies. In contrast, foreign-linked companies benefit from incentives, diplomatic protection, and policy leniencies negotiated behind closed doors—forming a political-business nexus where strategic industrial decisions are shaped by elite relationships rather than transparent rules. This dynamic not only compromises national sovereignty, but transfers financial and environmental risks to the Malaysian public. The pattern echoes earlier failures—such as Perwaja Steel—where projects framed as "strategic" were shielded from accountability, with losses ultimately borne by the public.

To move forward, Malaysia must establish enforceable climate governance, not aspirational statements. This requires a binding Climate Change Act that mandates transparent, verified emissions reporting; applies equal regulatory standards to all companies, public or private, domestic or foreign; and includes real penalties for omission. Strengthening institutional integrity also requires supporting legislation with independent authority to investigate regulatory failures.

Ultimately, Malaysia's success in meeting its climate commitments depends on credible governance—where environmental data is trusted, laws are enforced, incentives are transparent, and all corporations are held to the same standard. Reclaiming environmental integrity is therefore not only a technical exercise in counting emissions; it is a governance project that requires dismantling the opacity, political discretion, and elite capture that have historically defined strategic sectors. It is a choice to prioritise public accountability over private benefit, long-term climate security over short-term industrial gains, and the public interest over closed-door industrial diplomacy.

Appendix I

List of steel related companies in Malaysia compiled from this research

No	Name of company
1	Able Steel Pipes Sdn Bhd
2	Air Products Malaysia Sdn Bhd
3	Alliance Steel (M) Sdn Bhd
4	Allpipes Technology Sdn Bhd
5	Alpine Pipe Manufacturing Sdn Bhd
6	Alumtan Union Metal Sdn Bhd
7	Amalgamated Metal Corporation (M) Sdn Bhd
8	Amcan Color Coating Industries Sdn Bhd
9	Ann Joo Integrated Steel Sdn Bhd
10	Ann Joo Steel Berhad
11	Anshin Steel Service Centre Sdn Bhd
12	Asas Angsana Sdn Bhd
13	Asia Roofing Industries Sdn Bhd
14	Asia Wire Steel Mesh Manufacturers Sdn Bhd
15	Associated Steel Industries (M) Sdn Bhd

No	Name of company
16	ASTEEL (Sabah) Sdn Bhd
17	ASTEEL (Sarawak) Sdn Bhd
18	ASTEEL Ajiya Sdn Bhd
19	ASTEEL Group Berhad
20	ASTEEL Sdn Bhd
21	Astino Metal Industries Sdn Bhd
22	Auto Cast Sdn Bhd
23	Bahru Stainless Sdn Bhd
24	Boon & Cheah Steel Pipes Sdn Bhd
25	BRC Prefab Holdings Sdn Bhd
26	BW Scaffold Industries Sdn Bhd
27	BW Yee Seng Steel Industries Sdn Bhd
28	C.H.S. Steelworks Sdn Bhd
29	CH Ferrous Steel Sdn Bhd
30	CH Yodoform Sdn Bhd
31	China Communications Construction (ECRL) Sdn Bhd
32	Chong Lek Engineering Works Sdn Bhd
33	Choo Bee Metal Industries Berhad
34	Chung Yih Steel Sdn Bhd
35	Citaglobal Industries Sdn Bhd
36	City Top Enterprise Sdn Bhd
37	Colourcoil Industries Sdn Bhd
38	CSC Steel Sdn Bhd
39	Cumic Steel Limited
40	Daikin Steel Malaysia Sdn Bhd
41	Dexion Asia Sdn Bhd
42	Durabon Sdn Bhd
43	Dynaciate Engineering Sdn Bhd
44	Easteel Services (Malaysia) Sdn Bhd

No	Name of company
45	Eastern Steel Sdn Bhd
46	Ecco Steel Industries Sdn Bhd
47	Engtex Metals Sdn Bhd
48	Eonmetall Industries Sdn Bhd
49	Eonmetall Technology Sdn Bhd
50	Era Scaffold System Sdn Bhd
51	Established Metal Industries Sdn Bhd
52	Hanwa (Malaysia) Sdn Bhd
53	Hanwa Steel Centre (M) Sdn Bhd
54	Harum Bidang Sdn Bhd
55	Hoto Stainless Steel Industries Sdn Bhd
56	Huatraco Scaffold Sdn Bhd
57	Hydropipes Industries Sdn Bhd
58	Ibraco Ascent Sdn Bhd
59	Insafoam Insulation (M) Sdn Bhd
60	Integer Engineering Sdn Bhd
61	Japmas Steel Sdn Bhd
62	JFE Shoji Steel Malaysia Sdn Bhd
63	Ji Kang Dimensi Sdn Bhd
64	K. Seng Seng Corporation Berhad
65	Kamen Steel Industries Sdn Bhd
66	Kansai Paint Asia Pacific Sdn Bhd
67	Kanzen Tetsu Sdn Bhd
68	Kejuruteraan Wang Yuen Sdn Bhd
69	Kentzu Steel Sdn Bhd
70	Kin Kee Steel Pipe Manufacturing Sdn Bhd
71	King Hong Steel Sdn Bhd
72	Kiswire Sdn Bhd
73	Kong Brothers Engineering Works Sdn Bhd

No	Name of company
74	Kyodo Steel Sdn Bhd
75	Laksana Wibawa Sdn Bhd
76	Leader Steel Sdn Bhd
77	Leform Berhad (Formerly known as Leform Sdn Bhd)
78	Lhoist (Malaysia) Sdn Bhd
79	Linde Malaysia Sdn Bhd
80	LY Steel Pipe Industries Sdn Bhd
81	Lysaght Corrugated Pipe Sdn Bhd
82	Malaysia Steel Works (KL) Bhd
83	Mapel Harmony Sdn Bhd
84	Marubeni-Itochu Steel (M) Sdn Bhd
85	Master Jaya Greentech Sdn Bhd
86	Mechmar Boilers Sdn Bhd
87	Melewar Steel Tube Sdn Bhd
88	Metex Steel Sdn Bhd
89	Mycron Steel CRC Sdn Bhd
90	Nickel Institute
91	Nicom Steel Centre (M) Sdn Bhd
92	One Steel Industry (M) Sdn. Bhd.
93	Oriental Steel Pipe Sdn Bhd
94	P.P. Steel Service Centre Sdn Bhd
95	Pantech Stainless & Alloy Industries Sdn Bhd
96	Pantech Steel Industries Sdn Bhd
97	Pau Tatt Water Pipe Sdn Bhd
98	Perfect Combustion Sdn Bhd
99	Perusahaan Sadur Timah Malaysia (PERSTIMA) Berhad
100	PHH Metal 1 Sdn Bhd
101	Pipefab Industries Sdn Bhd
102	Pipemate Sdn Bhd

No	Name of company
103	Pipeworks Sdn Bhd
104	PM Access World (M) Sdn Bhd
105	PMI-Technology Sdn Bhd
106	Portal Frame Construction Sdn Bhd
107	POSCO-Malaysia Sdn Bhd
108	POSCO-MKPC Sdn Bhd
109	Prestar Resources Berhad
110	PTM Stainless Steel Industry Sdn Bhd
111	Resonac Graphite Malaysia Sdn Bhd
112	RM Wire Industries Sdn Bhd
113	S.P. United Industry Sdn Bhd
114	Schaefer Systems International Sdn Bhd
115	Seng Hiap Metal Sdn Bhd
116	Seremban Engineering Berhad
117	Serendah Steel Manufacturing Sdn Bhd
118	Serendah Steel Trading Sdn Bhd
119	SGS (Malaysia) Sdn Bhd
120	Shiuh Dong Industries Sdn Bhd
121	Shunto Steel Industries Sdn Bhd
122	SKB Storage Industries Sdn Bhd
123	SKF Malaysia Sdn Bhd
124	SMPC Industries Sdn Bhd
125	Soon Lien Fatt Flanging & Rolling (M) Sdn Bhd
126	Southern PC Steel Sdn Bhd
127	Southern Pipe Industry (M) Sdn Bhd
128	Southern Steel Berhad
129	Southern Steel Mesh Sdn Bhd
130	SSAB Swedish Steel Sdn Bhd
131	Stanta Mauser (M) Sdn Bhd

No	Name of company
132	Steel Industries (Sabah) Sdn Bhd
133	Sumiputeh Steel Centre Sdn Bhd
134	Sun Sung Lee Engineering Sdn Bhd
135	Sunvek Metal Sdn Bhd
136	Supcheng Fasteners Sdn Bhd
137	Syarikat Perniagaan Perindustrial King Hong Sdn Bhd
138	Syarikat Steelcon Sdn Bhd
139	Tashin Steel Sdn Bhd
140	Top-Mech Provincial Sdn Bhd
141	TotalEnergies Marketing Malaysia Sdn Bhd
142	TT Steel Processing (M) Sdn Bhd
143	United U-LI (M) Sdn Bhd
144	Vale Malaysia Minerals Sdn Bhd
145	Van Leeuwen Pipe and Tube (M) Sdn Bhd
146	Vesuvius Malaysia Sdn Bhd
147	Walsin Precision Technology Sdn Bhd
148	Wasco Pipe Sabah Sdn Bhd
149	Wasco Process Engineering Sdn Bhd
150	Wei Dat Steel Wire Sdn Bhd
151	Weida Steel Industries Sdn Bhd
152	Weng Yat Horizon Sdn Bhd
153	Wong Wai Scaffolding Sdn Bhd
154	Xiamen ITG Metals Co., Ltd.
155	Xinsteel Sdn Bhd
156	Yankong Stainless Sdn Bhd
157	Yew Lean Foundry & Co Sdn Bhd
158	Yoonsteel (Malaysia) Sdn Bhd
159	Yunco Enterprise Sdn Bhd
160	Zinco Manufacturing Sdn Bhd

Appendix II

List of steel companies for interviews

No	Name of company	Interview Status
1	Able Steel Pipes Sdn Bhd	Declined
2	Air Products Malaysia Sdn Bhd	Declined
3	Allpipes Technology Sdn Bhd	No response
4	Alpine Pipe Manufacturing Sdn Bhd	Declined
5	Ann Joo Steel Berhad	No follow-up
6	Anshin Steel Service Centre Sdn Bhd	No follow-up
7	Asia Wire Steel Mesh Manufacturers Sdn Bhd	Declined
8	Associated Steel Industries (M) Sdn Bhd	Declined
9	ASTEEL Group Berhad	No response
10	Auto Cast Sdn Bhd	Declined
11	Boon & Cheah Steel Pipes Sdn Bhd	No response
12	BW Scaffold Industries Sdn Bhd	No response
13	C.H.S. Steelworks Sdn Bhd	No follow-up

No	Name of company	Interview Status
14	CH Ferrous Steel Sdn Bhd	Declined
15	CH Yodoform Sdn Bhd	Declined
16	China Communications Construction (ECRL) Sdn Bhd	No response
17	Chong Lek Engineering Works Sdn Bhd	No response
18	Citaglobal Industries Sdn Bhd	Declined
19	Daikin Steel Malaysia Sdn Bhd	Declined
20	Dexion Asia Sdn Bhd	No follow-up
21	Durabon Sdn Bhd	Declined
22	Eonmetall Industries Sdn Bhd	No follow-up
23	**Established Metal Industries Sdn Bhd**	**Accepted**
24	Hanwa (Malaysia) Sdn Bhd	No follow-up
25	Hoto Stainless Steel Industries Sdn Bhd	Declined
26	Huatraco Scaffold Sdn Bhd	Declined
27	Hydropipes Industries Sdn Bhd	Declined
28	Insafoam Insulation (M) Sdn Bhd	No follow-up
29	JFE Shoji Steel Malaysia Sdn Bhd	No response
30	Ji Kang Dimensi Sdn Bhd	No response
31	K. Seng Seng Corporation Berhad	No follow-up
32	Kansai Paint Asia Pacific Sdn Bhd	No follow-up
33	Kanzen Tetsu Sdn Bhd	No follow-up
34	Kejuruteraan Wang Yuen Sdn Bhd	No follow-up
35	Kentzu Steel Sdn Bhd	Declined
36	Kin Kee Steel Pipe Manufacturing Sdn Bhd	No response
37	**King Hong Steel Sdn. Bhd.**	**Accepted**
38	Kong Brothers Engineering Works Sdn Bhd	No response
39	Kyodo Steel Sdn Bhd	No follow-up
40	Laksana Wibawa Sdn Bhd	No follow-up
41	Leform Berhad (Formerly known as Leform Sdn Bhd)	No follow-up
42	Linde Malaysia Sdn Bhd	Declined

No	Name of company	Interview Status
43	LY Steel Pipe Industries Sdn Bhd	No follow-up
44	**Malaysia Steel Works (KL) Bhd**	**Accepted**
45	Mapel Harmony Sdn Bhd	Declined
46	Marubeni-Itochu Steel (M) Sdn Bhd	No follow-up
47	Master Jaya Greentech Sdn Bhd	No follow-up
48	Mechmar Boilers Sdn Bhd	Declined
49	Melewar Steel Tube Sdn Bhd	Declined
50	Metex Steel Sdn Bhd	No response
51	Mycron Steel CRC Sdn Bhd	No follow-up
52	Nicom Steel Centre (M) Sdn Bhd	No follow-up
53	Oriental Steel Pipe Sdn Bhd	No response
54	P.P. Steel Service Centre Sdn Bhd	Declined
55	Pantech Steel Industries Sdn Bhd	No follow-up
56	Pau Tatt Water Pipe Sdn Bhd	Declined
57	Perfect Combustion Sdn Bhd	No follow-up
58	Perusahaan Sadur Timah Malaysia (PERSTIMA) Berhad	Declined
59	PHH Metal 1 Sdn Bhd	No follow-up
60	Pipefab Industries Sdn Bhd	No follow-up
61	Pipemate Sdn Bhd	Declined
62	Pipeworks Sdn Bhd	Declined
63	PM Access World (M) Sdn Bhd	No response
64	PMI-Technology Sdn Bhd	No follow-up
65	Portal Frame Construction Sdn Bhd	No follow-up
66	POSCO-Malaysia Sdn Bhd	No response
67	POSCO-MKPC Sdn Bhd	Declined
68	Prestar Resources Berhad	Declined
69	PTM Stainless Steel Industry Sdn Bhd	No response
70	Resonac Graphite Malaysia Sdn Bhd	No response

No	Name of company	Interview Status
71	Seng Hiap Metal Sdn Bhd	Declined
72	Serendah Steel Manufacturing Sdn Bhd	Declined
73	Serendah Steel Trading Sdn Bhd	Declined
74	SGS (Malaysia) Sdn Bhd	No response
75	SKB Storage Industries Sdn Bhd	No response
76	SMPC Industries Sdn Bhd	Declined
77	Soon Lien Fatt Flanging & Rolling (M) Sdn Bhd	Declined
78	Southern PC Steel Sdn Bhd	No follow-up
79	Southern Steel Mesh Sdn Bhd	No response
80	SSAB Swedish Steel Sdn Bhd	Declined
81	Stanta Mauser (M) Sdn Bhd	No follow-up
82	Sumiputeh Steel Centre Sdn Bhd	No follow-up
83	Sunvek Metal Sdn Bhd	No follow-up
84	Supcheng Fasteners Sdn Bhd	No follow-up
85	Top-Mech Provincial Sdn Bhd	No follow-up
86	Total Energies Marketing Malaysia Sdn Bhd	No response
87	TT Steel Processing (M) Sdn Bhd	No response
88	United U-LI (M) Sdn Bhd	No follow-up
89	Van Leeuwen Pipe and Tube (M) Sdn Bhd	No follow-up
90	Vesuvius Malaysia Sdn Bhd	No follow-up
91	Wasco Process Engineering Sdn Bhd	Declined
92	Weng Yat Horizon Sdn Bhd	Declined
93	Wong Wai Scaffolding Sdn Bhd	No follow-up
94	Xinsteel Sdn Bhd	Declined
95	Yankong Stainless Sdn Bhd	Declined
96	Yew Lean Foundry & Co Sdn Bhd	No response
97	Zinco Manufacturing Sdn Bhd	No follow-up

Appendix III

Supplementary Information

The following section provides a brief explanation of the main steelmaking technologies referenced in this report[84]:

Blast Furnace-Basic Oxygen Furnace (BF-BOF)

The BF-BOF route is the most widely used steelmaking process globally, accounting for about 70% of world crude steel output. It begins by smelting iron ore with coke and limestone in a blast furnace to produce molten pig iron, which is then refined in a basic oxygen furnace (BOF), where oxygen is blown through the metal to reduce its carbon content and convert it into crude steel.

This technology can produce high-quality steel for the construction, automotive, and heavy industries, but it is also the most carbon intensive process, emitting around 2.33 tonnes of CO_2 per tonne of steel due to carbon-rich coke.

[84]. Note: Brief explanations of each steelmaking method (BF–BOF, EAF, LRF, IF, and DRI) were adapted from a compilation of sources, including the Steel Industry Roadmap 2035 (MITI, 2025), Electric Arc Furnace Steelmaking and Secondary Refining (Steel Manufacturers Association, 2024), and World Steel in Figures 2025 (World Steel Association, 2025).

Electric Arc Furnace (EAF)

The EAF route primarily melts scrap steel using an electric arc generated between graphite electrodes. It can also use DRI or hot briquetted iron (HBI) as supplementary feedstock.

This process produces a wide variety of steel grades—from reinforcing bars to stainless steel—and is much cleaner and more flexible than the BF-BOF route. The average CO_2 emission for EAF steelmaking is about 0.68 tonnes of CO_2 per tonne of steel, less than one-third of the BF-BOF process.

Ladle Refining Furnaces (LRF)

A secondary metallurgical process used after initial steelmaking (typically following EAF or BOF stages). In this step, molten steel is transferred to a ladle for further refining and temperature adjustment. Alloying elements are added to achieve specific grades and quality standards, and non-metallic inclusions are removed by slag treatment.

The LRF ensures precise chemical composition and temperature control, producing high-quality steel for specialized applications such as automotive or structural steel.

Electric Induction Furnaces (IF)

IFs use electromagnetic induction to melt metal without electrodes or oxygen blowing. While efficient for small-scale or localized production, IFs lack refining capacity compared to EAFs and are generally used for low-to-medium-grade carbon steel.

They are less common in Malaysia due to quality control issues and policy restrictions on new IF capacity for construction-grade steel.

Direct Reduced Iron (DRI) and Hot Briquetted Iron (HBI)

The DRI process converts iron ore into solid iron using natural gas or coal as reducing agents, operating at lower temperatures (800–1,200°C) than BF–BOF. HBI is a compressed and easily transportable form of DRI.

Natural gas-based DRI emits about 1.07 tonnes of CO_2 per tonne of steel, while coal-based systems emit around 1.82 tonnes of CO_2 per tonne of steel.

References

Ann Joo Resources Berhad. (n.d.) *Ann Joo Steel Berhad company overview*. Available at https://theedgemalaysia.com/article/ann-joo-resources-bhd

Azmi & Associates. (2024, October 16). *Expanding opportunities: Malaysia's 2024 investment incentives for foreign investors*. Available at https://amcham.com.my/wp-content/uploads/Expanding-Opportunities-Malaysias-2024-Investment-Incentives-for-Fore.pdf

Bursa Malaysia. (2015). *Sustainability Reporting Guide*. Available at: https://www.bursamalaysia.com/sites/5d809dcf39fba22790cad230/assets/6768e301e6414a4c4beb9f49/Sustainability_Reporting_Guide_2022_FINAL__1_.pdf

Bursa Malaysia. (n.d.). *Listing Criteria – Get Listed*. Available at https://www.bursamalaysia.com/listing/get_listed/listing_criteria

Capital Markets Malaysia. (2023). *Simplified ESG Disclosure Guide (SEDG) for SMEs in Supply Chains*. Available at https://sedg.capitalmarketsmalaysia.com/

Department of Environment Malaysia, Ministry of Energy, Science, Technology, Climate Change, and Environment (June 2019). *Guidelines for the Installation & Maintenance of Continuous Emission Monitoring System (CEMS) for Industrial Premises/Facilities*. Available at: https://www.doe.gov.my/wp-content/uploads/2021/10/GUIDELINE-FOR-THE-INSTALLATION-MAINTENANCE-OF-CEMS-FOR-INDUSTRIAL-PREMISES-OR-FACILITIES-VERSION-7.0-JUNE-2019.pdf

Department of Environment Malaysia. (n.d.). *Air Pollutant Index Management System (APIMS)*. MyEQMS. Available at https://eqms.doe.gov.my/APIMS/main

Department of Environment, Malaysia (n.d.). *Best Available Technique (BAT) Guidance Document on Iron & Steel Industry*. Available at https://www.doe.gov.my/wp-content/uploads/2021/08/BEST-AVAILABLE-TECHNIQUES-GUIDANCE-DOCUMENT-ON-IRON-STEEL-INDUSTRY.pdf

ECERDC. (n.d.) *Malaysia-China Kuantan Industrial Park (MCKIP) development achieves significant progress: construction works by ECERDC, IJM Land and Sime Darby Property announced as new jobs at MCKIP and CMQIP projects*. Available at https://www.ecerdc.com.my/media_releases/malaysia-china-kuantan-industrial-park-mckip-development-achieves-significant-progressconstruction-works-by-ecerdc-ijm-land-and-sime-darby-property-announced-as-n/

Federation of Malaysian Manufacturing. *Expansion of Sales and Service Tax (SST) Scope: Effective July 1, 2025*. Available at https://www.fmm.org.my/Announcements-@-Expansion_of_Sales_and_Service_Tax_(SST)_Scope-;_Effective_July_1,_2025.aspx#:~:text=Raw%20materials%20such%20as%20certain%20iron%20and,agricultural%20and%20livestock%20machinery%20which%20remain%20exempt

Free Malaysia Today. (2024, October 6). *How Perwaja Steel fiasco caused Anwar-Mahathir blow-up*. Available at: https://www.freemalaysiatoday.com/category/nation/2024/10/06/how-perwaja-steel-fiasco-caused-anwar-mahathir-blow-up

Gan, S. (2002, February 27). *The Untouchables*. Malaysiakini. Available at https://www.malaysiakini.com/editorials/22744

Global Highways. (2020, August 10). *Malaysia's massive road building project is advancing the use of technology*. Global Highways. Available at https://www.globalhighways.com/feature/malaysias-massive-road-building-project-advancing-use-technology.

Gomez, E. T., Padmanabhan, T., Kamaruddin, N., Bhalla, S., & Fisal, F. (2017). *Minister of Finance Incorporated: Ownership and Control of Corporate Malaysia*. Palgrave Macmillan.

Hasanbeigi, A., Springer, C., & Sibal, A. (2025). *China's Steel Transformation: From Blast Furnaces to Electric Arc Furnaces*. Global Efficiency Intelligence. Available at https://static1.squarespace.com/static/5877e86f9de4bb8bce72105c/t/67efeaa0d84993542b2c82b0/1743776474910/China+EAF+study-+3.27.2025rev.pdf

Information Technology and Innovation Foundation (ITIF). (2021, July 26). *False promises II: The continuing gap between China's WTO commitments and its practices*. ITIF. Available at https://itif.org/publications/2021/07/26/false-promises-ii-continuing-gap-between-chinas-wto-commitments-and-its/

Institute for Democracy and Economic Affairs (IDEAS). (2024). *Asserting Climate Change Leadership in ASEAN: Carbon Pricing for the Malaysian Steel Industry (Policy Paper No. 79)*. IDEAS. Available at https://www.ideas.org.my/publications-item/asserting-climate-change-leadership-in-asean-carbon-pricing-for-the-malaysian-steel-industry/

International Energy Agency. (2025). *Iron & steel – Industry*. Available at https://www.iea.org/energy-system/industry/steel

Jalil, A.Z.A, & Mahmud, Z., (2015). *An alloy of steel and information communication technology (ICT): Does it facilitate trade? International Journal of Economics and Financial Issues, 5(Special Issue), 153-161*. Available at https://www.researchgate.net/publication/280385583_An_Alloy_of_Steel_and_Information_Communication_Technology_ICT_Does_It_Facilitate_Trade

Khair, A. H. A. (2015). *Personalisation of power, neoliberalism and the production of corruption*. Crime, Law and Social Change. Available at https://www.sciencedirect.com/science/article/abs/pii/S0155998215000253

Lall, S. (1995). Malaysia: Industrial success and the role of the government. J. Int. Dev., 7: 759-773. Available at https://doi.org/10.1002/jid.3380070506

Malaysia-China Business Council. (n.d.). *Malaysia-China Kuantan Industrial Park (MCKIP)*. Available at .https://www.mcbc.com.my/mckip/

Malaysia Steel Works (KL) Bhd. (2022). *History & Milestones*. Available at https://www.masteel.com.my/history-milestones/

Malaysian Investment Development Authority. (n.d.). *Malaysia's major economic transformation since 1957*. Available at https://www.mida.gov.my/mida-news/malaysias-major-economic-transformation-since-1957/#:~:text=In%20the%20years%20following%20independence,of%20both%20rubber%20and%20tin.

Malaysian Investment Development Authority (MIDA). (2024, July 30). *Mapping Malaysia's steel sector journey*. Available at https://www.mida.gov.my/mida-news/mapping-malaysias-steel-sector-journey/#:~:text=Industry%20Performance&text=Iron%20and%20steel%20exports%20went,and%20Vietnam%20(825%2C952%20MT).

Malaysian Investment Development Authority (MIDA). (2025, January 20). *ECER attracts 56pct more realised investments to RM13.4bil in 2024*. Available at https://www.mida.gov.my/mida-news/ecer-attracts-56pct-more-realised-investments-to-rm13-4bil-in-2024/

Malaysian Iron and Steel Industry Federation (MISIF) and Malaysia Steel Association (MSA). (2025). *Forging a Sustainable and Resilient Future for Malaysia's Iron and Steel Industry*. Available at https://misif.org.my/wp-content/uploads/2025/05/MISIF-MSA-Joint-Press-Statement-on-Forging-a-Sustainable-and-Resilient-Future-for-Malaysias-Iron-and-Steel-Industry.pdf

Malaysian Iron and Steel Industry Federation. (n.d.) *Directory – All members*. Available at https://misif.org.my/directory/

Mass Rapid Transit Corporation Sdn Bhd (MRT Corp). (2021, July 7). *Media release – MRT Putrajaya Line Phase One to open in November 2021*. Available at https://www.mymrt.com.my/wp-content/uploads/2021/07/MEDIA-RELEASE_-MRT-PUTRAJAYA-LINE-PHASE-ONE-TO-OPEN-IN-NOVEMBER-2021-1.pdf

Ministry of Economy, (August 2023). *National Energy Transition Roadmap, Energising the Nation, Powering Our Future*. Available at: https://ekonomi.gov.my/sites/default/files/2023-08/National%20Energy%20Transition%20Roadmap.pdf

Ministry of International Trade and Industry (MITI, 2025), *Steel Industry Roadmap 2035*.

Available at https://www.miti.gov.my/miti/resources/E-VERSION_STEEL_INDUSTRY_ROADMAP_2035_V11_FAOL.pdf

Ministry of Investment, Trade and Industry. (2023). *New Industrial Master Plan 2030 (NIMP 2030)*. Available at https://www.nimp2030.gov.my/nimp2030/modules_resources/bookshelf/NIMP_20303/NIMP_20303.pdf

Ministry of Natural Resources and Environmental Sustainability. (May 2025). *Malaysia's Nationally Determined Contribution Roadmap and Action Plan (NDC RAP)*.

Ministry of Natural Resources and Environmental Sustainability. (May 2025). *Malaysia's Long-Term Low Emissions Development Strategy (LT-LEDS)*.

Ministry of Natural Resources, Environment and Climate Change, Malaysia. (December 2022). *Malaysia's Fourth Biennial Update Report under the United Nations Framework Convention on Climate Change*. Available at https://unfccc.int/sites/default/files/resource/MY%20BUR4_2022.pdf

Ministry of Natural Resources, Environment and Climate Change, Malaysia. (December 2024). *Malaysia's First Biennial Transparency Report under the United Nations Framework Convention on Climate Change*. Page 27. Available at https://unfccc.int/documents/645171

MISIF. (2025). *About Us*. Available at https://misif.org.my/about-us

New Straits Times (2025, September 30). *MITI launches Steel Roadmap 2035, drafting new industry bill*. Available at https://www.nst.com.my/business/economy/2025/09/1284164/miti-launches-steel-roadmap-2035-drafting-new-industry-bill

Official Portal Department of Environment Ministry of Natural Resources and Environmental Sustainability (n.d.) *Environmental Quality (Clean Air) Regulations 2014*. Available at https://www.doe.gov.my/en/environmental-quality-clean-air-regulations-2014/ Page 75

Organisation for Economic Co-operation and Development. (2021). *OECD Competition Assessment Reviews: Logistics sector in Malaysia (OECD Competition Assessment Reviews)*. Available at https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/10/oecd-competition-assessment-reviews-logistics-sector-in-malaysia_0618136b/81b94b08-en.pdf

Rancangan Malaysia Ke-13 (RMK13). (2025, October 16). *Pamphlet RMK*. Malaysia Economic Planning Unit, Prime Minister's Department, Malaysia. Available at https://rmk13.ekonomi.gov.my/wp-content/uploads/2025/10/PamphletRMK_16102025.pdf

Securities Commission Malaysia. (n.d.). *Approval Process for Main Market Initial Public Offerings of Corporations in Malaysia*. Available at https://www.sc.com.my/about/

client-charter/business-processes/approval-process-for-main-market-initial-public-offerings-of-corporations-in-malaysia

Segal, M., (2025, October 21). *GHG Protocol Releases Draft Update to Framework for Reporting Scope 2 Emissions*. Available at https://www.esgtoday.com/ghg-protocol-releases-update-to-framework-for-reporting-scope-2-emissions/

Shanghai Metal Market. (2025, August 21). *Malaysian Steel Market Analysis*. Available at https://www.metal.com/en/newscontent/103490978

Technology Executive Committee. (2023). *Integrating hard-to-abate industries in the process of preparing and implementing nationally determined contributions (TEC Brief No. 19)*. United Nations Framework Convention on Climate Change. Available at https://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/TEC_documents/bb257f9ab28c416cbf76e6a75ba82875/e3dbe77ca6594d9c942eaac82320e693.pdf

Tham Siew Yean & Zhang, K. (2021, July 6). *Assessing challenges facing the ECRL's Economic Accelerator Projects (EAPs) (ISEAS Perspective 2021/90)*. ISEAS – Yusof Ishak Institute. Available at https://www.iseas.edu.sg/articles-commentaries/iseas-perspective/2021-90-assessing-challenges-facing-the-ecrls-economic-accelerator-projects-eaps-by-tham-siew-yean-and-kevin-zhang/

The Edge Communications Sdn. Bhd. (2020, May 27). *Southern Steel and Ann Joo abort partnership in long-steel products given uncertain market*. The Edge Malaysia. Available at https://theedgemalaysia.com/article/southern-steel-and-ann-joo-abort-partnership-long-steel-products-givenuncertain-market

The Edge Malaysia. (2024, January 8). *Long steel players urge close scrutiny of Alliance Steel*. Available at https://theedgemalaysia.com/node/696725

The Edge Malaysia. (2025, November 6). *Climate Change Bill slated for first Parliament sitting of 2026, says Johari Ghani*. Retrieved from https://theedgemalaysia.com/node/777534

The Star. (2025, August 22). *Bilateral parks drive growth*. Available at https://www.thestar.com.my/metro/metro-news/2025/08/22/bilateral-parks-drive-growth

The Star. (2026, January 15). *Environs Ministry to table first National Climate Change Bill in Parliament by March, says Arthur*. Retrieved from https://www.thestar.com.my/news/nation/2026/01/15/environs-ministry-to-table-first-national-climate-change-bill-in-parliament-by-march-says-arthur

The Star. (2025, October 29). *M'sia targets 30 million tonnes of carbon dioxide reduction by 2035*. Available at https://www.thestar.com.my/news/nation/2025/10/29/msia-targets-30-million-tonnes-of-carbon-dioxide-reduction-by-2035

Transition Asia. (2025, February 13). *Malaysian Iron and Steel Sector Overview–the Challenges of Decarbonisation*. Available at https://transitionasia.org/challenge-

of-decarbonisation-malaysia/

United Nations Development Programme. (2025, August 1). *Malaysia. Climate Promise*. Available at https://climatepromise.undp.org/what-we-do/where-we-work/malaysia

United Nations Framework Convention on Climate Change (UNFCCC). (2015). The *Paris Agreement*. United Nations. Available at https://unfccc.int/process-and-meetings/the-paris-agreement

United Nations Framework Convention on Climate Change. (2021, July). *Malaysia's update of its first nationally determined contribution*. Available at https://unfccc.int/sites/default/files/NDC/2022-06/Malaysia%20NDC%20Updated%20Submission%20to%20UNFCCC%20July%202021%20final.pdf

United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. Available at https://sdgs.un.org/2030agenda

Wei, Z., Xue, K., Hu, G., Wu, Y., & Wang, Y. (2024). *The Decarbonizing Strategies of China's Iron and Steelmaking Industry: A Comprehensive Perspective*. Sustainability, 16(24), 11268. Available at https://www.mdpi.com/2071-1050/16/24/11268

World Resources Institute & World Business Council for Sustainable Development. (2004). *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)*. Available at https://ghgprotocol.org/sites/default/files/ghgp/standards/ghg-protocol-revised.pdf

World Steel Association. (2012, April). *Indirect trade in steel: Definitions, methodology and application*. Available at (https://worldsteel.org/wp-content/uploads/Indirect-trade-in-steel-Definitions-methodology-and-applications-April-2012.pdf

World Steel Association. (2025) *World steel in figures 2025*. Available at https://worldsteel.org/data/world-steel-in-figures/world-steel-in-figures-2025/

Yap, C. Y., & Poon, J. M. L. (2010). *Perwaja Steel: Case and Instructor's Manual (Unpublished conference paper)*. Universiti Malaysia Pahang Institutional Repository. Available at https://umpir.ump.edu.my/id/eprint/1230/1/Chui_Yan_Yap.PDF

Yu, S. M., Wong, S. Y., Fedotova, E., Ahmad, M. S., Fioriti, D., & Rahim, N. A. (2025). *Prospect of green hydrogen in Malaysian iron and steel industry: Techno-economic assessment and energy modelling using PyPSA-Earth*. Renewable and Sustainable Energy Reviews. Available at https://www.sciencedirect.com/science/article/pii/S1364032125003387?ref=pdf_download&fr=RR-2&rr=99d78afffb42164f

Zhao, R.-J., Fu, J.-X., Wu, Y.-X., Yang, Y.-J., Zhu, Y.-Y., & Zhang, M. (2015). *Representative technologies for hot charging and direct rolling in global steel industry*. ISIJ International, 55(9), 1816–1821. Available at https://www.jstage.jst.go.jp/article/isijinternational/55/9/55_ISIJINT-2015-175/_html/-char/en