

A Study on ESG Adoption in Logistics Industry Towards a Carbon-Conscious Reporting Framework for Malaysian SMEs

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Abstract— As environmental, social, and governance (ESG) practices gain momentum globally, logistics service providers (LSPs) in Malaysia—particularly small and medium-sized enterprises (SMEs)—face growing pressure to adopt ESG frameworks and align with national sustainability mandates. This study investigates the key internal and external factors influencing ESG adoption among logistics SMEs, focusing on readiness for carbon-conscious reporting under the Simplified ESG Disclosure Guide (SEDG). Guided by Stakeholder and Institutional Theory, the study identifies four critical determinants: ESG knowledge and awareness, change readiness, resource availability, and stakeholder engagement.

A structured survey of 156 logistics professionals, combined with pilot testing and exploratory factor analysis, confirmed the reliability and validity of the constructs. Regression analysis revealed that all four factors significantly influence ESG adoption, with resource availability being the most dominant predictor. Findings show that knowledge gaps, resistance to change, limited financial resources, and weak stakeholder collaboration hinder effective ESG integration, especially regarding Scope 1–3 emissions reporting. To address these barriers, a five-year roadmap is proposed to help SMEs implement phased ESG strategies, build internal capabilities, and comply with upcoming regulatory requirements, including a potential carbon tax by 2027.

This research offers a practical framework for enhancing ESG maturity among logistics SMEs and provides actionable recommendations for policymakers, industry associations, and corporate stakeholders to support sustainable transformation in the Malaysian logistics sector.

Keywords— *ESG Adoption, Logistics SMEs, Sustainability reporting, carbon emissions, stakeholder engagement.*

1. Introduction

In recent years, Malaysia has seen a rapid acceleration in environmental regulations and sustainability expectations [4], particularly for industries with significant carbon footprints. Logistics Service Providers (LSPs), which form a backbone of the country's trade and commerce, are under increasing scrutiny [13]. In line with global trends and the national sustainability agenda, the Malaysian government is considering implementing a carbon tax, potentially including provisions for SMEs that fail to report their carbon emissions and implement ESG practices. This is part of a broader push for sustainability and alignment with global trends. While a carbon tax is planned for 2026, specifically targeting certain industries, the timeline for mandatory reporting and the potential for penalties for non-compliance for SMEs, including a carbon tax, is being explored, with some sources indicating a 2027 deadline for all companies, including SMEs, to comply with ESG reporting standards [1].

One of the key tools to address this challenge is the Simplified ESG Disclosure Guide (SEDG), which offers a practical, phased approach for SMEs [6]. The environmental pillar under the SEDG places emphasis on carbon accounting, energy and water consumption, waste management, and material usage, all critical for LSPs whose operations typically include warehousing, fleet transportation, and third-party logistics (3PL) services [7].

1.1 Problem Statement

Despite the urgency, several barriers hinder LSPs from taking immediate action.

1.1.1 Lack of ESG Knowledge & Awareness

Many internal stakeholders, from warehouse staff to drivers, do not fully understand ESG standards or their implications, making engagement and implementation difficult.

One of the most significant hurdles in ESG implementation among Malaysian LSPs is the lack of foundational knowledge and awareness about what ESG entails. Many logistics employees, especially in roles such as warehouse management, dispatch, and fleet driving, are unfamiliar with ESG terminology, the reporting process, and why it matters for long-term business sustainability [11]. This knowledge gap results in confusion and disengagement when ESG initiatives are introduced. Employees often perceive ESG as irrelevant or burdensome and fail to link environmental performance to business outcomes or regulatory compliance. For example, a small 3PL company may struggle to involve its staff in tracking fuel usage because drivers are unaware that such data is required for Scope 1 emissions reporting under SEDG. Another example could be a logistics SME attempting to roll out a sustainability initiative involving energy-efficient practices in its warehouse, but warehouse staff continued to overuse lighting and cooling systems due to a lack of training on energy reduction goals.

1.1.2 Resistance to Change & Cultural Inertia

Leadership and operational teams may resist the transition due to unfamiliarity with ESG frameworks, fear of disruption, or perceived increases in workload.

Organizational inertia and reluctance to change have proven to be another critical barrier. Leadership teams in some SMEs view ESG as a “nice-to-have” rather than a necessity, particularly when it does not show immediate financial returns. Longstanding operational habits, such as paper-based documentation or reactive maintenance practices, are deeply ingrained, making the adoption of sustainable alternatives an uphill battle [2]. Employees may fear that new ESG procedures will increase their workload or complicate their roles, especially if not properly guided by change management strategies. For example, a fleet operations manager may reject a proposal to adopt a digital fleet tracking system to monitor CO₂ emissions, claiming it is too complex and “not their way of doing things.” There could be instances where a 3PL firm may face pushback from warehouse supervisors when asked to segregate waste for reporting under SEDG guidelines. Staff could resist because they believe that recycling processes would slow down their daily workflow.

1.1.3 Insufficient Resources & Infrastructure

ESG implementation requires investment in systems such as carbon tracking, energy audits, and data management tools, which are often beyond the current capabilities of SMEs.

SMEs typically operate with tight budgets, and ESG-related activities are often viewed as secondary priorities due to their upfront costs [5]. Implementing carbon tracking software, hiring sustainability consultants, or upgrading to energy-efficient equipment demands financial investment that many small logistics firms cannot afford. Compounding the issue is the lack of internal systems for data collection, emissions tracking, or environmental performance monitoring, making ESG reporting nearly impossible without external support. For example, a logistics SME operating with a fleet of 10 trucks may find it too costly to install telematics systems that could automatically track fuel consumption and engine idling times, essential for Scope 1 emissions data. Another example could be a third-party warehouse operator postponing an energy audit due to the unavailability of funds and the absence of a qualified internal team to conduct preliminary assessments.

1.1.4 Limited Stakeholder Engagement

Effective ESG implementation requires active engagement with suppliers, clients, and internal teams, yet such stakeholder collaboration is often lacking among SMEs, limiting the scope and accuracy of sustainability reporting.

A frequently overlooked but equally critical issue is the limited engagement with stakeholders, both internal and external, on ESG matters [3]. Many SMEs do not include suppliers, customers, or even senior staff in conversations about sustainability. This weak stakeholder alignment leads to disjointed ESG strategies, lack of collaboration in data sharing (particularly for Scope 3 emissions), and a failure to create shared ownership of sustainability goals. Without stakeholder buy-in, efforts to embed ESG principles remain fragmented and superficial. There could be incidences of logistics SMEs failing to gather necessary information from its outsourced delivery partners to report Scope 3 emissions, as it had never engaged them in ESG-related discussions or contracts. Additionally, a family-owned logistics firm may never have consulted its clients about sustainability expectations and could be surprised when a multinational client requested ESG disclosures before renewing a service contract.

2. Literature Review & Underlying Theory

2.1 National Sustainability Reporting Framework (NSRF)

Malaysia's NSRF adopts International Financial Reporting Standards (IFRS S1 and IFRS S2) as the baseline for sustainability disclosures. It phases adoption by entity groups with a climate-first transition relief (permissible to disclose only IFRS S2 topics initially), and targets reasonable assurance on Scope 1 and Scope 2 greenhouse gas (GHG) emissions from 2027 for early groups. The groups are: Group 1 – Main Market issuers $\geq$ RM2b market cap; Group 2 – other Main Market issuers; Group 3 – ACE Market issuers and large non-listed companies ($\geq$ RM2b annual revenue).

2.2 International Financial Reporting Standards (IFRS) S1 & 2

IFRS S2 (Climate) requires disclosures across Governance, Strategy (including scenario analysis), Risk Management, and Metrics & Targets (Scopes 1–3, financed/insured where relevant). IFRS S1 (General) requires entity-wide materiality, linkage to financial statements, and consistent, comparable reporting across all sustainability topics beyond climate. Under Malaysia's NSRF, Group 1 begins climate-first reporting for periods starting 1 Jan 2025 (IFRS S2), with full IFRS S1+S2 later; Group 2 from 2026; Group 3 from 2027, with full adoption staged thereafter.

2.3 Sustainability integration through Stakeholder and Institutional theory

Sustainability integration in business is underpinned by Stakeholder Theory and Institutional Theory (Figure 1).

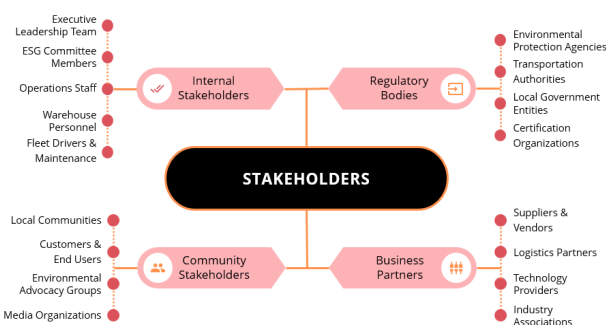


Figure 1. Stakeholder Theory Framework for LSPs
Source: IGTI SEDG Facilitator for SME Training

Stakeholder theory emphasizes the role of all affected parties, employees, customers, regulators, and communities, in shaping ESG outcomes.

Institutional theory explains the influence of regulatory, normative, and mimetic pressures on organizations to adopt sustainable practices. Ref. [12] presents institutional theory through the Institutional Logics Perspective, which argues that organizational behavior is shaped by broader cultural and institutional frameworks (logics) that influence how actors interpret their roles, make decisions, and structure their processes.

Ref. [9] extends stakeholder theory by incorporating insights from institutional theory, suggesting that organizational engagement with vulnerable stakeholders is shaped by institutional pressures and norms, which influence how salience and legitimacy are assigned in stakeholder relationships.

Ref. [8] suggests that institutional theory explains how external pressures, such as regulatory demands and stakeholder expectations, influence organizations to adopt materiality and stakeholder engagement practices in sustainability reporting to gain legitimacy and maintain social acceptance.

Institutional theory and stakeholder theory help explain why organizations adopt carbon emission reporting practices under the Greenhouse Gas (GHG) Protocol (Figure 2).

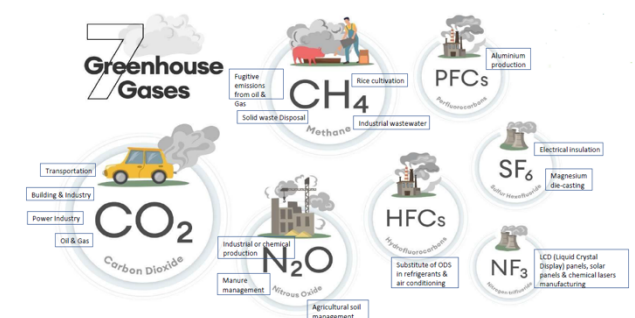


Figure 2. The Seven Greenhouse Gases (GHG)
Source: IGTI Train The Trainer program for ESG Reporting

Institutional theory focuses on external pressures like regulations and norms that drive legitimacy, while stakeholder theory emphasizes meeting the expectations of affected parties by transparently disclosing and managing carbon emissions, especially across Scope 1, 2, and 3 (Figure 3).

Carbon emissions, particularly under the Greenhouse Gas Protocol, are categorized into:

Scope 1 – Direct emissions from owned assets (e.g., fleet fuel combustion).

Scope 2 – Indirect emissions from energy purchased (e.g., warehouse electricity).

Scope 3 – Other indirect emissions in the value chain (e.g., outsourced transportation, suppliers).

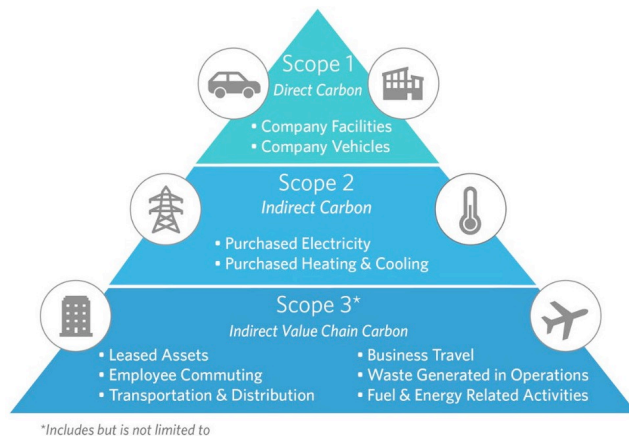


Figure 3. Scope 1, 2 & 3 GHG Emissions
Source: IGTI TTT program for SME SEDG implementation

Studies show that effective carbon accounting and reporting not only reduce regulatory risk but improve operational efficiency and investor confidence. Complex supply chains (SCs), which are part of globalised economic systems, must be managed to minimize sustainability-related risks and to manage environmental and social impacts in accordance with the expectations of many stakeholders [10].

2.4 Conceptual Framework & Hypotheses Development

Based on the underlying theory, the conceptual framework was developed as follows:

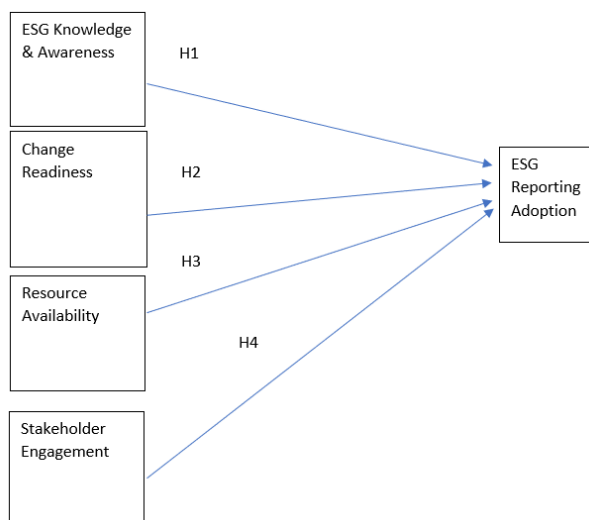


Figure 4. Conceptual Framework

The hypotheses for this study are:

H1 – ESG Knowledge & Awareness has a positive impact on ESG Reporting Adoption

H2 – Change Readiness has a positive impact on ESG Reporting Adoption

H3 – Resource Availability has a positive impact on ESG Reporting Adoption

H4 – Stakeholder Engagement has a positive impact on ESG Reporting Adoption

3. Methodology

To assess the ESG readiness of Malaysian logistics service providers (LSPs), particularly within the third-party logistics (3PL) sector, a pilot study was conducted using a structured questionnaire. The instrument was carefully developed to evaluate key areas such as ESG awareness, current reporting practices, and the primary barriers faced by logistics SMEs in implementing sustainability initiatives. The questionnaire targeted middle to senior-level managers who held decision-making roles related to operations, compliance, or sustainability within their organizations. These individuals were selected for their potential influence on ESG adoption and reporting processes.

For the pilot phase, a total of 30 respondents were selected from various SMEs involved in logistics and warehousing services across Malaysia. A purposive sampling technique was used to ensure that participants possess the relevant expertise and positional authority to provide meaningful insights into their company's ESG practices. This approach enabled the researchers to focus on those most likely to be involved in or impacted by ESG strategy and reporting.

Upon completion of data collection, several statistical tests were carried out to evaluate the quality of the questionnaire instrument. Normality of the data was assessed using the Shapiro-Wilk Test for each construct to determine the suitability of parametric analyses. To test the reliability of the instrument, Cronbach's Alpha was calculated, with a threshold of 0.70 or higher indicating acceptable internal consistency among items. For construct validity, exploratory factor analysis (EFA) was conducted. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy needed to exceed 0.60, and Bartlett's Test of Sphericity had to be statistically significant ($p <$

0.05), to confirm that the data was suitable for factor analysis.

3.1 Pilot Test Data Analysis

The 30 pilot testing samples collected had tests conducted for:

- (i) Shapiro-Wilk Test for Normality
- (ii) Cronbach's Alpha Test for Reliability

Pilot Test Data (n = 30)

Table 1. Shapiro-Wilk Test for Normality

Construct	W-Statistic	p-value	Interpretation	
ESG Knowledge	0.970	0.543	Data normal	appears
Change Readiness	0.965	0.423	Data normal	appears
Resource Availability	0.971	0.566	Data normal	appears
Stakeholder Engagement	0.974	0.667	Data normal	appears
ESG Adoption	0.958	0.274	Data normal	appears

All constructs show non-significant p-values, suggesting normality is not violated. This supports the use of **parametric statistical tests** (e.g., t-tests, ANOVA, regression), which assume normality.

Table 2. Cronbach's Alpha for Reliability

Construct	Cronbach's Alpha	Interpretation
ESG Knowledge	0.779	Acceptable
Change Readiness	0.796	Good
Resource Availability	0.836	Good
Stakeholder Engagement	0.861	Excellent
ESG Adoption	0.812	Good

All constructs exceed the **0.70 threshold**, indicating **reliable internal consistency**.

4. Discussion

156 samples collected had tests conducted for:

- Demographic analysis
- Inferential Analysis
 - o Construct Validity, Exploratory Factor Analysis
 - Meyer-Olkin (KMO) measure
 - Bartlett's Test of Sphericity
 - o Multiple Linear Regression

Data collected for 156 samples, provided the following data.

Table 3. Demographic Analysis

		Frequency	Percent			Frequency	Percent
Gender	Male	91	58.3	Job Level	Executive	39	25.0
	Female	65	41.7		Manager	61	39.1
Age	Below 30	28	17.9	Years of Experience	Senior Manager	32	20.5
	30-39	52	33.3		Director	24	15.4
	40-49	48	30.8		Less than 5	31	19.9
	Above 50	28	17.9		5-10	55	35.3
					11-20	47	30.1
Company Size	Less than 50	47	30.1	Has ESG Policy	Above 20	23	14.7
	50-199	62	39.7				
	200-499	31	19.9		Yes	59	37.8
	Above 500	16	10.3		No	97	62.2

Most respondents are aged between 30 and 49, indicating a mid-career demographic with substantial professional experience. The gender distribution shows male majority, but fair representation of females in management positions. This suggests that gender equality is building up in the logistics industry in Malaysia. Managers form the largest group among respondents, followed by executives and senior managers, reflecting a diverse range of leadership roles. Most respondents have between 5 and 20 years of experience, indicating a well-established workforce in the logistics industry. Most respondents work in small to medium-sized enterprises, consistent with the SME focus of the study. Only 38% of companies currently have an ESG reporting policy, highlighting the need for increased ESG adoption among Malaysian SMEs.

4.2 Suitability of the data to support Construct Validity

To validate construct validity, the suitability of the data was assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity. The Kaiser-Meyer-Olkin (KMO) test measures the proportion of variance among variables that might be common variance. A value greater than 0.60 is required for Exploratory Factor Analysis (EFA). The Bartlett's Test of Sphericity tests the hypothesis that the correlation matrix is an

identity matrix (i.e., variables are unrelated). A significant p-value ($p < 0.05$) is required.

Table 4. KMO & Bartlett's Test

Test	Result
KMO Measure of Sampling Adequacy	0.914 Marvelous
Bartlett's Test of Sphericity (p-value)	<0.001 Significant

The KMO value of 0.914 and a significant Bartlett's Test ($p < 0.001$) confirm that the dataset is highly suitable for factor analysis. The data contains substantial shared variance and is appropriately correlated for EFA.

4.3 Exploratory Factor Analysis (EFA)

The Rotated Factor matrix results show that:

SE (Stakeholder Engagement) items load strongly on **Factor 1** (all > 0.85 , minimal cross-loadings).

CR (Change Readiness) items load strongly on **Factor 2** (> 0.86).

EK (ESG Knowledge) items load strongly on **Factor 3** (> 0.86).

EA (ESG Adoption) items load strongly on **Factor 4** (> 0.85).

RA (Resource Availability) items load strongly on **Factor 5** (> 0.84).

Cross-loadings are minimal, with most items having a single high loading (> 0.7 – 0.8) on their respective factor and very low (< 0.3) loadings elsewhere, which is desirable. Each construct appears to be unidimensional (all items for each construct cluster under the same factor).

4.3 Hypothesis Testing/Multiple Linear Regression

A multiple linear regression analysis was conducted to determine the impact of the four independent variables (ESG Knowledge, Change Readiness, Resource Availability, and Stakeholder Engagement) on the dependent variable (ESG Adoption).

Table 5: Model Summary

Metric	Value	Interpretation
R-squared	0.735	73.5% of the variance in ESG Adoption is explained by the four independent variables
Adjusted R-	0.728	Adjusts for the number of predictors, indicating a strong

squared

model fit

F-statistic 104.9 Indicates the overall model is statistically significant

Prob (F- >0.001 The model is a better fit than an intercept-only-model
statistic)

Table 6: Regression Coefficients

Variable	Coefficient (B)	Std. Error	t-value	p-value	Interpretation
Intercept	0.046	0.165	0.278	0.781	Not Significant
ESG Knowledge	0.203	0.057	3.571	<0.001	Significant Positive Impact
Change Readiness	0.231	0.060	3.86	<0.001	Significant Positive Impact
Resource Availability	0.298	0.063	4.716	<0.001	Significant Positive Impact
Stakeholder Engagement	0.222	0.060	3.712	<0.001	Significant Positive Impact

4.3.1 Interpretation of Regression Results

The multiple regression analysis reveals that all four independent variables have a statistically significant positive impact on ESG Adoption among Malaysian logistics SMEs.

Resource Availability ($B = 0.298$) emerged as the strongest predictor, suggesting that having adequate financial, technological, and human resources is the most critical factor for companies looking to adopt ESG practices.

Change Readiness ($B = 0.231$) is the next most influential factor, highlighting that an organizational culture that embraces change is crucial for successful ESG implementation.

Stakeholder Engagement ($B = 0.222$) and ESG Knowledge ($B = 0.203$) are also highly significant predictors. This indicates that actively involving suppliers, customers, and employees, as well as ensuring they understand ESG principles, are fundamental drivers for adoption.

The high R-squared value of 0.735 confirms that these four barriers collectively provide a strong explanation for the current levels of ESG adoption in the sector.

5. Conclusion

The findings from this study indicate much scope for logistics companies in Malaysia to implement ESG initiatives leading to reporting on a national as well as meet global sustainability expectations. A 5-Year Road Map is explained to ensure smooth implementation for this initiative.

To support Malaysian logistics service providers (LSPs), particularly SMEs, in adopting and sustaining Environmental, Social, and Governance (ESG) reporting practices, a structured five-year implementation roadmap is proposed. This roadmap provides a phased approach aligned with the Simplified ESG Disclosure Guide (SEDG), focusing heavily on the environmental dimension, especially carbon emissions management.

In Year 1, the emphasis should be on assessment and capacity building. The first step is to establish a dedicated ESG committee responsible for steering sustainability initiatives and ensuring top-down accountability. This committee would oversee the initial implementation of baseline carbon accounting, focusing on Scope 1 and Scope 2 emissions as per SEDG E1.2. These include direct emissions from fleet fuel consumption and indirect emissions from electricity use in warehouses. Parallel to this, companies must initiate staff training on ESG fundamentals, including the importance of carbon disclosures, environmental compliance, and reporting procedures. These foundational activities are critical in creating awareness, developing internal competencies, and setting the stage for more advanced sustainability practices in subsequent years.

ADDENDUM (Y1): Establish IFRS S2-aligned governance (Board oversight, management roles), perform climate materiality and boundary scoping, run S1/S2 gap assessment, and build Scope 1–2 baselines with internal controls.

Year 2 marks the beginning of implementation and early reporting. During this phase, logistics firms should conduct energy audits and measure emissions from operational facilities and fleet activity, aligned with SEDG E2.1. Simultaneously, data collection processes for waste generation, water usage, and materials consumption should be initiated, building the data infrastructure needed for comprehensive ESG tracking. By the end of this year, companies should aim to produce their first internal ESG performance report, helping internal stakeholders understand progress and identify areas for improvement.

ADDENDUM (Y2): Produce draft climate disclosures covering Governance, Strategy (including qualitative scenarios), Risk Management, and Metrics & Targets. Stand up limited assurance readiness pack for Scopes 1–2 (policies, procedures, evidence).

Year 3 focuses on supply chain extension, a critical area given the significant impact of upstream and downstream activities on overall emissions. Companies should actively engage with suppliers and partners to obtain Scope 3 emissions data (SEDG E1.5), which includes outsourced transport and material sourcing. ESG key performance indicators (KPIs) should be integrated into procurement processes to ensure that sustainability is embedded throughout the value chain. In addition, firms must begin addressing community and labor-related issues, including human rights practices and workforce diversity, as specified in SEDG-S1.1 to S5.2. This expansion of ESG scope ensures that the company's sustainability approach is not limited to environmental data alone but also addresses key social dimensions.

ADDENDUM (Y3): Extend to IFRS S1 topics via double materiality screen, expand Scope 3 coverage and supplier data contracts, and connect sustainability metrics to financial statement effects (CAPEX, impairments, provisions).

Year 4 is the validation and disclosure phase. Companies should begin working with third-party auditors to validate the ESG data collected over the previous years, enhancing credibility and transparency. This validated data should be compiled into a formal ESG report, which can then be disclosed publicly to stakeholders, including clients, regulators, and investors. Benchmarking performance against industry peers and the United Nations Sustainable Development Goals (SDGs) at this stage provides strategic insight into how the company measures up and where it can further improve.

ADDENDUM (Y4): Under NSRF timelines, prepare for external assurance, align report location/timing with regulator rules, and validate scenario assumptions and target pathways against sector benchmarks.

Finally, Year 5 focuses on optimization and compliance readiness. By this stage, ESG data collection should be automated where possible, using software tools or integrated systems to streamline reporting and reduce manual effort. With a robust ESG infrastructure in place, the company should set clear, measurable carbon reduction targets that align with national climate objectives. This forward-thinking approach not only demonstrates commitment to environmental stewardship but also ensures that the company is prepared for potential

carbon taxation policies expected in 2027 for non-compliant SMEs (Figure 5).

ADDENDUM (Y5): Achieve full IFRS S1 and S2 compliance for the applicable group, automate data

pipelines (fleet telematics, warehouse energy), and institutionalise annual target-setting and board review cycles.

Milestones	Y1	Y2	Y3	Y4	Y5
1.ESG Committee Formation					
2.Stage 1 & 2 Emissions Account					
3.ESG Training					
4.Energy Audit & Emission Tracking					
5.Waste, Water, Material Data					
6.External ESG Support					
7.Stage 3 Emission Engagement					
8. ESG KPIs in Procurement					
9. Social & Labour Reporting					
10. IFRS S1 & S2					
11.Third-party Audit					
12.Public ESG Report					
13.Benchmarking with SDGs					
14.ESG Automation					
15.Carbon Reduction Targets					
16.Carbon Tax Compliance					

Figure 5. Road map for ESG Implementation

This roadmap will enable LSPs to progressively build their ESG capabilities and align with both national priorities and global sustainability expectations, while ensuring business continuity and competitiveness in an increasingly regulated marketplace.

The journey to ESG maturity for Malaysian LSPs, especially SMEs, is complex yet achievable. The adoption of a structured, stakeholder-informed, and environmentally focused reporting framework will not only position LSPs ahead of regulatory mandates but also improve competitiveness and resilience. By embracing ESG now, logistics companies are not just responding to risk, they're driving sustainable transformation.

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