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Sustainability Integrated Valuation Toolkit for SMEs

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Abstract

We present a simple toolkit for sustainability reporting and integrated valuation tailored to Small and Medium Enterprises (SMEs) in Singapore. The toolkit utilises the causality models that map the sustainability-related operational activities to the direct effect on company's financial statements ("financial value") and externalities generated ("impact value"). By systematising sustainability disclosure and impact assessment, our toolkit supports SMEs in progressing along the sustainability journey. The toolkit differs from some existing sustainability assessment frameworks/methods in three key respects. First, it incorporates an SME-oriented sustainability survey designed to streamline the data collection. Upon submission and verification of sustainability-related operational inputs, participating SMEs receive a simple and standardised sustainability statement. Second, it utilises a comprehensive set of financial proxies from the literature, government websites, well-established industry databases, and industry research to establish evidence-based linkages between operational activities and measurable impacts. Third, the integrated value report that incorporates both financial values and impact values of the sustainability drivers can provide managerial insights for SMEs to make better decisions in sustainability initiatives.

Keywords: Sustainability, Integrated Valuation, SME
JEL Classification: M14, Q56

About SGFIN

The Sustainable and Green Finance Institute (SGFIN) is a research institute established by the National University of Singapore (NUS). SGFIN aims to develop deep research capabilities in sustainable and green finance with a focal point on Asia, and to provide thought leadership and shape sustainability outcomes in policymaking across the financial sector and the economy at large. Supported by exceptional domain experts across NUS, SGFIN equips businesses with critical cross-disciplinary knowledge, training, and toolkits to integrate sustainability dynamics into their business strategies and investment decisions to better quantify the environmental and social impacts of their business developments, operations, products, and services. In essence, SGFIN aims to help companies embed sustainability as a key pillar in their business decisions.

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Foreword

In recent years, particularly following the COVID-19 pandemic, a shift has occurred in how corporate success is evaluated by consumers and investors. Traditional accounting metrics such as profit margins and revenue are no longer sufficient to capture the full value created by companies. Instead, corporate value is increasingly linked to a company's impact on the environment and society. As a result, sustainability reporting is no longer merely a compliance exercise but a strategic tool for long-term value creation.

While Small and Medium Enterprises (SMEs) are the backbone of global supply chains, they face significant structural hurdles. There is an underlying "capacity gap", where immediate survival is prioritised over long-term objectives. This is compounded by an "awareness gap", where benefits of implementing sustainable initiatives are left unrecognised due to limited capabilities to understand them.

As such, I am delighted to introduce our whitepaper titled *Sustainability Integrated Valuation Toolkit for SMEs,* which offers a practical and structured approach to capture operational performance and translate it into a unified language of financial and impact values. This paper synthesises three years of rigorous research and collaborative efforts between a dedicated team led by Associate Professor Zhang Weina and industry experts, designed specifically to be accessible for SMEs across different sectors and sizes.

The toolkit is built upon SGFIN's Sustainability Reporting Framework, which identifies the 29 metrics and 79 indicators most material to a Singapore SME's operations, stakeholder relationships, and regulatory environment. Rather than adapting comprehensive international standards designed for large companies, this framework ensures that the disclosure into the integrated valuation is grounded in operational reality and collected from sources that SMEs can easily access.

Building on this foundation, the toolkit provides a financial basis for evaluating sustainability performance by enabling SMEs to quantify the value of externalities associated with their activities and link these to financial outcomes and strategic decision-making. By extending beyond traditional accounting terms, the toolkit allows companies to better articulate their broader value creation, strengthen stakeholder trust, and improve access to sustainable financing. I am convinced this toolkit will serve as a practical roadmap, empowering SMEs in their journey towards more sustainable and resilient business models.

Prof. Sumit Agarwal
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Low Tuck Kwong Distinguished Professor of Finance at NUS Business School
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3 June 2026

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1 The SME Sustainability Landscape in Singapore

As sustainability becomes deeply embedded in the global economy, the expectations placed on businesses are shifting fundamentally. Sustainability performance is increasingly becoming a prerequisite for economic participation at all levels. For Singapore's Small and Medium Enterprises (SMEs), this transition presents both a critical challenge and a strategic necessity. As key nodes in global supply chains and the backbone of the local economy, SMEs face growing pressure from regulators, financiers, and customers to demonstrate their sustainability contributions in a structured and credible way. This shift is requiring smaller companies to adopt more rigorous methods for measuring and communicating their sustainability impact to ensure long-term viability in a resource-constrained world.

This whitepaper introduces the **SGFIN Integrated Valuation Toolkit**, which is designed to support Singapore SMEs in conducting sustainability reporting and understanding how sustainability performance can be monetized systematically into impact values that can be used for strategic decision-making for long-term business resilience.

This chapter describes the current sustainability landscape of Singapore SMEs, outlining their economic contribution and key challenges they face when integrating sustainability initiatives into business operations.

1.1 The Strategic Significance of SMEs in the Sustainability Transition

SMEs are integral to Singapore's economy, representing 99% of enterprises (Ministry of Foreign Affairs, 2025), generating 70% of employment and close to half of the city-state's economic output (Workforce Singapore, 2026). This mirrors the significant contribution of SMEs across OECD countries (OECD, 2022). Given that Singapore is a small city-state with limited endowment of natural resources, innovation and human capital are essential growth drivers, further emphasising the importance of SMEs to its development (Institute of Policy Studies, 2016).

At the same time, as suppliers to larger firms, these SMEs also serve as critical links within regional and global value chains. (Lim, 2025). Many larger anchor companies depend on networks of SME suppliers for inputs, services, and production, meaning that a large portion of broader corporate Scope 3 emissions (i.e., indirect greenhouse gas emissions from the value chain) originate within SME activities, even though these companies are often not directly targeted by regulatory reporting requirements. This makes the sustainability footprint of SMEs disproportionately important: as a whole, SMEs account for more than 40% of Singapore's greenhouse gas (GHG) emissions (Enterprise Singapore, 2025b), reflecting both their direct emissions and contributions toward embedded emissions across wider supply chains.

Singapore's decarbonisation strategy is anchored in its national climate commitments under the Paris Agreement and articulated through policy frameworks such as the Singapore Green Plan 2030. Singapore's GHG emissions were approximately 55.5

$MtCO_2e$ in 2023, with emissions expected to peak around 2028 (EDB, 2025). Under its updated Nationally Determined Contribution (NDC), Singapore aims to reduce emissions to around 45-50 MtCO2e by 2035, before achieving net-zero emissions by 2050 (NCCS, 2022). To support these targets, the government has implemented a progressively rising carbon tax, alongside investments in renewable energy, regional power imports, and energy efficiency improvements (NCCS, 2024). These national-level targets and policy instruments set the broader direction for decarbonisation, but their success will depend significantly on the participation of all segments of the economy.

Given their economic weight and sizable collective sustainability footprint, greening the SME sector is imperative for meeting sustainability targets. As large companies embed sustainability requirements into their supply chains, SMEs that fall behind on sustainability practices (e.g., emissions measurements) risk being left out of key business relationships. In the process, it also undermines broader net-zero ambitions. Engaging SMEs supports resilience, competitiveness and access to finance, ensuring that the green transformation is inclusive and aligned with Singapore's national decarbonisation goals.

1.2 The Business Case for Integrating Sustainability in SMEs

While sustainability investments can appear resource-intensive, a growing body of evidence demonstrates that they are powerful drivers for long-term valuation, creating competitive advantages that far outweigh the initial costs (Oduro & Haylemariam, 2025). From a financial perspective, companies that integrate sustainability into business activities tend to outperform their peers in the stock market (Eccles, Ioannou, & Serafeim, 2014), and reports a stronger link between social and cultural diversity to profitability (McKinsey & Company, 2020). Operationally, these initiatives contribute to higher-than-average labour productivity (Delmas & Pekovic, 2013). Research also indicates that sustainability initiatives enhance brand value and improve employee retention (Morgan Stanley, 2025; Lee, 2017), and boost consumer demand, with sustainable products commanding a price premium (PWC, 2025).

Recognising that these benefits are crucial for national competitiveness, the Singapore government has taken proactive steps to help SMEs overcome initial barriers and capture this value. This commitment is formalised through the Singapore Green Plan 2030 (SG Green Plan, 2025) and backed by substantial financial and capability support. Specifically, S$180 million has been allocated under the Enterprise Sustainability Programme to catalyse SME sustainability adoption across the project lifecycle, from workforce training to product development to certification and financing (Enterprise Singapore, 2025a). Local financial institutions such as DBS, OCBC, and UOB collaborate with Enterprise Singapore to offer sustainability-linked loans, ensuring SMEs have the capital needed to adopt sustainable practices. The National Environment Agency (NEA) also offers further subsidies for adopting energy-efficiency

technologies through its Energy Efficiency Fund (National Environment Agency, 2026a).

1.3 Why SMEs Struggle with Sustainability Adoption

Despite the clear benefits of sustainability and support from government agencies, adoption among SMEs remains limited in terms of participation in sustainability programs and related investments. In Singapore, 75% of SMEs have not yet commenced any sustainability actions (Gprnt, 2025).

For many SMEs, sustainability is still perceived as peripheral rather than core business priorities (United Overseas Bank, 2025), a view shaped by deep-seated structural gaps in awareness and capacity. These underlying challenges prevent many SMEs from implementing concrete and actionable practices.

1.3.1 The Awareness Gap

The primary barrier to the adoption of sustainability practices among Singapore SMEs is a persistent awareness gap, characterised by a limited recognition of sustainability as a credible driver for long-term value. Less than half of SMEs recognise sustainability's key value propositions: market opportunities (47%), reputation gains (39%), and cost reductions (39%) as compelling benefits (Singapore Business Federation, 2021). Fewer still view sustainability as a prerequisite for partnering with MNCs (37%) (United Overseas Bank, 2025). As a result, approximately 80% of SMEs report a lack of clarity on the tangible returns of sustainable initiatives (Gprnt, 2025).

This gap is exacerbated by the fact that strategic decision-making in smaller companies is often concentrated in the hands of a few owners (Ryabota, Volynets, Kravatzky, & Carrington, 2019), who may lack the specialised technical expertise or financial literacy to evaluate sustainability measures (OECD, 2025). As a result, the economic benefits of energy retrofits, such as lower utility bills and extended equipment lifespan, alongside the financial advantages of preferential borrowing rates tied to sustainability performance, and productivity gains from improved indoor environmental quality, often remain unrecognised (OECD, 2021b; IEA, 2015; NTUC Learning Hub; GRI, 2025). Intangible benefits, including brand value and supplier preferences, are also seldom measured or quantified for companies' financial decision-making (OECD, 2022; SMECentre@SMF, 2023). Without a framework to bridge this awareness gap, many Singapore SMEs overlook the material risks of sustainability inaction, which include potential exclusion from international trade (Enterprise Singapore, 2023), and diminished global competitiveness (Ministry of Trade and Industry, 2023).

1.3.2 The Capacity Gap

SMEs typically operate on narrow margins, face restricted access to capital (Gprnt, 2025; United Nations ESCAP, 2024; Yoshino & Taghizadeh-Hesary, 2018), and are often constrained by relatively limited supplier–buyer networks (Gprnt, 2025). The imperative

of day-to-day survival compels many companies to allocate most of their resources to immediate operational priorities, like marketing and cost saving measures to defend market position and stabilise cash flows (Gprnt, 2025). Under these structural constraints, sustainability is frequently deprioritised because its returns are not sufficiently visible: over half of Singapore SMEs find it difficult to justify sustainability due to tight operating margins, and 80% report a lack of clarity on the tangible returns of sustainability initiatives. This short-term orientation also creates an implementation gap, where over 40% cite time and resource constraints as barriers to sustainability initiatives (Gprnt, 2025), and many report that time limitations hinder the measurement and communication of sustainability efforts (SME Climate Hub, 2025). Consistent with this, SMEs often do not allocate resources or expertise to sustainability reporting or initiatives when the benefits are not evident (Gprnt, 2025).

While these survival strategies may stabilise cash flows in the immediate term, they can constrain innovation, undermine long-term value creation, erode brand perception (Jenkins, 2009), and ultimately contribute to unhealthy price competition that suppress profitability within the sector. Human capability constraints compound these challenges: most SMEs lack dedicated sustainability or risk-management personnel, and 75% of SMEs in Singapore report insufficient technical expertise to translate sustainability into actionable plans (Gprnt, 2025). This limits their capability to systematically identify and mitigate sustainability-related risks, ranging from reputational damage to competitive disadvantages, which in turn constrain future revenue growth and long-term resilience.

1.4 The Need for Measurement, Reporting and Integrated Valuation

SMEs are vital to the global transition due to their significant economic presence and their role in supply-chain emissions. In Singapore, these companies are particularly vulnerable to mounting pressure from stringent international sustainability requirements from supply chain partners. Nevertheless, persistent structural barriers continue to impede progress. Beyond existing awareness and capability gaps, a major constraint is the lack of quantifiable returns on sustainable investments. SMEs often hesitate to allocate resources because they do not see the holistic value of sustainability initiatives, reinforcing the view of sustainability as a "cost centre," leading to decision paralysis. This highlights the urgent need for a practical integrated valuation framework that enables SMEs to measure, monetise, and communicate the business value and impact of their sustainability initiatives.

2 Sustainability Reporting and Assessment

To contextualise the need for a new digital sustainability reporting and impact valuation toolkit, it is necessary first to examine the existing reporting landscape. The transition toward a sustainable global economy has led to a fundamental shift in how corporate value is defined and measured. For Singapore SMEs, this shift is increasingly important as sustainability expectations evolve from "nice-to-have" narratives to decision-useful disclosures that influence access to customers, financing, and participation in regional supply chains (United Nations ESCAP, 2024; Singapore Business Federation, 2021).

However, this transition is occurring amid a complex push for standardisation, particularly through the International Sustainability Standards Board (ISSB)'s IFRS S1 and IFRS S2 climate-related disclosures. In practice, reporting remains uneven because collecting, verifying, and disclosing sustainability information is costly and operationally complex, especially for resource-constrained SMEs (Pandiangan, Rajindran, Zhang, & Sulaeman, 2025; United Nations ESCAP, 2024).

This section examines the architect of the sustainability reporting ecosystem for Singapore SMEs, tracing the historical trajectory from voluntary disclosures to regulated global standards. It then distinguishes between reporting frameworks and assessment methodologies, showing how they prioritise different objectives, from financial materiality to real-world impact. Finally, it introduces the SGFIN Integrated Valuation Toolkit, which distils comprehensive reporting standards into a curated set of key sustainability indicators and enables SMEs to transform raw data into decision-useful insights on impact and value creation.

2.1 The Evolution of Sustainability Reporting in Singapore

Sustainability reporting in Asia has evolved from early voluntary participation to a landscape of increasingly stringent mandatory requirements, with Singapore at the forefront of this evolution (Dezan Shira & Associates, 2026; Pandiangan, Rajindran, Zhang, & Sulaeman, 2025). Since the early 2000s, large Singapore companies have voluntarily adopted the Global Reporting Initiative (GRI), which remains the region's most popular framework utilised by the majority of listed issuers. This foundation evolved into mandatory "comply-or-explain" reporting in 2017, followed by the incorporation of the Task Force on Climate-related Financial Disclosures (TCFD) recommendations for climate-related disclosures (SME Sustainability Hub, 2025).

In recent years, we observe a growing momentum toward the consolidation of the fragmented reporting landscape, a shift that extends well beyond the frameworks previously mentioned. The formation of the ISSB emphasises the creation of globally consistent standards, specifically IFRS S1 and S2, to provide decision-useful information for investors (KPMG, 2024; IFRS, 2025). Large Singapore companies are currently transitioning toward this mandatory ISSB-aligned baseline, supported by a starting set of 27 core ESG metrics introduced by the Singapore Exchange (SGX) (SGX, 2026; PwC,

2024). These requirements apply to listed companies since FY2025 and will extend to large non-listed companies by FY2027.

To navigate this complex ecosystem, it is helpful to distinguish between sustainability reporting (SR) and sustainability assessment (SA), and to describe the applicability of established standards, frameworks, and tools in each area for large companies and SMEs, respectively. ***Table 1*** and ***Table 2*** provide a comparative overview of the sustainability themes covered by leading SR frameworks and SA methodologies, respectively, alongside those covered by the SGFIN Integrated Valuation Toolkit.

2.2 Sustainability Reporting (SR) Frameworks

SR frameworks define structured disclosure requirements that specify what the companies must report and how it should be presented. While these frameworks share the common goal of improving transparency, they differ significantly in scope, materiality focus, and the resources required to implement them. It is therefore important to distinguish between frameworks designed for large companies and those suited to SMEs.

Table 1. Comparison of Sustainability Themes Among Sustainability Reporting Tools

		Large Companies			SMEs			
	Theme	**GRI[1]**	**SASB[2]**	**SGX Core[3]**	**OECD[4]**	**VSME[5]**	**ESG-pedia[6]**	**SGFIN SME**
Environmental	GHG Emissions	✓	✓	✓	✓	✓	✓	✓
	Energy	✓	✓	✓	✓	✓	✓	✓
	Water	✓	✓	✓	✓	✓	✓	✓
	Waste	✓	✓	✓	✓	✓	✓	✓
	Biodiversity	✓	✓			✓		✓
Social	Gender Equality	✓	✓	✓	✓	✓	✓	✓
	Age-based Equality	✓	✓	✓			✓	✓
	Occupational Health & Safety	✓	✓	✓	✓	✓	✓	✓
	Development & Training	✓	✓	✓	✓	✓	✓	✓
	Employee Welfare	✓				✓	✓	✓
	Community Engagement	✓	✓				✓	✓
Governance	Board Diversity	✓		✓		✓	✓	✓
	Ethical Behaviour	✓	✓	✓	✓	✓	✓	✓
	Privacy & Security	✓	✓		✓	✓	✓	✓
	Supply Chain Risks	✓	✓				✓	
	Sustainability Governance	✓	✓		✓	✓	✓	✓

(1) GRI Standards: https://www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-english-language/
(2) IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information: https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s1-general-requirements.html/content/dam/ifrs/publications/html-standards-issb/english/2025/issued/issbs1/
IFRS S2 Climate-related Disclosures: https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s2-climate-related-disclosures.html/content/dam/ifrs/publications/html-standards-issb/english/2025/issued/issbs2/
(3) SGX Core ESG Metrics: https://api2.sgx.com/sites/default/files/2023-05/SGX%20Core%20ESG%20Metrics_for%20website%20%28updated%20Apr2023%29.pdf
(4) OECD Guidance Note on fostering convergence in SME sustainability reporting: https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/06/oecd-guidance-note-on-fostering-convergence-in-sme-sustainability-reporting_b1f6af62/d95a25de-en.pdf
(5) EFRAG Voluntary Sustainability Reporting Standard for non-listed SMEs: https://www.efrag.org/sites/default/files/sites/webpublishing/SiteAssets/VSME%20Standard.pdf
(6) ESGpedia: https://esgpedia.io/industry-insights/sustainability-reporting-guide-for-businesses/

2.2.1 Large Companies

Large companies in Singapore operate under stringent regulatory requirements and face growing pressures from investors to provide comprehensive, decision-useful sustainability information. These companies primarily rely on established frameworks like GRI, ISSB, and regional baselines like the SGX Core Metrics.

GRI: GRI remains the most widely adopted SR framework and is particularly dominant in Asia. It adopts a comprehensive "double materiality" approach that captures both the impact of over 30 sustainability issues on the company and the company's impact on society and the environment. A distinctive feature of GRI is its modular, topic-specific standards structure, which allows companies to report flexibly while maintaining compatibility and alignment with global best practices. The reporting platform of the SGFIN Toolkit will cover information on these categories, excluding Supply Chain Risks. This is because SMEs typically operate as suppliers or customers within larger production networks led by anchor companies (Bain, 2024). While SMEs provide important data that helps assess supply chain risk exposure, reporting requirements are generally imposed on anchor companies, with data flows primarily from SMEs to these companies.

ISSB: In contrast to GRI's broad approach, the ISSB (specifically IFRS S1 and IFRS S2) adopts a strictly investor-focused, financial materiality perspective. The ISSB was established to provide globally consistent standards that help investors assess how sustainability-related risks and opportunities affect a company's enterprise value, cash flows, and access to capital. As illustrated in ***Table 1***, ISSB's coverage is highly targeted to GHG Emissions, Energy, Privacy and Security, Supply Chain Risks, and Climate Risk Management. The ISSB prioritises systemic financial risks that materially affect valuations across sectors. For large Singapore companies transitioning to ISSB-aligned reporting (mandatory for listed companies from FY2025), this approach reduces reporting burden while maintaining investor-grade disclosure quality. The reporting platform of the SGFIN Toolkit will cover information on these categories.

SGX Core Metrics: The Singapore Exchange Group (SGX) introduced its 27 Core ESG Metrics as a pragmatic starting baseline for listed companies. It establishes a minimum viable disclosure baseline that aligns with both GRI and ISSB while remaining feasible for companies new to SR. These 27 metrics are clearly defined, quantitative indicators spanning areas such as Scope 1 and 2 emissions, energy usage, employee turnover, gender diversity, and board independence, providing a clear set of decision-useful data points rather than narrative disclosures. They are prescribed with specific measurement units and reporting guidance, requiring companies to disclose on the comply-or-explain basis in a tabular, comparable format to enhance consistency and enable benchmarking across issuers. The reporting platform of the SGFIN Toolkit will cover information on these categories.

UN SDGs: The United Nations Sustainable Development Goals (UN SDGs) are also widely used by large companies as a high-level framework to structure and

communicate sustainability priorities. At the company level, the 17 SDGs are commonly mapped across sustainability and economic pillars, with four goals classified as economic (decent work and economic growth, industry and innovation, responsible consumption and production, and reduced inequalities), four as environmental (climate action, clean water and sanitation, life below water, and life on land), seven as social (no poverty, zero hunger, health, education, gender equality, clean energy, and sustainable cities and communities), and two as governance (peace, justice and strong institutions, and partnerships for the goals). While not a reporting standard, the SDGs serve as a strategic alignment tool, enabling companies to connect their operations and strategy to globally recognised sustainability outcomes rather than prescribing specific disclosure requirements.

2.2.2 SMEs

Large companies are able to navigate exhaustive SR frameworks better than SMEs, which face significant capacity and awareness constraints, as discussed earlier. SME-oriented approaches must selectively prioritise indicators that balance materiality themes with reporting feasibility and relevance.

OECD SME: The OECD Guidance Note for SMEs SR is designed to help public entities and financial institutions establish a proportionate set of core sustainability indicators and metrics that SMEs can realistically collect and disclose, given their resource and capacity constraints. It identifies a core set of commonly used indicators across the ESG dimensions that are most feasible for SMEs to report and most relevant to financial stakeholders' decisions. As a result, more data-intensive or complex topics such as biodiversity impact metrics, detailed employee welfare subdimensions (beyond basic workforce and safety figures), granular community engagement outcomes and board supply chain risk assessments typically fall outside of the core set. The SGFIN reporting framework, on the other hand, requires minimum data inputs in some of these omitted themes to encourage SME awareness and incremental actions without imposing the detailed measurement or reporting burden.

The Voluntary Standard for non-listed SMEs (VSME): Developed by the European Financial Reporting Advisory Group (EFRAG), the VSME was released in 2024 as a proportionate SR standard specifically designed for SMEs that are not publicly listed. Recognising that the full European Sustainability Reporting Standards (ESRS) impose disproportionate compliance burdens on smaller companies, VSME simplifies disclosure requirements to make SR more accessible for smaller companies. It prescribes what SMEs should disclose and how to present it. However, it does not help SMEs interpret their data, benchmark performance against peers, or translate sustainability activities into measurable business value. An SME using VSME can produce a compliant sustainability report but will not know whether its energy consumption is high or low relative to industry norms, or whether its waste reduction efforts justify the upfront costs. The Basic Module focuses on 11 metrics, and the Comprehensive Module covers an additional 9 metrics. The reporting framework of the SGFIN Toolkit will cover information on these categories.

ESGpedia: ESGpedia has established itself as a central digital infrastructure for the Asia-Pacific region, designed to streamline the fragmentation of sustainability data. The platform allows businesses to move away from manual spreadsheet management toward a standardised and digital approach. It facilitates the creation of comprehensive ESG reports aligned with global frameworks (such as GRI and ISO 14064), which can then be seamlessly shared with financial institutions to access sustainability-linked loans and green financing. This digitisation reduces the reporting burden for SMEs and provides the necessary transparency for banks and supply chain partners to verify ESG credentials efficiently.

2.3 Sustainability Assessment (SA) Methodologies

While SR frameworks prescribe what data should be disclosed, SA methodologies evaluate the reported data to generate performance or value signals for stakeholders. Methodologically, these assessments can be generally categorised into risk-based ESG ratings and outcome-based impact valuations.

ESG ratings focus on financial materiality, assessing how external sustainability factors may affect a company's financial performance. These methodologies typically produce a relative score or ranking, benchmarking a company against its industry peers to signal its resilience to long-term disruptions to investors and creditors.

Table 2. Comparison of Sustainability Themes Among Sustainability Assessment Tools

		Large Companies			SMEs	
	Theme	**IWA[1]**	**VBA[3]**	**MSCI[4]**	**Eco-Vadis[5]**	**SGFIN Toolkit**
Environmental	GHG Emissions	✓	✓	✓	✓	✓
	Energy			✓	✓	✓
	Water	✓	✓	✓	✓	✓
	Waste	✓	✓	✓	✓	✓
	Biodiversity		✓	✓	✓	
Social	Gender Equality		✓		✓	✓
	Age-based Equality				✓	✓
	Occupational Health & Safety	✓	✓	✓	✓	✓
	Development & Training		✓		✓	✓
	Employee Welfare	✓	✓	✓	✓	✓
	Community Engagement			✓	✓	✓
Governance	Board Diversity				✓	✓
	Ethical Behaviour			✓	✓	✓
	Privacy & Security			✓	✓	✓
	Supply Chain Risks			✓	✓	
	Sustainability Governance					✓

(1) Impact Accounting Methodology: https://ifvi.org/methodology/
(2) Integrated Valuation Sprint 2024: https://www.gistimpact.com/wpcontent/uploads/2024/06/Impact_Valuation_Sprint_Report_2024_Final-1.pdf
(3) MSCI ESG Ratings Methodology: https://www.msci.com/documents/1296102/34424357/MSCI+ESG+Ratings+Methodology.pdf
(4) EcoVadis Ratings Methodology Overview and Principles: https://resources.ecovadis.com/ecovadis-solution-materials/ecovadis-ratings-methodology-overview-and-principles-2022-neutral

MSCI ESG: As a leading provider for institutional investors, MSCI ESG ratings utilise a rules-based methodology to identify industry leaders and laggards (MSCI, 2024). Their assessment focuses specifically on the intersection of a company's core business and

the industry-specific issues that can create significant financial risks or opportunities. By providing a letter-grade ranking from AAA to CCC, MSCI helps stakeholders understand a company's exposure to ESG risks and its capacity to manage them relative to its global competitors.

EcoVadis: In contrast to pure financial risk models, EcoVadis evaluates the quality of a company's sustainability management system (EcoVadis, 2025). Their methodology assesses performance across four themes, namely Environment, Labour and Human Rights, Ethics, and Sustainable Procurement, based on documented evidence of policies, actions, and results. This provides a performance signal that is widely used by large "anchor companies" to verify the operational sustainability and ethical compliance of their SME suppliers across the global value chain.

While SA methodologies assess how well a company manages its sustainability practices, they stop short of quantifying the actual outcomes those practices generate for society and the environment, a gap that impact-oriented methodologies are designed to fill.

2.4 Impact-oriented Methodologies

Impact-oriented methodologies translate the question of how a company's operations affect its broader environment into a structured and quantifiable framework. Rather than producing a risk score or management rating, they estimate the actual monetary value of a company's sustainability outcomes, both positive and negative. This is grounded in the recognition that impacts currently treated as externalities, such as carbon emissions, public health costs, or community benefits, are increasingly being reflected in financial outcomes through regulatory changes, shifting market preferences, and resource constraints. By expressing these outcomes in monetary terms, impact-oriented methodologies allow sustainable practices to be recognised not merely as risk mitigants but as measurable drivers of long-term business value.

Impact-Weighted Accounts (IWA): The IWA methodology operationalises this perspective by translating environmental and social outcomes into monetary terms that can be viewed alongside traditional financial statements. By valuing externalities such as carbon emissions or the economic benefits of employee upskilling as tangible economic units, IWA demonstrates how a company's broader impact is fundamentally linked to its potential long-term profitability. This allows stakeholders to visualise how the eventual internalisation of these impacts will affect the company's valuation, moving beyond abstract scoring to a concrete measurement of total value creation.

SGFIN Integrated Valuation Toolkit: The SGFIN Toolkit distinguishes itself from traditional assessment models by adopting a primary impact-oriented approach, aligning its methodology with the conceptual framework of IWA rather than risk-centric metrics of mainstream rating agencies. With consideration of themes covered by the SGX

Core Metrics, our toolkit provides a localised and standardised reporting baseline that ensures Singapore SMEs meet regulatory expectations while simultaneously laying the groundwork for sophisticated impact assessment. This transition from narrative disclosure to quantified impact value signals a shift in corporate strategy, encouraging companies to view sustainability not as a compliance burden but as a fundamental driver of future financial resilience.

Technically, the SGFIN Toolkit functions as a seamless, one-stop digital infrastructure that bridges the gap between high-level conceptual frameworks and the operational realities of SMEs. Unlike other theoretical valuation models that can be difficult to operationalise, our toolkit utilises a refined scope of data points directly relevant to SME activities, ensuring the reporting process remains intuitive and accessible. It serves as a dual-purpose engine: the act of fulfilling standard reporting requirements (SR) simultaneously triggers the impact valuation process, achieving both outcomes instantly. The resulting outputs are bifurcated into financial values and impact values, providing a clear distinction between immediate financial impact on firm's profitability and the broader value contribution to the long-term business resilience. By computing these values, our toolkit provides a clear, actionable roadmap for companies to internalise their environmental and social impact.

Table 3. Comparison of Sustainability Themes Among Leading Standards & Rating Methodologies

		Large Companies									SMEs				
		Sustainability Reporting (SR)					Sustainability Assessment (SA)				SR			SA	
	Theme	GRI[1]	ESRS[2]	ISSB[3]	SASB[4]	SGX Core[5]	IWA[6]	UN SDGs[7]	VBA[8]	MSCI[9]	OECD[10]	VSME[11]	ESG-pedia[12]	SGFIN SME	Eco-Vadis[13]
Environmental	GHG Emissions	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
	Energy	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓
	Water	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Waste	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
	Biodiversity	✓	✓		✓				✓	✓		✓		✓	✓
Social	Gender Equality	✓	✓		✓	✓		✓	✓		✓	✓	✓	✓	✓
	Age-based Equality	✓			✓	✓		✓					✓	✓	✓
	Occupational Health & Safety	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
	Development & Training	✓	✓		✓	✓			✓		✓	✓	✓	✓	✓
	Employee Welfare	✓	✓				✓		✓	✓		✓	✓	✓	✓
	Community Engagement	✓	✓		✓			✓		✓			✓	✓	✓
Governance	Board Diversity	✓	✓			✓						✓	✓	✓	✓
	Ethical Behaviour	✓	✓		✓	✓				✓	✓	✓	✓	✓	✓
	Privacy & Security	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓
	Supply Chain Risks	✓	✓	✓	✓					✓			✓		✓
	Sustainability Governance	✓	✓	✓	✓			✓			✓	✓	✓	✓	

(5) GRI Standards: https://www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-english-language/ (Accessed 28 Jan 2026, GRI)
(6) European Union Law: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R2772 (Accessed 28 Jan 2026, EUR-Lex)
(7) IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information: https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s1-general-requirements.html/content/dam/ifrs/publications/html-standards-issb/english/2025/issued/issbs1/ (Accessed 28 Jan 2026, IFRS)
IFRS S2 Climate-related Disclosures: https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s2-climate-related-disclosures.html/content/dam/ifrs/publications/html-standards-issb/english/2025/issued/issbs2/ (Accessed 28 Jan 2026, IFRS)
(8) SASB Standards: https://sasb.ifrs.org/standards/materiality-map/ (Accessed 28 Jan 2026, SASB)
(9) SGX Core ESG Metrics: https://api2.sgx.com/sites/default/files/2023-05/SGX%20Core%20ESG%20Metrics_for%20website%20%28updated%20Apr2023%29.pdf (Accessed 28 Jan 2026, SGX)
(10) Impact Accounting Methodology: https://ifvi.org/methodology/ (Accessed 28 Jan 2026, IFVI)
(11) Sustainable Development Goals: https://sdgs.un.org/goals (Accessed 3 Feb 2026, SDGs UN)
(12) Integrated Valuation Sprint 2024: https://www.gistimpact.com/wp-content/uploads/2024/06/Impact_Valuation_Sprint_Report_2024_Final-1.pdf (Accessed 28 Jan 2026, GIST Impact)
(13) ESG Ratings Methodology: https://www.msci.com/documents/1296102/34424357/MSCI+ESG+Ratings+Methodology.pdf (Accessed 29 Jan 2026, MSCI)
(14) OECD Guidance Note on fostering convergence in SME sustainability reporting: https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/06/oecd-guidance-note-on-fostering-convergence-in-sme-sustainability-reporting_b1f6af62/d95a25de-en.pdf (Accessed 28 Jan 2026, OECD SME and Entrepreneurship Papers OECD SME and Entrepreneurship Papers
(15) EFRAG Voluntary Sustainability Reporting Standard for non-listed SMEs: https://www.efrag.org/sites/default/files/sites/webpublishing/SiteAssets/VSME%20Standard.pdf (Accessed 28 Jan 2026, EFRAG)
(16) ESGpedia: https://esgpedia.io/industry-insights/sustainability-reporting-guide-for-businesses/ (Accessed 3 Mar 2026, ESGpedia)
(17) EcoVadis Ratings Methodology Overview and Principles: https://resources.ecovadis.com/ecovadis-solution-materials/ecovadis-ratings-methodology-overview-and-principles-2022-neutral (Accessed 28 Jan 2026, EcoVadis)

3 SGFIN's Sustainability Reporting

SR typically requires the systematic collection of operational data across ESG dimensions. However, many SMEs face resource and capability constraints in measuring and disclosing such data. SGFIN's toolkit addresses this challenge by defining a set of practical sustainability indicators that can be readily collected across internal departments and drawn from the existing company's data. These indicators are aligned with existing frameworks to ensure consistency, comparability, and alignment with prevailing reporting standards and industry practices.

Our reporting framework comprises **15** sustainability themes, **29** metrics and **79** indicators, organised across the three ESG pillars. It is designed specifically for SMEs operating in Singapore. The framework is intentionally bounded, which is sufficiently comprehensive to satisfy emerging regulatory expectations and investor due diligence, while clear enough to be actionable without dedicated sustainability teams.

Themes: It represents the highest level of the framework, grouping related sustainability disclosures into 15 general areas across the three pillars as shown in

below. These themes, such as carbon emissions, workforce diversity, occupational health and safety, and board diversity, reflect the material issues that are most relevant to Singapore SMEs across their environmental footprint, human resource management, and governance practices. Themes provide the strategic lens through which stakeholders interpret a company's sustainability profile, and they serve as the primary structure for communicating sustainability performance to external audiences such as banks, customers, and investors.

Metrics: Metrics operate at an intermediate level, translating 15 themes into 29 specific categories. A single theme may encompass multiple metrics, for example, the theme of workforce diversity covers employees gender diversity, and age diversity as separate metrics, allowing for more precise tracking and comparison over time. Metrics are the unit of disclosure that most stakeholders will engage with directly, and they are designed to be consistent, comparable, and aligned with the SGX Core ESG Metrics where applicable.

Indicators: Indicators form the most granular level of the framework, comprising 79 data items that feed into the metrics above. Each indicator captures a specific operational measurement, such as total amount of water purchased, number of male/female employees, employee training hours, or the number of workplace harassment cases, which are drawn from records that most SMEs already have, such as payroll systems, utility or electricity bills, and incident logs. Multiple indicators typically are aggregated into a single metric, ensuring that the metric captures the underlying operational activity.

Table 4. Breakdown of SGFIN's SR Themes and Metrics under each ESG Pillar

3 Pillars	15 Themes	29 Metrics
Environmental 5 themes 9 metrics	Carbon Emissions	Scope 1 Carbon Emissions
		Scope 2 Carbon Emissions
	Energy	Fuel Consumption
		Electricity Consumption
		Renewable Energy
		Energy Intensity
	Water	Water Management
	Waste	Waste Management
	Biodiversity	Biodiversity
Social 6 themes 11 metrics	Workforce Diversity	Employee Type
		Employee Gender Diversity
		Employee Age Diversity
	Employee Turnover	Employee Turnover
	Occupational Health & Safety	Workplace Injuries
		Workplace Fatalities
		Misconduct Incidents
	Training & Development	Training & Development
	Employee Welfare	Employee Welfare & Benefits
	Community Engagement	Volunteering
		Satisfaction Surveys
Governance 4 themes 9 metrics	Board Diversity	Board Gender Diversity
		Board Age Diversity
	Ethical Behaviour	Unethical Behaviour
	Privacy & Security	Data Security
	Sustainability Governance	Sustainability Personnel
		Sustainability Reporting
		ESG Rating
		Sustainability Certification
		Emissions Reduction Target

This three-tier data structure is designed to improve the clarity and usability of the SR framework. Sustainability indicators are inherently granular and operation-oriented; a single sustainability concern, such as water consumption, may involve multiple distinct data points across different data types, each carrying its own operational unit. Grouping indicators under a common metric provides stakeholders with a clearer understanding of how individual data items relate to one another, while organising metrics under broader sustainability themes provides the conceptual context that helps management and external stakeholders understand the strategic relevance of each disclosure. The grouping logic draws from the organisational conventions established by well-recognised frameworks, including GRI Standards, the OECD SME sustainability reporting guidance, and the SGX Core ESG Metrics, ensuring that the data structure is familiar and recognisable to stakeholders who already engage with these standards. Our data structure here serves primarily as a tool for interpretation, ensuring that every indicator can be understood both on its own terms and as part of a general ESG narrative.

SMEs face significant resource constraints, including limited staff, budgets, and data infrastructure. Our framework was designed under the principle that reporting should cost less than the value it creates. Every metric included has to be clear and financially material to a typical Singapore SME's operation, and that it can be easily collected. Sustainability metrics requiring complex assessments or Scope 3 supply chain tracking were excluded from our baseline.

International frameworks such as GRI and IFRS S2 are designed for large companies with dedicated sustainability teams and mature reporting infrastructure. Applying them in full to a SME generates compliance fatigue rather than useful implications. Our framework adopts a different approach: instead of selecting a subset of an international standard and scaling it down, it takes a ground-up approach based on what a Singapore SME needs to measure and disclose to manage its ESG risks and meet the expectations of its key stakeholders, such as customers, employees, and financiers. The primary reference point is the SGX Core ESG Metrics, the 27-metric list published by Singapore Exchange and updated in April 2023 (SGX, 2023), which represents a clear benchmark of what Singapore's capital markets and institutional lenders expect to see in a credible sustainability disclosure.

3.1 Environmental Metrics (9 metrics, 26 indicators)

The environmental pillar comprises 26 indicators mapped across 9 metrics, covering the key dimensions of a company's resource consumption and emissions footprint. The metrics span from fuel consumption across stationary and mobile sources, electricity consumption from non-renewable grid supply, renewable energy generation and procurement, energy intensity, Scope 1 and 2 carbon emissions, water withdrawal from multiple source types, waste generation and recycling, to operations at biodiversity-sensitive areas. Together, these metrics capture both the direct environmental impact of day-to-day operations and the company's progress in transitioning toward more resource-efficient and lower-carbon practices. They also provide the foundational data required for emissions targets, energy efficiency improvements, and environmental cost assessments can be built over time.

(1) **Scope 1 Carbon Emissions:** Direct carbon emissions from fuel burned by the company form the source of any credible climate disclosure. For Singapore SMEs operating vehicle fleets, generators, or fuel-dependent equipment, Scope 1 emissions are often the largest and most controllable portion of their carbon footprint. Understanding the emission amount is the prerequisite for managing and eventually reducing it. Furthermore, as Singapore's carbon tax continues to rise toward S$50 to S$80 per tonne of CO2e by 2030 (NEA, 2024), the financial incentive to act will only grow stronger. There are two indicators under this metric, including direct emissions from stationary fuel combustion and direct emissions from mobile fuel combustion.

(2) **Scope 2 Carbon Emissions:** Scope 2 emissions capture the indirect carbon emissions impact of purchased electricity. In Singapore, the national grid emission factor is published annually by the Energy Market Authority, and stood at 0.402 kgCO2/kWh in 2024, making Scope 2 calculations straightforward for

most SMEs from existing electricity bills (EMA, 2025). Together with Scope 1, these two figures represent the company's total direct carbon footprint and form the core of environmental disclosure expected by investors, financiers, and large-enterprise customers. This metric is represented by two indicators capturing indirect emissions from purchased electricity calculated on a location-based basis and market-based basis separately.

(3) **Fuel Consumption:** Fuel consumption is tracked separately by source, distinguishing stationary combustion, mobile diesel, and mobile petrol. This granularity matters because the levers for reducing each are different, and because fuel costs are directly tied to operational expenditure in a way that makes this metric useful for management, not just reporting. For SMEs with vehicle fleets or fuel-dependent operations, this is often where the most significant environmental exposure lies. Three indicators are fed into this metric, capturing fuel consumed from stationary combustion and mobile sources, respectively.

(4) **Electricity Consumption:** Grid electricity consumed across all operations is a metric most SMEs can access from existing utility records. It captures the energy cost of running facilities, equipment, and office space, and forms the basis for both Scope 2 emissions calculations and energy intensity ratios. Separating electricity from fuel consumption gives companies a clearer picture of where their energy use is concentrated and where efficiency gains are most achievable. One indicator is recorded under this metric: non-renewable electricity consumption.

(5) **Renewable Energy:** Tracking renewable energy separately from total electricity consumption captures the company's progress in transitioning away from fossil fuel dependence. This includes renewable energy generated on-site, sold, or procured through renewable energy certificates (RECs). Its inclusion signals awareness of renewable generation as a future option and creates a ready disclosure item as on-site energy generation becomes more accessible and financially attractive in Singapore, where the government targets at least 2 GWp of solar energy deployment by 2030 under the SG Green Plan (Singapore Green Plan 2030, 2026). Four indicators are tracked under this metric, spanning from renewable energy generated on-site, renewable energy procured through power purchase agreements (PPA), RECs purchased, to RECs sold.

(6) **Energy Intensity**: Total energy consumed across all fuel and electricity sources per unit of sales, expressed as a ratio to normalise the energy consumption of the business against its activities, which is recorded under on indicator.

(7) **Water Management:** Total water consumed across all operations is material for SMEs in water-intensive sectors such as food and beverage, manufacturing, hospitality, and healthcare, where water is a direct operational input and cost. For others, low values may indicate that water is not a material risk for that business. Seven indicators are reported under this metric, distinguishing between third-party water, surface water, groundwater, seawater and produced water, which makes up total water withdrawn. Water discharge is also recorded to calculate the total water consumption, expressed as water withdrawn minus water discharge. Aside from water consumption, recycled water across all company operations is also considered.

(8) **Waste Management:** Waste generated are broken down into hazardous and non-hazardous streams, waste disposed of, and waste recycled. Waste management can affect profitability and reflect operational efficiencies. For businesses with physical operations, tracking waste often reveals opportunities to reduce procurement costs or improve disposal practices, in line with Singapore's Zero Waste Masterplan, which targets a 30% reduction in waste sent to landfill per capita per day by 2030 (Singapore Green Plan 2030, 2026). This metric is drawn from six indicators, tracking hazardous and non-hazardous waste generated, disposed of, and recycled.

(9) **Biodiversity:** This metric is captured as a single binary indicator: whether the organisation operates in or adjacent to biodiversity-sensitive areas. This is unlikely to be material for the SMEs operating in urban commercial or industrial settings in Singapore. For the minority operating near nature reserves, coastal areas, or in sectors such as agriculture or aquaculture, it is a material risk factor that warrants disclosure. A single binary indicator is used here, recording whether the company conducts any operations in or adjacent to biodiversity-sensitive areas.

3.2 Social Metrics (11 metrics, 33 indicators)

The social pillar captures how a company manages its human capital, comprising 33 indicators mapped across 11 reporting metrics and covering the key dimensions of workforce management and community engagement. Talent attraction, retention, safety, and development are not abstract sustainability concerns but core business management challenges in one of the world's most competitive labour markets. These 11 metrics are designed to give management a structured and clear picture of how the company manages its employees, and how that management translates into business performance and organisational resilience. Many of these metrics also reflect the evolving regulatory landscape in Singapore, where recent developments, including the Workplace Fairness Act, the Tripartite Guidelines on Flexible Work Arrangement Requests, and the ongoing national emphasis on workforce skills development, are progressively raising the baseline of what responsible employment practice looks like for companies in Singapore.

(10) **Employee Type:** This metric captures the structural composition of the company's workforce, including headcount and employment type. Two indicators are captured under this metric: the number of full-time employees and the number of part-time employees for each reporting year.

(11) **Employee Turnover:** Employee turnover rate is a financially material social metric for SMEs. The cost of replacing an employee, includes recruitment, onboarding, and lost productivity. Disaggregating turnover by gender enables the identification of retention patterns across demographic groups. Six indicators fall under this metric, including the number of new full-time hires by gender, the number of full-time employees who departed by gender, and the turnover rate by gender during the reporting period.

(12) **Employee Age Diversity:** Employee age diversity provides insight into workforce sustainability and succession risk. In SMEs, where institutional knowledge and client relationships are often concentrated among a limited number of

employees, an imbalanced age distribution may create operational vulnerabilities. Tracking age distribution gives management early visibility into this gap. Three indicators are reported here, segmenting the workforce into young employees aged under 30, medium-aged employees between 30 and 50, and senior employees aged above 50.

(13) **Employee Gender Diversity:** Employee gender diversity reflects both regulatory requirement and evolving market expectations. While gender pay gap reporting is not yet mandatory for private companies in Singapore, policy direction increasingly emphasises transparency and fair employment practices, as reflected in SGX Core ESG Metrics (SGX, 2023). This metric includes three indicators: the number of male employees, the number of female employees, and the company's gender pay gap.

(14) **Training & Development:** Training & development reflect a company's investment in human capital and long-term capability building. Tracking total training hours and the number of employees trained helps assess whether development opportunities are being extended equitably across the workforce or remain limited to certain employees. In Singapore's skills-labour driven economy, where SkillsFuture is a national policy priority, workforce development is both a strategic imperative and an area of meaningful government co-funding support (MySkillsfuture, 2026). For SMEs, this metric also provides insight on how the organisation is leveraging the government co-funding and training support programmes. This metric includes three indicators: total training hours, total training expenditure, and number of employees trained.

(15) **Workplace Injuries:** Workplace injuries fall under occupational health and safety, which is a fundamental employer obligation and a direct financial risk. Such injuries disrupt operations, generate liability, and damage morale in ways that affect the whole company. Tracking work-related injuries gives management a reliable, ongoing measure of workplace safety performance, where consistent improvement or a zero injury represents one credible signal of a safe corporate culture. Ministry of Manpower enforcement activity underscores how seriously Singapore takes this issue. A single targeted inspection exercise across 514 workplaces between April and June 2025 uncovered 1,263 unsafe conditions, resulting in S$230,100 in fines and three stop-work orders (Straits Times, 2025). For SMEs specifically, the financial and operational cost of a stop-work order or injury claim can be disproportionately severe relative to the size of the business. This metric is captured through a single indicator recording the total number of work-related injuries during the reporting period.

(16) **Workplace Fatalities:** Workplace fatalities represent the most severe form of safety risk, with significant legal, financial, and reputational consequences. Singapore's overall workplace fatal injury rate has been improving, with its annualised workplace fatal injury rate falling to 0.92 per 100,000 workers in the first half of 2025, down from 1.0 in the same period of 2024 (NTUC, 2025). Every fatality represents an irreversible outcome for the individual and a serious governance failure for the company. Transparent reporting of this indicator, whether zero or otherwise, demonstrates accountability and commitment to employee welfare. This metric is captured through a single indicator recording the total number of work-related fatalities during the reporting period.

(17) **Misconduct Incidents:** This metric contains harassment, discrimination, and policy violations, which are low-frequency but high-impact events for a small organisation. The Workplace Fairness Act, passed on 8 January 2025, legally prohibits discrimination based on characteristics including age, nationality, sex, race, disability, and caregiving responsibilities across all stages of employment, and requires employers to implement clear grievance-handling procedures (Ministry of Manpower, 2025). For SMEs to have a documented process for recording and resolving misconduct incidents is not just a good practice, but a legal obligation. Tracking these incidents and being able to report zero incidents signals that the organisation has the structure in place to identify and address problems if they arise. Two indicators are tracked here, covering the number of company policy violations and workplace harassment cases.

(18) **Employee Welfare & Benefits:** Employee welfare and benefits, including leave entitlements and flexible working arrangements, are increasingly important determinants of talent attraction and retention. In Singapore, this has been formalised at the policy level: from 1 December 2024, all employers must fairly consider formal requests from employees for flexible work arrangements under the mandatory Tripartite Guidelines on Flexible Work Arrangement Requests (MOM, Tripartite Guidelines on Flexible Work Arrangement Requests, 2024a). This applies to all employers, including SMEs, covering flexi-place, flexitime, and flexi-load arrangements. For SMEs that cannot always match the base salaries offered by large enterprises, a clearly communicated and genuinely flexible benefits package is where the employer may win or lose in a highly competitive hiring market like Singapore. Disclosing these policies makes it visible for SME to highlight its competitive advantage. Six indicators come under this metric, documenting the entitlements offered across annual leave, family care leave, childcare leave, training and education leave, volunteer leave and work from home arrangements.

(19) **Corporate Volunteering:** Volunteering activities reflect both corporate social engagement and employee participation. An organisation that offers volunteering leave but sees little actual take-up may be signalling a gap between its stated values and its workplace culture, and our reporting framework makes that gap visible. In Singapore, corporate volunteering is actively encouraged at the policy level. The Corporate Volunteer Scheme allows businesses to claim a 250% tax deduction on qualifying expenditure when employees volunteer with Institutions of a Public Character (IRAS, 2024). For SMEs, this makes structured volunteering not only a community contribution but a financially sensible one, demonstrating concrete volunteering activity rather than just a stated commitment. This can also create real value in talent attraction, as purpose-driven work is an increasingly important factor for employees when choosing and staying with an employer. This metric includes four indicators: paid volunteering hours, number of employees participating in paid volunteering, non-paid volunteering hours, and participation in non-paid volunteering.

(20) **Satisfaction Surveys:** This reflects engagement with both consumers and employees, captured in the form of binary yes/no disclosures. The metric does not require publication of results, only acknowledgement of whether the organisation systematically seeks feedback. Two indicators are recorded here,

whether the company conducts customer satisfaction surveys and whether it conducts employee satisfaction surveys.

3.3 Governance Metrics (9 metrics, 20 indicators)

The governance pillar comprises 20 indicators across 9 metrics, covering the leadership structures, behaviours, and commitments that determine whether a company's ESG efforts are credible and sustained over time. These metrics range from who sits on the board and how they are composed, to how the company responds when things go wrong, how it protects the data it holds, to whether it has made public commitments on climate.

(21) **Board Gender Diversity:** Board gender diversity is an important dimension of governance quality, as a lack of diversity may constrain the breadth of perspectives available for effective risk oversight and strategic decision-making. In Singapore, the Council for Board Diversity (established by the Ministry of Social and Family Development in 2019) has set a progressive triple-tier target of 20% women on boards by 2020, 25% by 2025, and 30% by 2030 for the top 100 SGX-listed companies. As of mid-2025, the top 100 SGX-listed companies reached 25.3% women on boards, achieving their 25% milestone ahead of schedule (CBD, 2025). For SMEs with formal board structures, disclosing board gender composition demonstrates that diversity is treated as a governance quality. This metric is recorded through two indicators: the number of board members by gender.

(22) **Board Age Diversity:** Board age diversity contributes to balanced decision-making by reducing the herding tendency and avoiding behavioural bias due to homogenous group composition. Tracking board age diversity encourages companies to reflect on whether their governance structure brings a balanced decision-making process. This metric is measured through three indicators capturing the age diversity profile of board members, which are those below 30 years old, 30 to 50 years old, and 50 years old and above.

(23) **Unethical Behaviour:** Unethical behaviour, including fraud, bribery, conflicts of interest, and legal penalties, represents a significant governance and financial risk for SMEs. Such incidents not only result in direct financial losses but may also undermine organisational trust, disrupt operations, and damage external relationships. Three indicators are recorded in this metric, documenting the occurrence of fraud and corruption, bribery, conflicts of interest, and legal penalties during the reporting period.

(24) **Data Security:** Data security represents a critical operational and governance risk for companies handling customer, employee, or partner information. Singapore's Personal Data Protection Act (PDPA) imposes significant financial consequences for companies that fail to protect personal data. Penalties can reach up to 10% of a company's annual turnover in Singapore, or S$1 million, whichever is higher (PDPA, 2020). In May 2024 alone, Singapore's data protection regulator imposed a total of S$102,000 in regulatory fines across three companies for breaches of the protection obligation (Privacy World, 2024). Regulatory enforcement has been increasing, reflecting heightened scrutiny of data protection practices. SMEs, which are often more vulnerable to cyber threats due

to limited resources, face disproportionate exposure to such risks. This metric includes two indicators: the number of cyber-attacks and privacy breaches.

(25) **Emissions Reduction Target:** The disclosure of emissions data without forward-looking commitments provides an incomplete representation of climate risk management. Setting and publishing a target, whether an absolute reduction in tonnes of CO2e, a percentage reduction goal, or a net-zero commitment, signals that the company treats its carbon footprint as something to be actively managed over time rather than merely measured. Singapore has set a national commitment to achieve net zero emissions by 2050 under the SG Green Plan 2030, with the carbon tax scheduled to reach S$50 - 80 per tonne of CO2e by 2030, up from S$45 per tonne in 2026 (NEA, Carbon Tax, 2019). These trends will progressively increase the cost of inaction for all businesses across the supply chain, not just those directly liable for the carbon tax. A SME that sets and discloses an emissions target is not just aligning with national strategy, but also demonstrating to customers, financiers, and partners that it is managing the climate risk that will become more material over time. This metric contains five indicators, capturing whether the company has set an absolute emissions reduction target or a percentage reduction target, along with the base year and target year for its Scope 1 and 2 emissions, and a net-zero commitment.

(26) **Sustainability Report:** A sustainability report is a structured disclosure document through which a company communicates its ESG performance, commitments, and progress to external stakeholders. In Singapore, the impetus to report is growing steadily: SGX-listed companies have been subject to mandatory climate reporting requirements since 2025, and this expectation is progressively extending down the supply chain to their SME suppliers and partners (Acra, 2023). For SMEs, producing even a basic sustainability report signals that ESG data is being actively managed rather than merely collected, and positions the company credibly when engaging with banks, large enterprise customers, or government procurement processes. EnterpriseSG's Enterprise Sustainability Programme provides co-funding and structured support to help SMEs develop this capability (EnterpriseSG, 2025). This metric is captured through a single binary indicator recording whether the company has published a sustainability report for the reporting period.

(27) **Sustainability Personnel:** The presence of dedicated sustainability personnel reflects the extent to which sustainability responsibilities are institutionalised within a company's governance structure. Singapore's Enterprise Sustainability Programme by EnterpriseSG, which the government introduced specifically to help SMEs build sustainability capabilities, creating an opportunity for SMEs to access to practical support and co-funding (EnterpriseSG, 2025). As such, the presence of sustainability personnel has both governance and operational implications. This metric includes three indicators capturing whether the company has appointed a chief sustainability officer, established a sustainability committee, or employed dedicated sustainability professionals.

(28) **ESG Rating:** Third-party ESG ratings provide external validation of a company's sustainability performance based on established methodologies. These ratings serve as a concise and comparable signal for stakeholders, particularly financial institutions and large corporate customers. MAS's Environmental Risk

Management Guidelines have encouraged Singapore banks to collect and assess ESG data from their borrowers, making a formal ESG rating an increasingly useful credential for SMEs seeking green financing or sustainability-linked loans (MAS, 2026). It also requires banks to assess each customer's environmental risk as part of their credit and capital markets transaction process and explicitly note that banks may refer to external ratings on environmental performance as part of this assessment. For SMEs seeking credit facilities or financing, having a formal ESG rating simplifies and strengthens this process. It provides the bank with an independently validated data point rather than requiring a bespoke assessment from scratch. Over time, as green financing becomes more accessible and more competitively priced for well-rated borrowers, maintaining an up-to-date ESG rating benefits SMEs. This metric is captured through a single indicator recording the rating agency and the corresponding ESG rating score assigned to the company.

(29) **Sustainability Certification:** Sustainability certifications provide sector-specific external validation that an organisation's practices meet defined standards. Unlike ESG ratings, which assess overall performance, certifications validate specific systems or processes. Disclosure of certifications offers stakeholders a concrete indication of verified sustainability practices. This metric includes one indicator capturing the type and number of sustainability certifications held by the company.

The 29 metrics presented in this section form a clear and well-defined set of disclosures, designed to cover what is financially material for Singapore SMEs without imposing too much reporting burden of international standards like GRI. Spanning the ESG pillars, these metrics address the key areas where SMEs face real operational risk, stakeholder scrutiny, and regulatory exposure in Singapore context. Each metric reflects a disclosure that a company's customers, banks, employees, or regulators are either already requesting or are likely to require in the future.

For each metric, the corresponding indicators, data descriptions, measurement units, framework alignment, and recommended data sources are set out in full in ***Appendix A***, providing companies with the practical guidance needed to begin data collection without requiring external sustainability expertise. In the appendix, we list out all 79 indicators captured in our framework, structured by themes and metrics under three ESG pillars. For each indicator, the table specifies the definition of what is being measured, the unit of measurement, the corresponding international framework alignment, and the recommended data sources that SMEs can draw from in practice. The last column is particularly important because it identifies the specific documents and records, such as fuel invoices, electricity bills, and equipment meter readings, that serve as the basis for each data disclosure. The appendix table bridges the gap between reporting requirements and operational implementation, giving SMEs a clear and actionable starting point for data collection without requiring specialised sustainability expertise.

4 SGFIN's Integrated Valuation Toolkit

This section introduces SGFIN's Integrated Valuation Toolkit, a methodological framework that defines the concept of "integrated value" as the combination of traditional financial performance and the monetised value of sustainability-related impacts through two complementary components: Financial Value (FV) and Impact Value (IV).

The toolkit applies integrated valuation to 21 of the 29 metrics in the reporting framework, covering the ESG pillars. The remaining 7 metrics, while important for disclosure purposes, currently lack sufficiently robust and applicable financial proxies for monetisation and are therefore presented as qualitative disclosures. Each monetised metric is assigned with a financial proxy that converts the underlying operational data into a dollar value, allowing the reporting company to see the tangible value implications of its sustainability performance across all three pillars.

4.1 Motivation

Sustainability reporting (SR) is often perceived by large companies and SMEs as a compliance obligation, a cost centre that consumes time and resources without a clear return. Unlike financial reports, which express all activities in a common monetary unit, sustainability reports present data across disparate physical units, tonnes and cubic metres. The absence of a common measurement makes it difficult for stakeholders to aggregate or interpret in a unified analytical framework. However, behind every sustainability metric lies a value implication: energy consumed has a cost, a workplace injury generates expense, a diverse workforce increases productivity, and a data breach erodes revenue. The SGFIN Integrated Valuation Toolkit is designed to bridge the gap between traditional SR and a comprehensive assessment of sustainability impact by providing a structured way to reveal the integrated value embedded in sustainability indicators, enabling companies to translate sustainability data into monetary values that reflect holistic contributions to both business and society.

Together, these valuations produce a consolidated integrated value report in dollar terms, structured to mirror the logic of a profit and loss statement. This allows SME leadership and other relevant stakeholders to see sustainability performance not as a separate exercise, but as a set of activities that directly affect the company's financial performance in both short-term and medium to long term. By connecting each sustainability metric to a measurable financial outcome, the toolkit makes the case that sustainability is not a cost to be minimised but a source of value to be managed, and that the value implication of sustainability performance, whether positive or negative, belong in the same conversation as any other business result.

4.2 Definition of Integrated Value

Integrated value combines traditional financial performance and monetised value of sustainability-related impacts to provide a more comprehensive perspective on a company's value creation. In SGFIN's Integrated Valuation Toolkit, integrated value consists of two complementary components: Financial Value and Impact Value.

Financial value (FV): It refers to the direct and economically traceable influence of companies' sustainability initiatives on the reporting entity's financial performance. These initiatives are embedded in the company's operational and business activities, directly affecting revenues, operating costs, asset values, or expenditures.

Wherever possible, company-specific financial data are collected directly from the reporting entity, including annual electricity bills, water bills, energy expenditures, and other relevant operating cost information. In cases where complete billing information is not available, financial proxies are used. Financial proxies used in the calculation of FV are sourced from government databases, regulatory frameworks, and company-level financial data to capture the direct financial effects of sustainability-related operational activities. Policy instruments and regulatory benchmarks, such as electricity and water tariffs, carbon pricing mechanisms, fuel taxes, and other compliance-related costs, form the core external reference points for FV valuation.

Impact Value (IV): It captures sustainability-related value that does not immediately appear in financial statement as line items but influences the company's financial outcomes through indirect, intermediate, or long-term channels. These values often operate through human capital development, organisational effectiveness, innovation capacity, and reputation. Empirical research has shown that factors such as workforce diversity, employee training, health and safety practices are associated with productivity improvements, and financial performance metrics, including return on assets over time.

Financial proxies used to value the IV are primarily sourced from academic literature, as well as industry and professional reports that provide empirical evidence on the relationship between sustainability practices and value creation.

The Integrated Valuation Toolkit applies a structured, accounting-based workflow to transform sustainability data into a unified language readily understood. Similar to traditional financial accounting, the methodology records granular data into standardised accounts and aggregates them through defined valuation rules.

Appendix B provides a full reference table of all proxies used in the integrated valuation, detailing the source, country of application, proxy type, and publication year for each valuation input.

4.3 Logic Models for SGFIN's Integrated Valuation Toolkit

This sub-section outlines the metrics monetised under our integrated valuation methodology, detailing the calculation approach, data requirements, and the

impacts each metric is intended to capture. For each metric, both FV and IV are specified, together with a logic chain that defines inputs, activities, outputs, and outcomes leading to the quantified impacts associated with each sustainability indicator.

Only the indicators that can be credibly linked to monetised financial and impact values are selected in our methodology and listed below. It should be noted that certain indicators, such as fuel and electricity consumption, and misconduct incidents, are financial costs to the company and are captured as primary data inputs that feed into the FV calculation directly, rather than indirect monetised impact metrics.

As integrated valuation methodologies and data availability continue to evolve, we expect this universe of indicators to expand over time.

4.3.1 Carbon Emissions

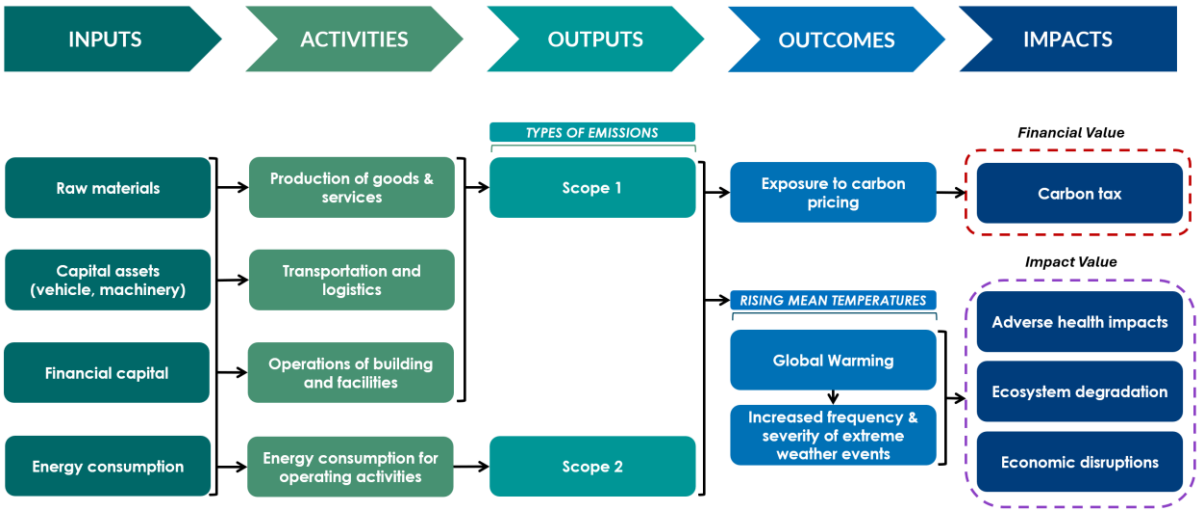
Carbon emissions represent the carbon footprint left by a company's operational engine. The logic model illustrated in **Figure 1**Figure 1 traces the footprint through a clear value chain, starting with business inputs (e.g., raw materials and energy) and activities (e.g., manufacturing and logistics) that generate measurable outputs.

Central to this are two primary categories of carbon emissions:

- **Scope 1:** These are direct emissions from sources the company owns or controls, such as fuel burnt by its vehicles and facilities.
- **Scope 2:** These cover indirect emissions from the generation of purchased electricity.

While **Scope 3** emissions, which cover the broader value chain, are a significant part of the environmental footprint, they are excluded here to focus on the SME's direct operational control. Capturing an SME's Scope 1 and Scope 2 carbon emission impacts is therefore a strategic necessity, as the SME's operational carbon footprint effectively defines the Scope 3 impact that their larger corporate partners are required to account for.

Figure 1. Logic Model for Carbon Emissions



Financial Value

These emissions are exposed to carbon pricing and regulatory compliance costs, which may be borne by the emitting entities themselves or passed through along the supply chain. Such costs typically arise through two policy mechanisms. First, carbon taxes directly levy a price per unit of emissions generated. Second, emissions trading schemes (ETS) establish an economy-wide emissions cap and allocate tradable allowances, which companies can buy or sell to meet their compliance obligations. Both compliance mechanisms imply a direct financial cost of carbon, typically expressed in dollars per tCO_2e. While the specific cost varies across jurisdictions, it generally increases over time as climate policies tighten.

In Singapore, the carbon tax rate is set at S$45/$tCO_2e$ in 2026, up from S$5/$tCO_2e$ when it was first introduced in 2019 (NCCS, 2025). Hence, higher emissions translate into higher compliance costs, either through tax liabilities or the need to purchase additional emissions allowances. Conversely, emissions reductions generate tangible cost savings by lowering future tax payments or freeing up tradable allowances. The calculation is as follows:

$$FV_{Scope\ 1,2} = Total\ Scope\ 1,2\ Emissions\ (tCO_2e) \times Carbon\ Tax\ (\$/tCO_2e)$$

Both scope 1 and 2 emissions can be obtained from companies' sustainability report, where disclosed. Alternatively, they can be estimated using the energy consumption data derived from companies' energy bills, multiplied by specific emission factors. Financial impacts (FI) are then calculated by applying Singapore carbon tax rates to the calculated emissions.

The carbon tax included in financial value (FV) represents an expected future liability rather than a current operational cost. While SMEs are not presently subject to direct carbon taxation on Scope 1 and 2 emissions in most jurisdictions including Singapore, this metric serves as a "shadow price" to help companies quantify future regulatory risks that could phase in when the emissions volume turns significant.

Impact Value

The social cost of carbon (SCC) is a monetary estimate of the incremental global damages associated with emitting one additional tonne of carbon dioxide in a given year. It represents the present value of the stream of future economic, health, environmental, and infrastructure damages caused by that marginal emission. SCC estimates are derived using integrated assessment models, which combine climate science, economic growth projections, and damage functions to simulate how emissions affect temperatures and how temperature changes translate into economic and societal costs.

In practical terms, the SCC converts climate externalities such as property damage from extreme weather, reduced agricultural productivity, human health impacts, ecosystem degradation, and energy system disruptions, into a monetary value (Stern, 2007). This enables policymakers and companies to incorporate the broader social damages of carbon emissions into economic decision-making, facilitating a more comprehensive assessment of the true costs of emissions across the value chain.

A key methodological feature of SCC estimation is the discount rate, which determines how future climate damages are valued relative to present-day costs. Because climate impacts unfold over long-time horizons, the discount rate significantly influences SCC estimates. Integrated assessment modelling typically links the discount rate to macroeconomic fundamentals, including expected long-run consumption growth, intergenerational equity considerations, and society's degree of risk aversion to uncertain future damages. In practice, many policy analyses adopt discount rates between 2% and 3%, reflecting assumptions about long-term economic growth and social time preference (Nordhaus, 2017).

Using this framework, the US Environmental Protection Agency (EPA) provides widely cited benchmark estimates for the SCC based on the methodology of the US interagency Working Group using updated climate science and economic damage functions. These estimates suggest a value ranging approximately from US$ 120 to US$ 340 per tCO_2e for 2025, depending on model assumptions and discount rates (US EPA, 2023).

More recent research has sought to improve these estimates by refining how climate damages are measured. Earlier integrated assessment models typically relied on stylised damage functions that approximated how economic output responds to rising temperatures. By contrast, newer work associated with Michael Greenstone and collaborators at the Climate Impact Lab incorporates empirical estimates of climate impacts derived from large historical datasets linking weather outcomes to economic and social indicators, including mortality, labour productivity, agricultural yields, and energy demand. These empirically estimated relationships are subsequently integrated into economic modelling frameworks to reassess the overall damages associated with climate change. Using this approach, recent analyses suggest a social cost of carbon of approximately US$ 225 per tonne, indicating that climate

damages, particularly in already warm regions, may be larger than earlier modelling exercises implied (Eco-Business, 2024).

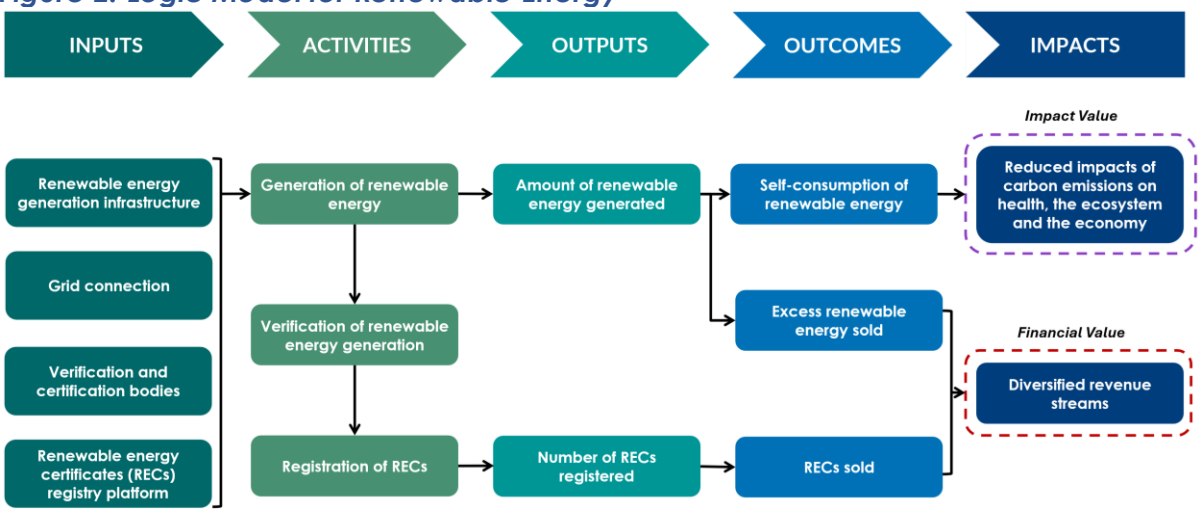
$$IV_{Scope\ 1,2} = Total\ Scope\ 1,2\ Emissions\ (tCO_2e) \times [Social\ Cost\ of\ Carbon\ (\$/tCO_2e) - Carbon\ Tax\ (\$/tCO_2e)]$$

The integrated value of Scope 1 and 2 emissions, calculated as the product of total greenhouse gas emissions and social cost of carbon, reflects all externalities of carbon emissions. To calculate the externalities that have not been internalised as the company's financial impact, or "impact value" as defined in this whitepaper, we need to subtract the unit carbon tax rate from the social cost of carbon.

4.3.2 Renewable Energy

Renewable energy represents another significant strategic input that companies are increasingly adopting to reduce their environmental footprints and demonstrate commitment to sustainability. As illustrated in **Figure 2,** companies establish renewable energy generation infrastructure, supported by grid connectivity to enable both consumption and distribution of the energy produced. They may also engage accredited verification and certification bodies, including the registration of Renewable Energy Certificates (RECs).

Figure 2. Logic Model for Renewable Energy



Financial Value

In cases where renewable energy generation capacity exceeds the internal demand, the company can consider on-site Power Purchase Agreements (PPAs) to sell off its excess renewable energy. A PPA establishes a contractual arrangement between the energy-generating company and a buyer, governing the terms of supply, including price, volume, and duration, typically over a period of 10 to 20 years. By securing offtake commitments through PPAs, companies are able to convert surplus generation into an additional revenue stream. In Singapore, the PPA electricity rate is approximately 20% to 50% below prevailing electricity tariffs (Union Energy, 2026), with most arrangements reporting a discount of around 20%. Beyond the physical sale of surplus electricity through PPAs, companies can also independently monetise their

Renewable Energy Certificates (RECs). A REC is a market-based instrument that serves as verified proof that one megawatt-hour (MWh) of electricity was generated from a renewable energy source. Unlike the physical electricity sold under a PPA, RECs can be sold separately to other companies seeking to substantiate their own renewable energy claims or meet SR requirements. Together, PPAs and RECs represent two complementary but distinct mechanisms through which companies can derive financial value.

$$FV_{PPA} = Surplus\ Renewable\ Energy\ Sold(kWh) \times PPA\ Electricity\ Rate\ (\$/kWh)$$

$$FV_{REC} = Number\ of\ RECs\ sold \times REC\ Market\ Price\ (\$)$$

Note that each REC = 1 MWh of renewable energy generated from a renewable energy source.

Impact Value

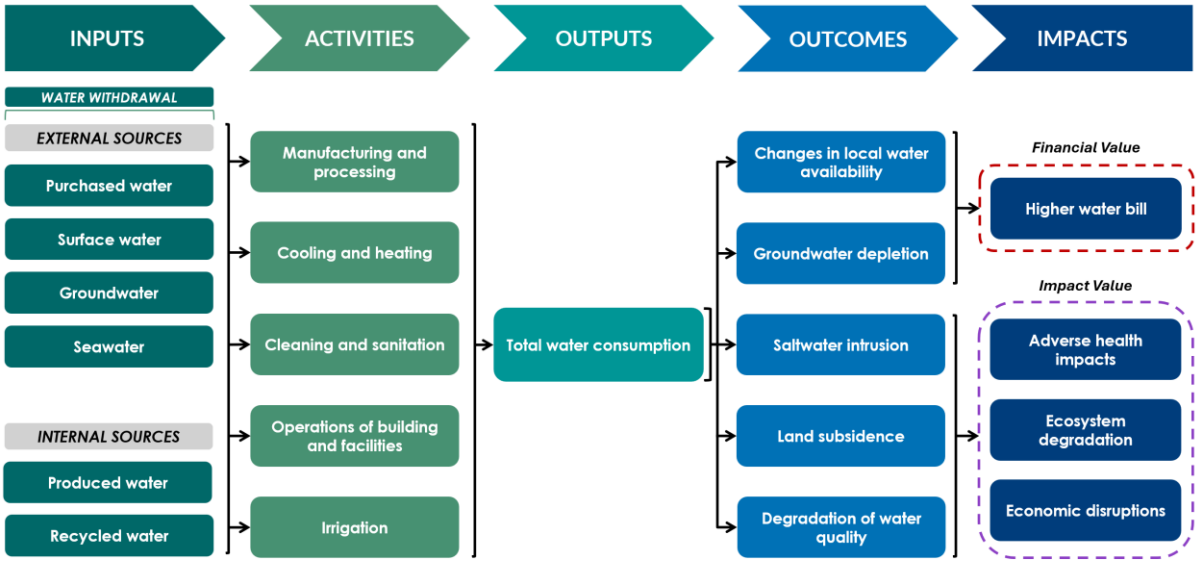
Beyond the financial value derived from PPAs and RECs, the self-consumption of renewable energy delivers measurable impact value by reducing carbon emissions and mitigating their long-term effects on public health, ecological systems, and economic resilience. When companies consume renewable energy in place of conventional grid electricity, they directly avoid the release of greenhouse gases that would otherwise contribute to climate change and its associated societal costs. To quantify the impact, we adopt SCC to calculate the cost that would have been borne by society had the equivalent amount of carbon been emitted.

$$IV_{PPA} = On-site\ Renewable\ Consumption\ (kWh) \times Emission\ Grid\ Factor\ (tCO_2e/kWh) \times Social\ Cost\ of\ Carbon\ (\$/tCO_2e)$$

4.3.3 Water Consumption

As presented in **Figure 3**, the main input for the water consumption impact pathway is water withdrawn from both external and internal sources. External sources include purchased water, surface water, groundwater and seawater, while internal sources comprise produced water and recycled water. Water is an essential input across a wide range of corporate activities, including manufacturing, cooling, irrigation and other operational processes. These activities result in water consumption, defined as the portion of withdrawn water that is not discharged back to the original water source.

Figure 3. Logic Model for Water Consumption



Water withdrawal: the total amount of water drawn from surface water, groundwater, seawater, or third-party supplies.
Water discharge: the amount of water returned to surface water bodies, groundwater systems, seawater, or third parties after use.
Water consumption: the portion of withdrawn water that is not returned to the water environment and is therefore unavailable for immediate reuse within the same watershed.

Financial Value

Increased water consumption by companies reduces local water availability, particularly in water-stressed regions. Long-term withdrawal from groundwater sources can lead to aquifer depletion, which is when the extraction of groundwater occurs at a rate faster than natural replenishment. This, in turn, raises the cost of water supply as water becomes scarcer. Hence, there could be higher water procurement costs for companies, primarily through increased water bills. In 2025, the price of water for businesses in Singapore was set at S$3.24/m^3 (Public Utilities Board, 2026), comprising three components (SPgroup, 2026): 1) a water tariff of S$1.43/m^3, 2) a water conservation tax, and 3) a fixed waterborne tax. The conservation tax, introduced in 1991, is levied at 50% of total water use. The waterborne tax, fixed at $1.09/m^3, covers the costs of treating used water and maintaining the national wastewater network.

$$FV_{Water} = Total\ Water\ Consumption\ (m^3) \times Water\ Price\ (\$/m^3)$$

Total water consumption can be obtained from corporates' sustainability reports or water bills.

Impact Value

Beyond direct financial values, continuous water withdrawals can impose high external environmental and social costs. Excessive extraction from natural water systems may lead to saltwater intrusion, land subsidence, and degradation of water quality, ultimately contributing to ecosystem degradation and biodiversity loss. Over

the longer term, constraints on water availability can reduce economic productivity in water-dependent sectors, with broader implications for human health, ecosystems, and regional economic resilience.

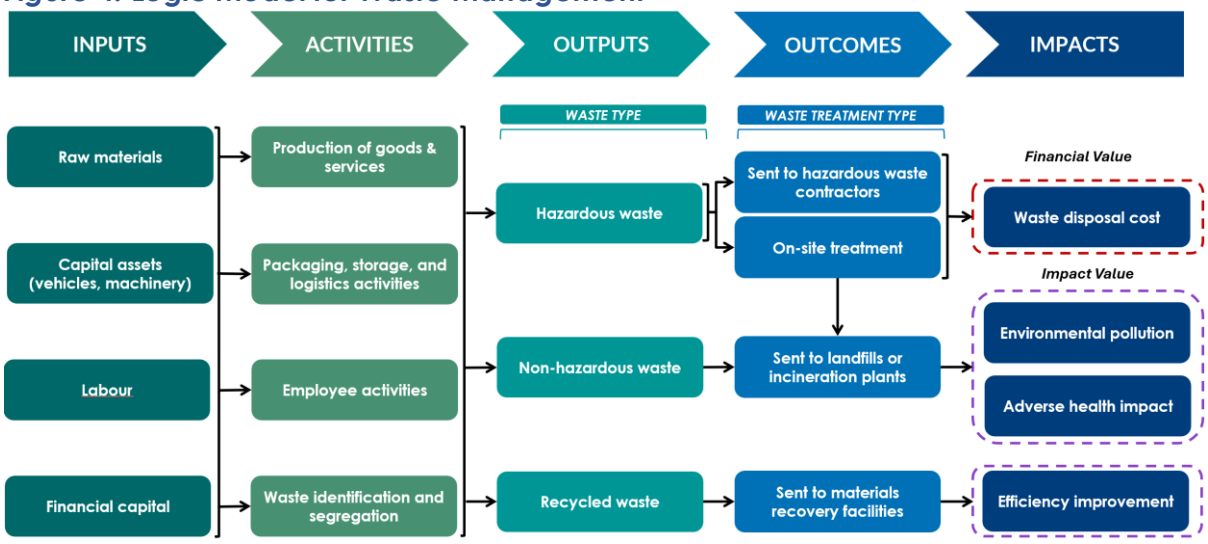
To estimate the monetary value of these harms, we use the water externalities cost. This metric internalises water externalities, such as loss of ecosystem and the cost of replacing depleted sources, into cost considerations. This allows for a more comprehensive assessment of the cost of water. To capture these externalities, this study applies a marginal damage approach, whereby the incremental environmental harm associated with an additional unit of water consumed is used to estimate the external cost of water consumption.

$$IV_{Water} = Total\ Water\ Consumption\ (m^3) \times Water\ Externalities\ Cost\ (\$/m^3)$$

4.3.4 Waste Management

Companies produce large amounts of waste that must be effectively managed to minimise environmental impacts. Companies typically implement waste identification and segregation processes to enable more efficient handling, treatment, and recycling. Waste streams are generally classified into three main categories, as seen in **Figure 4**:

Figure 4. Logic Model for Waste Management



Hazardous Waste: Waste that poses significant risks to human health or the environment, requiring specialized handling and treatment in accordance with strict regulatory requirements.
Non-Hazardous Waste: General waste streams that do not pose immediate threats but require disposal, typically through landfill or incineration processes.
Recyclable Waste: Materials that can be diverted from disposal streams and reprocessed into new products, thereby retaining their material value.

Financial Value

Waste management is exposed to pricing and regulatory compliance costs, which are borne directly by the companies. Such costs typically arise through disposal costs

and specialised treatment charges. First, general disposal fees levy a price per tonne of waste sent to landfills or incinerators. In Singapore, waste sent to landfill can cost as high as S$89.60 per tonne, while incineration can cost companies around S$126.30 per tonne (National Environment Agency, 2026b).

While some companies may conduct on-site treatment before disposal, SMEs more commonly engage licensed hazardous waste contractors due to limited in-house treatment capabilities. The financial value of waste management, therefore, arises primarily from the costs incurred in the treatment and disposal of the total waste generated.

$$FV_{Waste} = Total\ Waste\ Generation\ (t) \times Waste\ Disposal\ Fee\ (\$/t)$$

Impact Value

Aside from waste disposal fees incurred by companies, there are broader impacts that waste brings to society. Poorly managed waste imposes negative environmental externalities, including air and water pollution, soil contamination, and associated risks to ecosystems and human health. To quantify these environmental impacts, a financial proxy for waste externalities derived from valuation studies is applied:

$$IV_{Waste} = [Waste\ Generated\ (t) - Waste\ Recycled\ (t)] \times Waste\ Env.Externalities\ (\$/t)$$

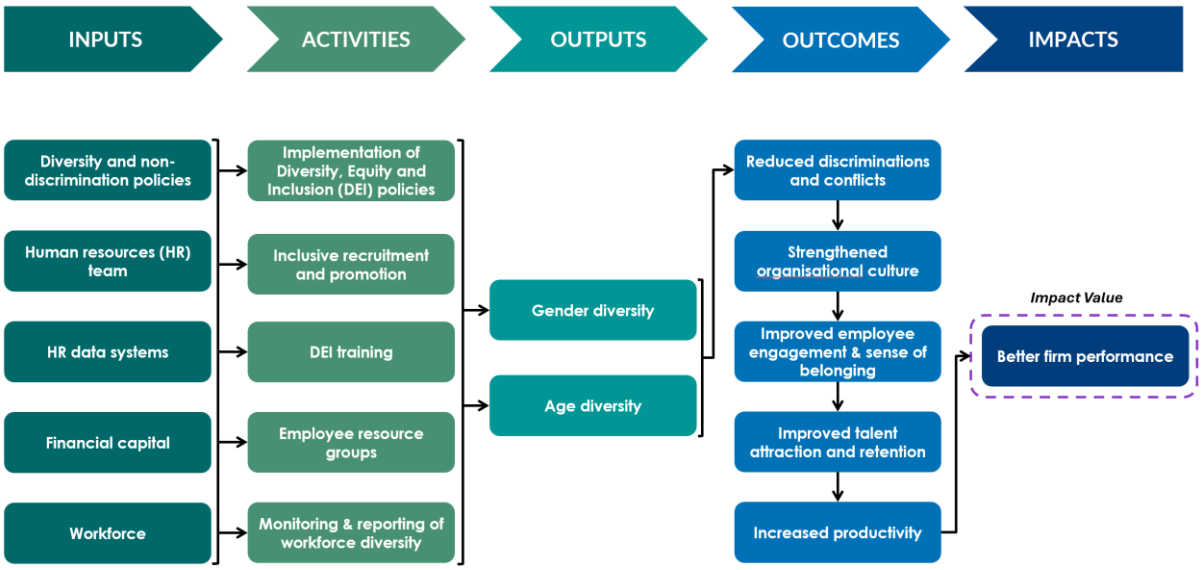
Beyond environmental externalities, waste management also creates direct financial value at the company level. Empirical evidence (Gull, Atif, Ahsan, & Derouiche, 2022) demonstrates that higher levels of waste generation are negatively associated with return on assets (ROA), while greater recycling rates are linked to improved ROA. This occurs through reduced waste disposal and management fees, as well as enhanced asset utilisation efficiency. Drawing on this empirical relationship, the company-level financial impact of improved recycling practices is quantified as:

$$IV_{Waste} = \Delta\ Recycling\ Ratio\ (\%) \times Premium\ of\ Recycling\ on\ ROA\ (\%) \times Total\ Asset\ (\$)$$

4.3.5 Employee Diversity

Diversity is a core element of effective human capital management within companies. The human resources (HR) function plays a central role in advancing workforce diversity through the implementation of diversity, equity, and inclusion (DEI) policies, the delivery of DEI training, the adoption of inclusive recruitment and promotion practices, and the establishment of employee resource groups that support individuals with shared backgrounds, identities, or interests. Collectively, these initiatives aim to foster a more diverse workforce across gender and age dimensions.

Figure 5. Logic Model for Employee Diversity



Impact Value

As presented in **Figure 5,** a greater workforce diversity generates measurable company-level value through two empirically documented channels. First, gender diversity improves decision-making quality and broadens the talent pool, effects that manifest in revenue outcomes and are captured here through an empirically estimated premium on sales. Second, age diversity strengthens financial resilience by combining the experience of senior employees with the adaptability of younger ones, an effect that is reflected in company book value. The formulas below quantify these relationships using premiums derived from the empirical literature. Empirical evidence supports this relationship between diversity and company value. For example, a study by PwC finds that higher levels of age diversity in company boards are associated with improved financial resilience, measured through higher solvency ratios, indicating lower risk exposure and stronger balance-sheet stability. The study further estimates that achieving optimal levels of age diversity could increase company value by improving the risk–return profile of companies (PWC, 2026).

Over the longer term, these improvements can contribute to improved company performance under certain conditions, which is supported by empirical literature (Herring, 2009). The formulas below illustrate how the impacts for gender and age diversity are calculated.

$$IV_{GD} = \triangle\ Gender\ Diversity(\%) \times Premium\ of\ GD\ on\ Sales\ (\%) \times Sales\ (\$)$$

$$IV_{AD} = \triangle\ Age\ Diversity\ (\%) \times Premium\ of\ AD\ on\ Book\ Value\ (\%) \times Book\ Value\ (\$)$$

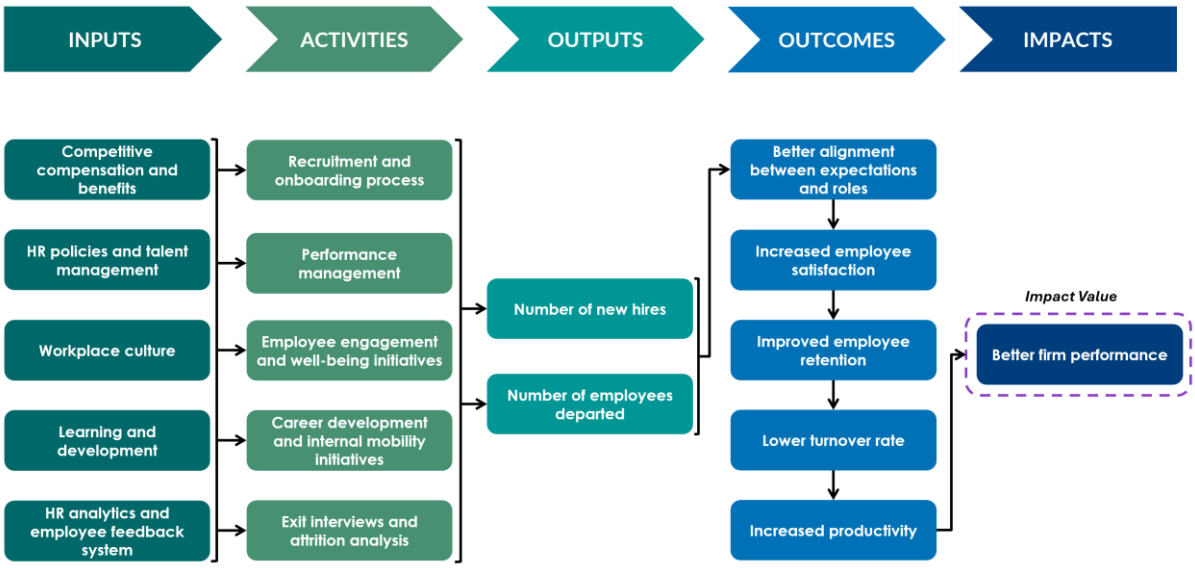
GD and AD refer to gender diversity and age diversity, respectively.

4.3.6 Employee Turnover

Workforce stability is a critical determinant of operational continuity and long-term value creation for SMEs. As illustrated in **Figure 6**, companies invest in competitive compensation and benefits, HR policies and talent management, workplace culture, learning and development, and HR analytics and employee feedback systems. These inputs drive key activities including structured recruitment and onboarding, performance management, employee engagement and well-being initiatives, career development and internal mobility programmes, and exit interviews and attrition analysis. These activities generate two primary outputs: the number of new hires and the number of employees departed during the reporting period.

These outputs drive a sequential chain of outcomes, better alignment between expectations and roles leads to increased employee satisfaction, which supports improved employee retention, leading to a lower turnover rate.

Figure 6. Logic Model for Employee Turnover



Impact Value

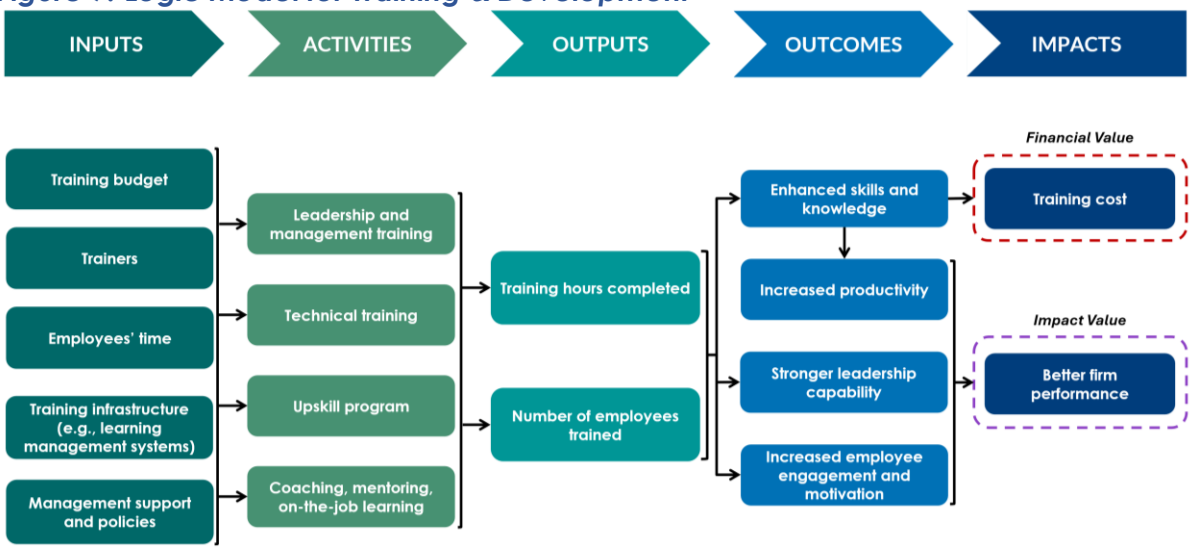
The paper published by Work Institute points out that the loss from turnover will likely rise in 2025 due to wage inflation and labour market constraints, which is estimated as a percentage of an employee's base pay (Work Institute, 2025). The cost will be further amplified by rising wages associated with labour shortages and talent competition, alongside indirect costs such as reduced productivity, knowledge loss, and recruitment expenses. The impact value can be estimated from the following:

$$IV_{Employee\ Turnover} = No.\,of\ Employees\ Departed \times Loss\ from\ Employee\ Turnover\ (\%) \times Average\ Annual\ Salary\ per\ Employee\ (\$)$$

4.3.7 Training & Development

Training and development are another key component of human capital investment within companies. Companies typically establish dedicated policies and budgets to support employee development through initiatives such as leadership and management training, upskilling programmes, and on-the-job training.

Figure 7. Logic Model for Training & Development



Financial Value

As seen in **Figure 7**Training and development are another key component of human capital investment within companies. Companies typically establish dedicated policies and budgets to support employee development through initiatives such as leadership and management training, upskilling programmes, and on-the-job training.

Figure 7, the commitment to workforce development necessitates a direct capital outlay, representing the immediate financial cost of these programs. This financial value is measured by the total investment required to facilitate learning across the organisation. The total investment in training can be estimated by tracking the number of training hours and applying a financial proxy based on the average training expenditure per hour for small companies. The proxy is derived from industry-wide benchmarks reported in the Training Industry Report (Training, 2025), which estimates training expenditures across more than 100, 000 small U.S. companies. While the underlying dataset is based on U.S. companies, the proxy remains broadly applicable in the Singapore context. Corporate training services are largely globalised, with many training providers operating internationally and delivering comparable programmes across markets. The calculation is as shown:

$$FV_{Training} = Training\ hours \times Average\ Training\ Cost\ per\ hour\ (\$)$$

Impact Value

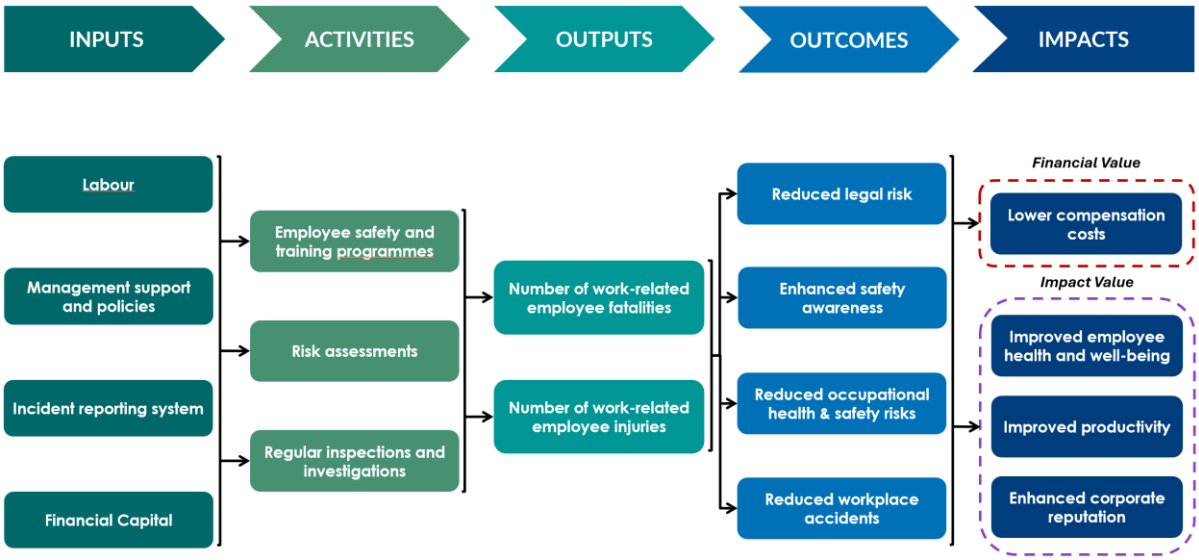
Beyond the initial expenditure, the impact of training is realised through outcomes such as increased productivity, enhanced leadership capabilities, and stronger employee engagement. These improvements can contribute to indirect financial benefits, such as higher productivity and improved company performance, as suggested by empirical studies. The OECD paper reported that companies which provide training benefit from higher sales, value-added, employment, productivity, and an increase in exports (OECD, 2021a). We use the premium of training on sales per worker as the financial proxy to capture the productivity gains associated with workforce training, providing us with the basis to estimate the broader economic benefits of training initiatives using the following calculation:

$$IV_{Training} = No.of\ Employees\ Trained \times Premium\ of\ Training\ on\ Sales\ (\%) \times Sales$$

4.3.8 Occupational Health and Safety (OHS)

OHS is a priority area for companies, as it directly concerns the health and safety of employees. Companies allocate both financial resources and organisational capacity to implementing safety programmes, workplace risk assessments, and ongoing monitoring systems to minimise work-related injuries and fatalities. These measures are designed to safeguard employee well-being while reducing financial and operational disruptions to the company.

Figure 8. Logic Model for OHS



Financial Value

As identified in **Figure 8**, A key financial benefit of effective occupational health and safety (OHS) management is the reduction of direct workplace accident costs borne by companies. Workplace injuries and fatalities often result in financial expenditures through workers' compensation payments, medical treatment, legal settlements, insurance premiums, and operational disruptions. Improvements in workplace safety

reduce the occurrence of these incidents and therefore lower the direct financial burden associated with them.

The financial value (FV) of workplace safety improvements is estimated by calculating the direct economic cost associated with workplace injuries and fatalities. These costs represent the compensation and insurance-related expenditures that companies are expected to bear when workplace accidents occur. Accordingly, the financial impact is estimated using the following formulation:

$$FV_{Injury} = No.of\ Injuries \times Workplace\ Injury\ Cost\ (\$)$$

$$FV_{Fatality} = No.of\ Fatalities \times Workplace\ Fatality\ Cost\ (\$)$$

The financial cost associated with workplace injuries and fatalities is estimated using unit cost estimates reported in academic papers and government reports, which provide an empirical assessment of the economic burden of occupational injuries and diseases in Singapore. The study aggregates national data on workplace incidents and calculates the average economic cost per case. (MOM, 2024b)

Impact Value

Beyond the direct compensation costs borne by companies, workplace injuries and fatalities also generate broader economic and social consequences. These impacts arise primarily through lost labour productivity, reduced lifetime earnings, and diminished household production when injured workers are unable to fully participate in economic or domestic activities. Improvements in OHS can therefore help to mitigate these wider societal losses.

To capture these broader impacts, our calculation also draws on the methodology developed by Leigh (2011), which estimates the total societal cost of occupational injuries and illnesses by incorporating several components, including medical costs, lost wages, productivity losses, and reduced household production. The unit cost estimates reported in the study, therefore, represent comprehensive measures of the economic losses associated with workplace accidents. (Leigh, 2011; International Labour Office, 2012)

Using these estimates as financial proxies, the impact value (IV) associated with workplace safety incidents is calculated by applying the social cost per injury or fatality to the number of incidents reported by the company:

$$IV_{Injury} = No.of\ Injuries \times Workplace\ Injury\ Social\ Cost\ (\$)$$

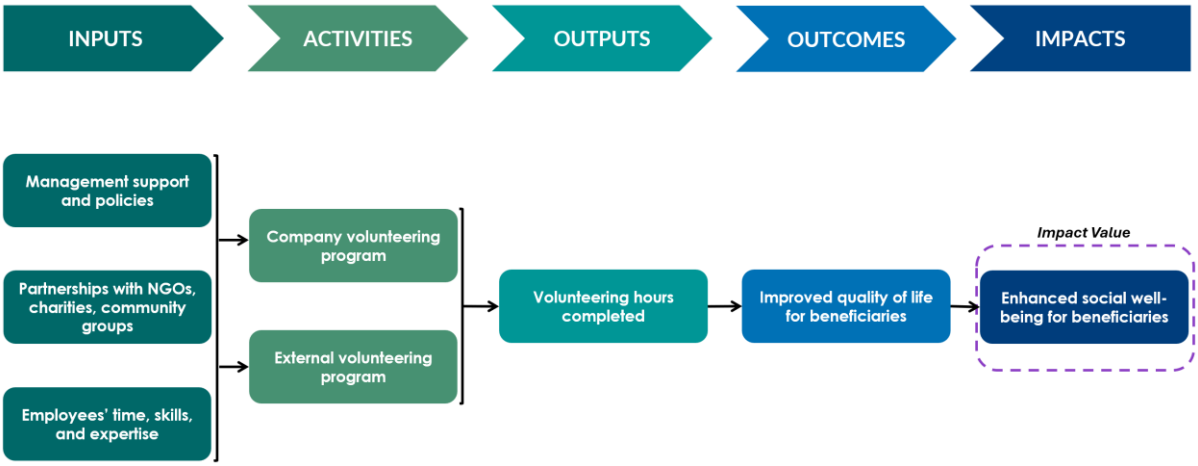
$$IV_{Fatality} = No.of\ Fatalities \times Workplace\ Fatality\ Social\ Cost\ (\$)$$

By applying the cost estimates derived from Leigh (2011), workplace safety indicators can be translated into monetised values that reflect the broader economic burden of occupational accidents, allowing OHS performance to be incorporated into the integrated impact valuation.

4.3.9 Corporate Volunteering

Corporate volunteering has become increasingly prevalent among companies, with many companies partnering with non-profit organisations, charities, and community groups to support structured employee volunteering programmes. Some companies also encourage participation in external volunteering initiatives beyond company-organised activities.

Figure 9. Logic Model for Corporate Volunteering



Impact Value

These programmes are intended to generate social value for communities by improving the quality of life of beneficiaries, as seen in **Figure 9**Corporate volunteering has become increasingly prevalent among companies, with many companies partnering with non-profit organisations, charities, and community groups to support structured employee volunteering programmes. Some companies also encourage participation in external volunteering initiatives beyond company-organised activities.

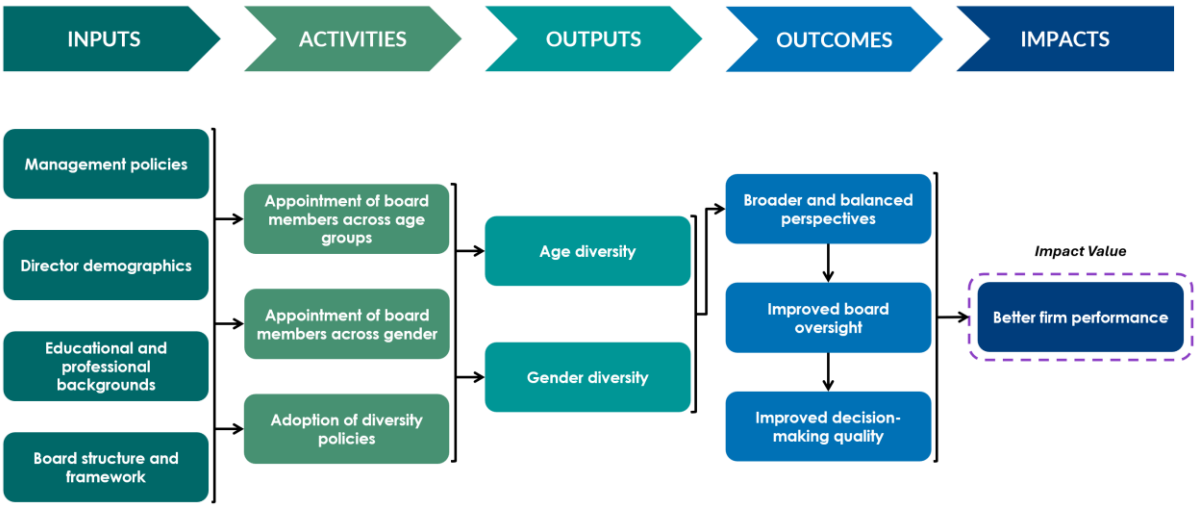
Figure 9. To estimate the resulting enhancement in social well-being, we use the total number of volunteering hours delivered as the primary output measure. These hours are then multiplied by the value of volunteer time, estimated using the methodology developed by Independent Sector, which applies a wage-replacement approach to approximate the economic value of volunteer labour (Independent Sector, 2025). This approach reflects the cost that companies would incur if they had to hire paid workers to perform similar volunteering services. As such, the proxy provides a practical way to estimate the tangible economic value created through volunteer contributions to communities, as follows:

$$IV_{Volunteering} = Total\ Volunteer\ Hours \times Value\ of\ a\ Volunteer\ Hour\ (\$/hr)$$

4.3.10 Board Diversity

Board diversity is increasingly recognised as a material attribute of corporate governance, with companies adopting nomination and succession policies aimed at promoting fair and inclusive board appointments. In this analysis, we focus on age and gender diversity at the board level and their associations with governance quality and decision-making outcomes.

Figure 10. Logic Model for Board Diversity



Impact Value

Referring to **Figure 10**, boards that reflect a broader range of intergenerational perspectives and gender-diverse viewpoints may be better positioned to respond to evolving market conditions. Age diversity can contribute to more balanced deliberation, as younger directors may bring greater openness to innovation and change, while more experienced directors contribute institutional knowledge, external networks, and practical judgment that support strategic stability. Gender diversity further enhances board deliberations by broadening perspectives on risk and decision-making. Prior studies suggest that female directors tend to exhibit greater prudence in risk assessment, while male directors are, on average, more inclined toward risk-taking, creating a complementary balance in board-level decision processes.

The valuation of board gender diversity is based on the empirical analysis (Low, Roberts, & Whiting, 2015), which examines the relationship between gender diversity and company performance using a sample of publicly listed companies across Hong Kong, South Korea, Malaysia, and Singapore. In this study, gender diversity is measured as the percentage of female directors on the board and financial performance is measured using Return on Equity (ROE).

The valuation of board age diversity is informed by the study of Fernández-Temprano and Tejerina-Gaite, which investigates how demographic diversity within corporate boards affects company performance. In this study, age diversity is measured using the standard deviation of directors' ages, reflecting the dispersion of age across board members (Fernández-Temprano & Tejerina-Gaite, 2020). Their results show that age diversity among board members has a positive and statistically significant effect on ROA, suggesting that the combination of experience from older directors and innovation perspectives from younger directors improves asset utilisation and company performance.

$$IV_{Board\ GD} = \triangle\ Board\ GD \times Premium\ of\ Board\ GD\ on\ ROE\ (\%) \times Shareholders'\ Equity\ (\$)$$

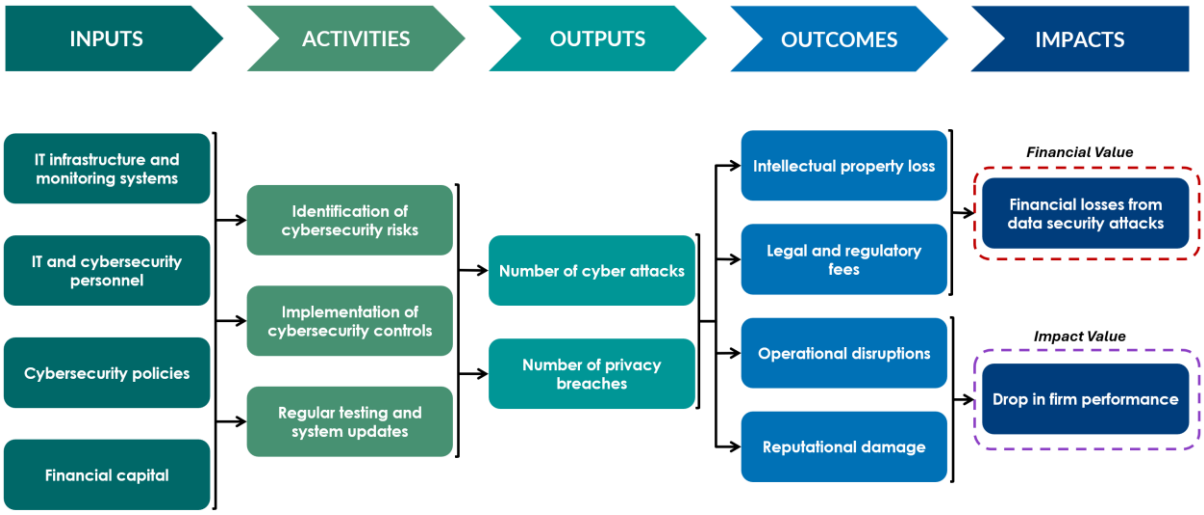
$$IV_{Board\ AD} = \triangle\ Board\ AD \times Premium\ of\ Board\ AD\ on\ ROA\ (\%) \times Total\ Asset\ (\$)$$

GD and AD refer to gender diversity and age diversity, respectively.

4.3.11 Data Security

Data security has become a critical component of operational resilience and risk management as companies increasingly rely on digital systems and data-driven processes. Companies invest in IT infrastructures and cybersecurity personnel, aimed at identifying any cybersecurity risks, implementing the necessary controls and conducting regular testing and system updates. These measures are intended to reduce the number of cyber-attacks and privacy breaches.

Figure 11. Logic Model for Data Security



Financial Value

Cyberattacks and data breaches can impose significant financial losses on SMEs, which often have more limited resources to absorb unexpected shocks. These losses may include direct costs such as system remediation, data recovery, legal and regulatory penalties, and ransom payments (**Figure 11**). The following calculations can be used as estimations:

$$FV_{Cyber\ attacks} = No.of\ Cyber\ Attacks\ \times Average\ Loss\ per\ Cyber\ Attack\ (\$)$$

$$FV_{Data\ breaches} = No.of\ Data\ Breaches\ \times Average\ Loss\ per\ Data\ Breach\ (\$)$$

Company-level data on the number and cost of cyberattacks and data breaches will be obtained from company disclosures where available. These figures will then be used to estimate the associated financial losses using the formulas above. In cases where such information is not disclosed, the toolkit assumes that no material financial losses from cyberattacks or data breaches were reported during the period.

Impact Value

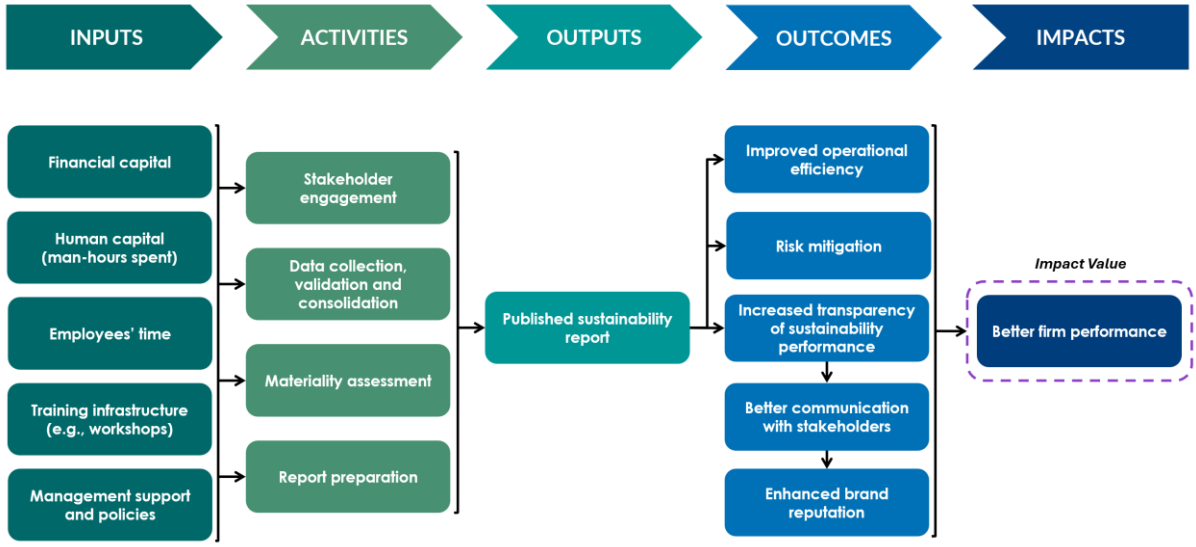
In addition to the direct and measurable expenses outlined above, companies may incur substantial costs arising from operational disruption and reputational damage following cyber incidents. These effects can lead to a decline in customer trust, reduce demand for the companies' products or services, causing a drop in sales and weakened financial performance of the company. A study examined companies that experienced cybersecurity breaches and compared their financial performance with that of similar companies that had been unaffected. It found that companies that suffer from cyberattacks subsequently experience a reduction in year-on-year sales growth. (Kamiya, Kang, Kim, Milidonis, & M. Stulz, 2018). We used this loss in sales from cyber-attacks as a financial proxy in our calculation to derive the estimated IV as follows:

$$IV_{Data\ breaches} = Loss\ in\ Sales\ from\ cyber\ attacks\ (\%) \times Sales\ (\$)$$

4.3.12 Sustainability Reporting

SR plays an increasingly important role in corporate governance, with companies spending substantial efforts to engage stakeholders to identify material themes, collect, validate and consolidate data to prepare sustainability reports. This allows companies to obtain clearly defined sustainability metrics and targets to publicly publish their sustainability report (**Figure 12**).

Figure 12. Logic Model for Sustainability Reporting



Companies invest in SR through the establishment of internal data systems, reporting processes, and governance structures to disclose sustainability-related information to stakeholders. These disclosures are intended to reduce information asymmetry, strengthen internal decision-making, and support more informed engagement by investors, regulators, and other stakeholders.

Impact Value

The process of preparing sustainability reports enables companies to identify areas for operational improvement and strengthen risk management practices. Public disclosure further enhances transparency and reduces information asymmetry, supporting better internal and external decision-making and reinforcing corporate reputation. Empirical evidence is broadly supportive of these effects, with approximately 73% of existing studies reporting a positive association between SR and financial performance (Global Reporting Initiative, 2025). Consistent with this literature, SR has been linked to improved financial outcomes, including higher return on assets (ROA) (Whetman, 2018). The impact value is calculated as:

$$IV_{SR} = Premium\ of\ SR\ on\ ROA\ (\%) \times Total\ Assets\ (\$)$$

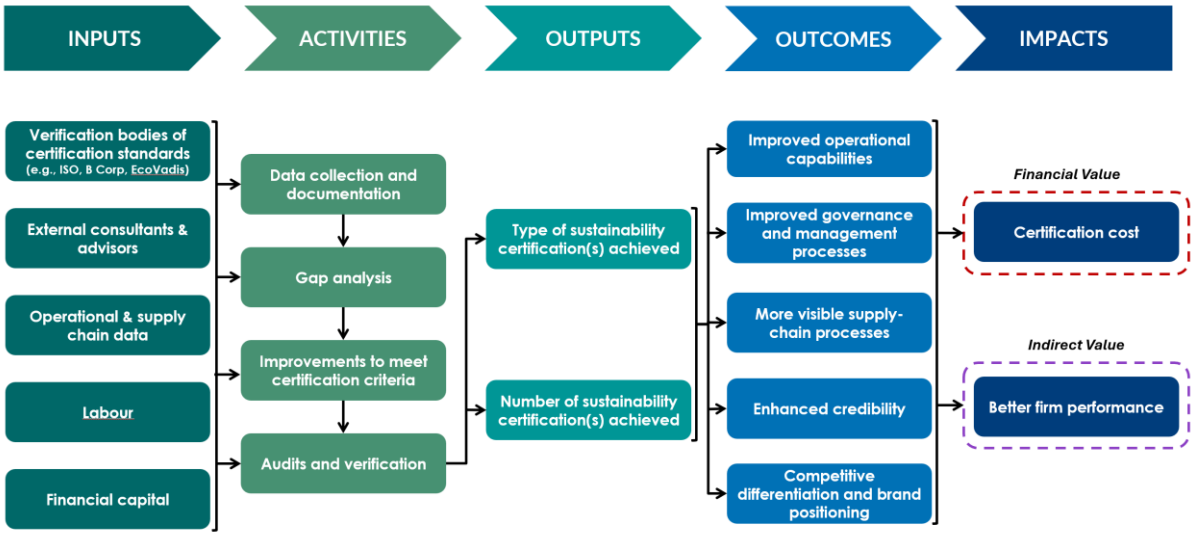
This approach assumes that the operational and reputational benefits of SR materialise through improved ROA, which, when applied to a company's total asset base, yields the aggregate financial value created by the reporting initiative.

4.3.13 Sustainability Certifications

Sustainability certifications are formal mechanisms through which companies demonstrate compliance with recognised environmental and social standards. Companies invest in certifications by aligning internal processes with prescribed requirements and subjecting these practices to independent third-party verification

(e.g., ISO, B Corporations, Ecovadis). During the process, they conduct gap analysis to identify areas of improvement to achieve the desired certifications (**Figure 13**). The primary output of these efforts is the attainment of specific sustainability certifications, which are third-party verified and act as a benchmark of the company's commitment to its sustainability goals and commitments.

Figure 13. Logic Model for Sustainability Certifications



Financial Value

The commitment to third-party validation requires a direct capital investment, representing the primary financial cost of establishing and maintaining certification status. This includes the direct fees paid to auditors and the cost of internal or external resources required to meet compliance standards. By tracking the total expenditure associated with the certification portfolio, companies can quantify their direct financial cost:

$$FV_{Cert} = Cost\ of\ Obtaining\ Sustainability\ Cert(\$)$$

Impact Value

Attaining sustainability certifications can deliver tangible benefits for companies by strengthening operational practices and governance systems. These improvements enhance the credibility of sustainability claims and provide competitive differentiation and stronger brand positioning, which can support improved financial performance.

While the impacts vary across different certification schemes, evidence suggests that certain certifications are associated with measurable economic benefits. For example, buildings certified under LEED have been shown to command rental premiums (Cushman & Wakefield, 2022), reflecting stronger tenant demand and perceived asset quality. Similarly, ISO-certified companies are more likely to gain from higher return on assets (ROA) (Arocena, Orcos, & Zouaghi, 2020).

$$IV_{Cert} = Premium\ of\ Sustainability\ Certifications\ on\ ROA\ (\%) \times Total\ Asset\ (\$)$$

5 Case Study

In this section, we demonstrate the practical application of the sustainability integrated valuation toolkit through a real-life corporate case study. The case illustrates how company-level initiatives across the ESG pillars can be systematically translated into measurable performance improvements, creating value not only for the company but also for its wider ecosystem of societal stakeholders.

The following case study is based on an anonymised small manufacturing company in Singapore. Certain operational details have been modified to preserve confidentiality while maintaining analytical integrity.

5.1 Background of the Case Company

The case company is a Singapore-headquartered listed company, with operations spanning three primary business segments: alternative energy supply and related services, the manufacture and trading of specialised industrial packaging materials for high-technology sectors, and property-related activities including leasing and development.

In recognition of the evolving expectations of investors and stakeholders, the company has progressively embedded sustainability considerations into its strategic planning and reporting processes. The company conducted its first materiality assessment in 2018, marking a formal starting point for its SR journey. This enabled the company to identify key sustainability risks and opportunities relevant to its operations and stakeholders, and to prioritise sustainability issues for management attention and disclosure.

Its environmental approach focuses on minimising its ecological footprint associated with its operations and promoting energy-efficient practices. Energy usage and greenhouse gas emissions, as well as effluents and waste management, were identified as material issues for the company. In response, it implemented practical operational initiatives, including the installation of energy-efficient light-emitting diode (LED) lighting across office facilities and the adoption of 25 degrees Celsius as the default temperature setting for air-conditioning systems. We observed a consistent decline in Scope 1 emissions, decreasing from 74.20 tCO_2e in 2023 to 73.30 tCO_2e in 2024, and further to 70.00 tCO_2e in 2025. In addition, the company does not produce any hazardous waste and has consistently achieved a 100% recycling rate for its waste streams over multiple years, reflecting a sustained commitment to waste minimisation and circular resource use.

On the social pillar, the company initiatives are centred on fostering a safe, inclusive, and development-oriented workplace. Occupational health and safety is treated as a core component of operational integrity, with structured safety policies endorsed by senior management and systematic hazard identification processes in place. Employees, particularly those involved in high-risk activities, receive targeted training and certification to reinforce safe work practices.

Governance practices are overseen by a Board-approved sustainability framework that integrates sustainability oversight into its management. The Board also reviews material sustainability issues and commits to implementing best practices in its policy and oversight.

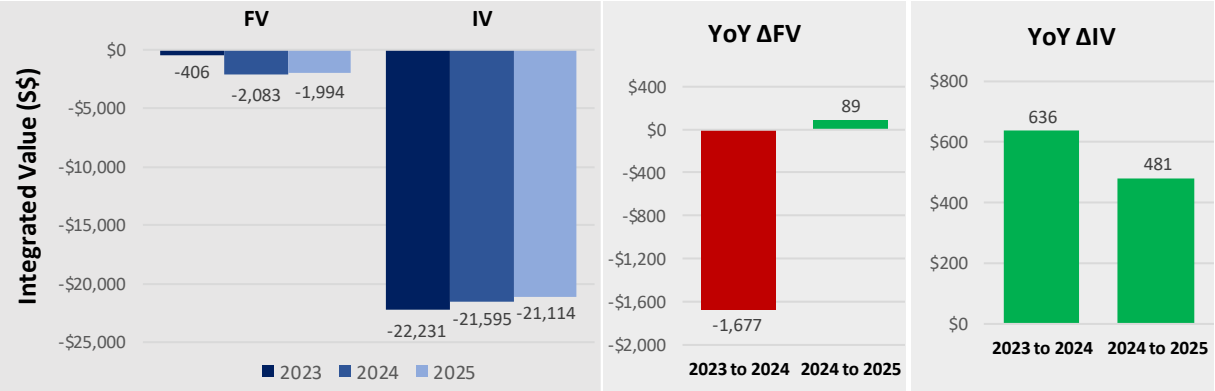
5.2 Applying Integrated Valuation

To demonstrate our integrated valuation toolkit, we will focus on three metrics: Carbon emissions, training and development, and board age diversity.

Carbon Emissions:

Table 5. Integrated Valuation Breakdown for Carbon Emissions

		2023	2024	2025
Input	Scope 1 & 2 Carbon Emissions (tCO_2e)	81.20	83.30	79.76
Impacts	[FV] Carbon Tax (S$)	-406	-2,083	-1,994
	[IV] Externality Cost of Carbon (S$)	-22,231	-21,595	-21,114



Between 2023 and 2024, the financial cost associated with carbon emissions increased sharply, as shown in **Table 5**, driven primarily by the rise in Singapore's carbon tax from S$ 5/tCO_2e to S$ 25/tCO_2e. This regulatory change led to a substantial increase in the financial value of emissions, despite only a moderate increase in absolute emissions over the same period. From 2024 to 2025, the carbon tax rate remained constant. Consequently, the financial value of emissions declined in line with the reduction in Scope 1 and 2 emissions. In contrast, the impact value is calculated using the SCC, net of the carbon tax paid in the respective year. From 2023 to 2024, the impact value declined as the externality cost per tonne of carbon emissions decreased following the increase in the carbon tax rate in 2024. The impact value declined further in 2025 as the company achieved reductions in its Scope 1 and Scope 2 emissions.

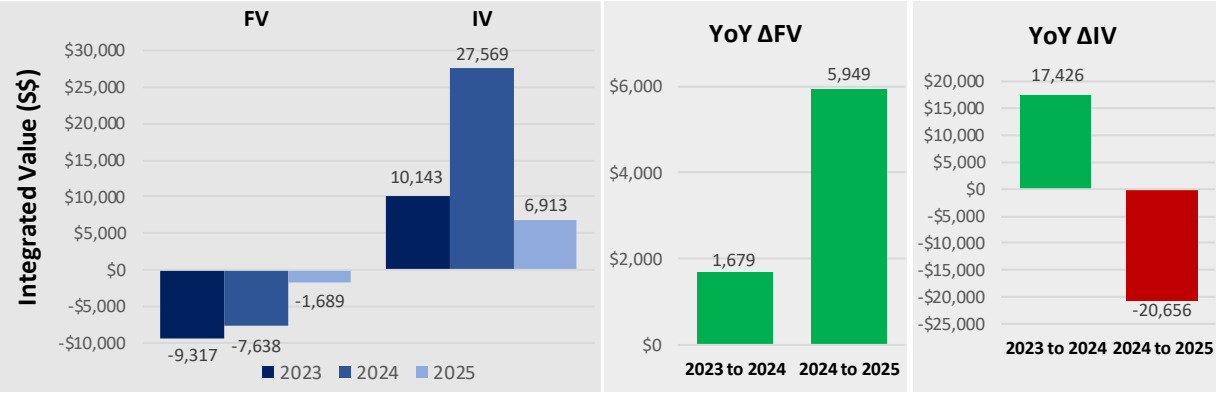
In **Table 5**, we can observe that investments in energy-saving initiatives to reduce carbon emissions are beneficial because the Year-on-Year (YoY) change suggests positive cost savings for the company. These results also highlight the dual incentive for emissions reduction. Further cuts in carbon emissions would not only lower the direct financial costs borne by the company through carbon taxation, but also reduce the broader societal costs associated with climate-related damages. This

illustrates how company-level decarbonisation efforts can simultaneously enhance corporate cost efficiency and deliver positive environmental impact.

Training & Development:

Table 6: Integrated Valuation Breakdown for Training & Development

		2023	2024	2025
Inputs	Total training hours (hr)	67.50	56.20	12.00
	No. of employees trained (#)	6	11	2
Impacts	**[FV]** Training Costs (S$)	-9,317	-7,638	-1,689
	[IV] Premium of Training on Sales (S$)	10,143	27,569	6,913



In **Table 6**, despite a slight reduction in total training hours from 2023 to 2024, the company increased the number of employees participating in training programmes. As a result, the estimated sales premium associated with employee training rose, reflecting productivity gains arising from broader workforce upskilling. In 2025, both total training hours and the number of employees trained declined markedly, as multiple training sessions were cancelled or repeatedly postponed due to low enrolment. This contraction in training activity corresponded with a reduction in the estimated sales premium.

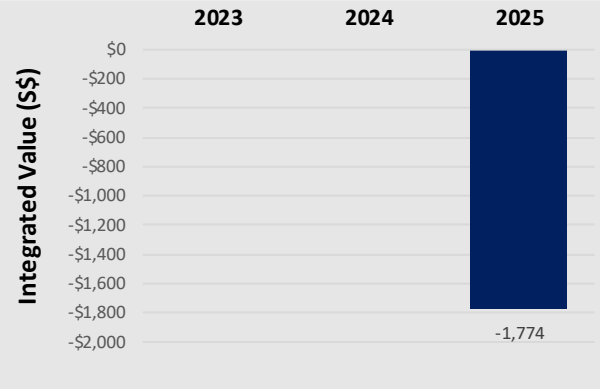
As shown in Table 4, the productivity loss (ΔIV) from 2024 to 2025 greatly exceeds the cost savings (ΔFV) in the same period. This highlights the fact that the company should not neglect training and development for short-term cost savings. Instead, to sustain productivity improvements and associated value creation, the company should aim to ensure that employees participate in at least one training programme annually.

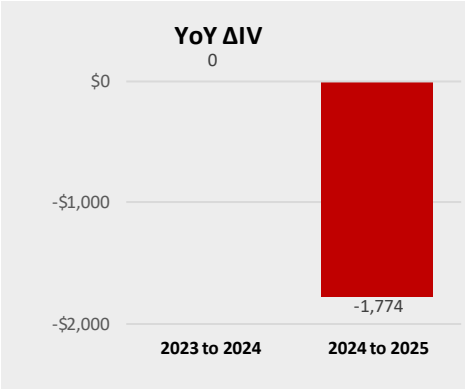
Board Age Diversity (Board AD):

Table 7: Integrated Valuation Breakdown for Board AD

		2023	2024	2025
Inputs	Board Director 1 (Age)	67	68	69
	Board Director 2 (Age)	50	51	52
	Board Director 3 (Age)	54	55	56
	Board Director 4 (Age)	49	50	51
	Board Director 5 (Age)	47	48	49
	Board Director 6 (Age)	77	78	NIL*
Impact	**[IV]** Impact of Board AD on ROA (S$)	-	-	-1,774

* Board Director 6 resigned in 2025





As observed in **Table 7**, there were no changes in the composition of the Board of Directors from 2023 to 2024. However, in 2025, the resignation of the oldest board director resulted in a reduction in board AD. Accordingly, we estimate a slight negative impact on the company's return on assets. This underscores the role of board age diversity in combining institutional experience with fresh perspectives, thereby strengthening strategic oversight and long-term decision-making.

5.3 What's Next for the Case Company

Overall, this case study demonstrates how applying integrated valuation to selected ESG dimensions can reveal the broader value of sustainability initiatives for both the company and society. Even across a limited set of metrics, the analysis shows that environmental stewardship, workforce upskilling, and sound governance practices generate financial and impact values. Looking ahead, further opportunities exist for the company to deepen its impact by accelerating emissions reduction efforts, strengthening the consistency of workforce development, and embedding diversity considerations into long-term board succession planning.

6 Conclusion

The journey toward a net-zero and socially equitable economy is no longer a peripheral concern within corporate social responsibility but a fundamental shift in the global competitive landscape. While the initial wave of sustainability focused on the compliance of multinational companies, the current "second wave" is defined by supply chain transparency and the "trickle-down" of mandatory disclosure requirements. For SMEs, the motivation to adopt integrated valuation is increasingly driven by the risk of "supply chain exclusion" as global buyers seek to de-risk their Scope 3 emissions. Beyond mere risk mitigation, this paper is motivated by the untapped potential of SMEs to leverage their inherent organisational agility, a trait often lacking in larger companies, to pivot toward sustainable business models. By addressing the "data deficit" that limits SMEs' ability to communicate the value of their sustainability initiatives, this research provides the tools necessary to ensure that the journey to sustainability remains inclusive of the enterprises that form the backbone of local economies.

We believe our toolkit can enable SMEs to transform their sustainability approach across three key dimensions:

1. **The toolkit provides a standardised blueprint for mapping sustainability initiatives to impacts.** By moving away from the fragmented and often overwhelming landscape of global ESG standards, this research distils the most material indicators specifically relevant to the SME scale and operational reality. The systemic integrated valuation approach allows SMEs to move beyond "anecdotal sustainability" narratives to an evidence-based strategy where "impact value drivers" provide a longitudinal view of their contributions to environmental and social externalities, effectively making the invisible visible to internal stakeholders.
2. **Monetising impacts acts as an enabler for SMEs to articulate value creation from sustainability initiatives.** A primary contribution of this methodology is the application of financial proxies, such as carbon pricing, health cost savings, and productivity multipliers, to convert sustainability performance into monetary terms. It provides a common financial language readily understood by lenders and investors. This valuation approach reframes sustainability from a "cost centre" into a "value driver" by demonstrating how improvements in resource efficiency and labour practices can be correlated with lower risk exposure and a potentially reduced cost of capital. The toolkit enables SMEs to present a more comprehensive "value proposition" linked to corporate performance indicators that are increasingly tied to impact and sustainability outcomes, particularly as stakeholders are increasingly seeking verifiable and quantifiable targets.
3. **Strategic integration of financial and impact valuation empowers SMEs to build long-term business resilience.** The case study shown in the previous section highlights that sustainability is not just a brand enhancement but also serves as a shield against risks such as climate-related price volatility. Furthermore, the toolkit

provided alongside this paper offers a scalable pathway for companies at various maturity levels to begin their sustainability journey, ensuring that the ability to measure and manage impact is accessible to all businesses rather than being a privilege reserved for the large and well-resourced companies.

In conclusion, this whitepaper marks a progression from viewing sustainability as a reporting burden to recognising it as a pillar of 21st-century business excellence. By establishing a rigorous toolkit to convert sustainability performance into monetised value drivers, this whitepaper provides the practical mechanism required to facilitate the journey of the SME toward a more transparent, resilient, and value-aligned future.

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Appendix A – Definition of Sustainability Report Indicators

Environment					
Metrics	**Indicators**	**Description**	**Unit**	**Framework Alignment**	**Source(s)**
Fuel Consumption	Fuel – Stationary combustion	Total energy consumed from non-renewable fuels (petrol, diesel, natural gas, and coal) burned in fixed equipment owned or controlled by the company	GJ	GRI 302-1	Fuel invoices, Utility bills, Equipment meter readings
	Fuel – Mobile combustion	Total energy consumed from non-renewable fuel (petrol, diesel) burned in company-owned or controlled vehicles and mobile machinery (e.g., forklifts)	GJ	GRI 302-1	Petrol station invoices, Fleet fuel logs, Vehicle logbooks
Electricity Consumption	Purchased electricity	Total electricity purchased from the grid that is generated from non-renewable sources (e.g., natural gas)	GJ	GRI 302-1	Electricity bills
Renewable Energy	Renewable energy generated	Total electricity self-generated on-site from renewable sources (e.g., solar photovoltaic panels), regardless of whether it is consumed internally or exported	GJ	GRI 302-1	Solar data loggers
	Renewable energy sold (PPA)	Total renewable energy generated on-site and sold to an off-taker under a Power Purchase Agreement (PPA), to be reported separately from internally consumed renewable energy	GJ	GRI 302-1	PPA contract records
	Renewable energy certificates (REC) purchased	Total RECs purchased to substantiate the company's renewable energy consumption claims	GJ	GRI 302-1	REC purchase invoices
	REC sold	Total RECs generated from on-site renewable energy production and sold to third parties	GJ	GRI 302-1	REC issuance records, REC trading platforms
Energy Intensity	Energy intensity ratio	Total energy consumed (across all fuel and electricity sources) per unit of sales, expressed as a ratio to normalise energy consumption against business activity	GJ/Sales	GRI-302-3	Derived from total energy consumed divided by the sales

Scope 1 Carbon Emissions	Carbon Emissions – Fuel – Stationary Combustion	Total direct carbon emissions arising from the combustion of fuels in fixed, non-transport company-owned or controlled equipment	tCO_2e	GRI 305-1, GHG Protocol Scope 1, IFRS S2	Stationary fuel consumption data log, Emission factors
	Carbon Emissions – Fuel – Mobile Combustion	Total direct carbon emissions arising from the combustion of fuels in company-owned or controlled vehicles and mobile machinery	tCO_2e	GRI 305-1, GHG Protocol Scope 1, IFRS S2	Mobile fuel consumption data log, Emission factors
Scope 2 Carbon Emissions	Purchased electricity (location-based)	Total indirect carbon emissions arising from the generation of purchased electricity consumed by the company, calculated using the average emission factor of the local grid, regardless of any renewable energy arrangements	tCO_2e	GRI 305-2, GHG Protocol Scope 2, IFRS S2	Electricity bill, Grid emission factor
	Purchased electricity (market-based)	Total indirect carbon emissions arising from the generation of purchased electricity consumed by the company, calculated using emission factors based on the company's contractual arrangements (e.g., RECs, PPAs)	tCO_2e	GRI 305-2, GHG Protocol Scope 2, IFRS S2	Electricity bill, Grid emission factor
Water Management	Third-party water	Water obtained or purchased from external suppliers such as municipal water utilities or other third-party providers, rather than self-extracted directly from natural sources	m^3	GRI 303-3	Water bill, Water meter readings
	Surface water	Water withdrawn directly from water bodies such as rivers, lakes, reservoirs, and wetlands	m^3	GRI 303-3	On-site water meters, Rainwater harvesting system
	Groundwater	Water withdrawn directly from underground aquifers or formations beneath the Earth's surface	m^3	GRI 303-3	Groundwater level sensors, Flow meters
	Seawater	Water withdrawn directly from the sea or ocean	m^3	GRI 303-3	Water management records, Intake flow meters
	Produced water	Water that enters an organisation's boundary as a result of an extraction, processing or use of any raw material, and has to be managed by the organisation	m^3	GRI 303-3	Process flow meters, Wastewater treatment plant records
	Water discharge	Water that leaves the organisation's boundary after use, sent to a municipal wastewater treatment plant, river, or other receiving body	m^3	GRI 303-3	Water management bill

	Recycled water	Water that has been treated or collected and reused within the organisation's own operations	m^3	GRI 303-3	Water recycling system logs
Waste Management	Hazardous waste generated	Total weight of waste generated by the company's operations that is classified as hazardous due to its toxic, flammable, corrosive, reactive or infectious characteristics (e.g., chemical waste)	tonnes	GRI 306-3	Waste bills, Waste disposal records
	Non-hazardous generated	Total weight of waste generated by the company's operations that does not exhibit hazardous characteristics, including general solid waste, packaging materials, food waste, paper, and plastics	tonnes	GRI 306-3	Waste bills, Waste disposal records
	Hazardous waste disposed	Total weight of hazardous waste generated by the company's operations that is sent for final disposal through methods such as incineration, landfill, or other regulated disposal processes, excluding waste recovered or recycled	tonnes	GRI 306-5	Waste bills, Waste disposal records
	Non-hazardous disposed	Total weight of non-hazardous waste generated by the company's operations that is sent for final disposal through methods such as landfill or incineration, excluding waste recovered, composted, or recycled	tonnes	GRI 306-5	Waste bills, Waste disposal records
	Hazardous waste recycled	Total weight of hazardous waste diverted from disposal through recycling, reclamation or recovery operations	tonnes	GRI 306-4	Waste recycling records
	Non-hazardous waste recycled	Total weight of non-hazardous waste diverted from disposal through recycling or recovery operations	tonnes	GRI 306-4	Waste recycling records
Biodiversity	Operations at Biodiversity-sensitive areas	Disclosure of whether any of the company's owned, leased or managed operational sites are located in or adjacent to protected areas or ecologically sensitive areas of high biodiversity value	Yes/No	GRI 101-5	NParks nature area maps, URA Master Plan zoning records, World Database on Protected Areas

Social					
Metrics	**Indicators**	**Description**	**Unit**	**Framework Alignment**	**Source(s)**
Employees Information	Full-time employees	Total number of employees engaged by the company under a full-time employment contract, whose working hours are defined according to the national legislation and practice regarding working time, as of the end of the reporting period	#	GRI 2-7	HR management system, MOM employment records
	Part-time employees	Total number of employees engaged by the company under a part-time employment contract, whose working hours are fewer than the standard full-time working hours, as of the end of the reporting period	#	GRI 2-7	HR management system, MOM employment records
Employees Gender Diversity	Male employees	Total number of male-identifying employees across all employment types, as of the end of the reporting period	#	GRI-405-1	HR management system, MOM employment records
	Female employees	Total number of female-identifying employees across all employment types, as of the end of the reporting period	#	GRI-405-1	HR management system, MOM employment records
Employees Age Diversity	Young employees (age < 30)	Total number of employees below 30 years of age, as of the end of the reporting period	#	GRI-405-1	HR management system, MOM employment records
	Medium-aged employees (age 30 – 50)	Total number of employees between 30 and 50 years of age, as of the end of the reporting period	#	GRI-405-1	HR management system, MOM employment records
	Senior employees (age > 50)	Total number of employees above 50 years of age, as of the end of the reporting period	#	GRI-405-1	HR management system, MOM employment records
Employees Turnover	Full-time male new-hires	Total number of full-time male employees who commenced employment with the company during the reporting period	#	GRI 401-1	HR management system, MOM employment records
	Full-time female new-hire	Total number of full-time female employees who commenced employment with the company during the reporting period	#	GRI 401-1	HR management system, MOM employment records

	Full-time male employees departed	Total number of full-time male employees who left the company during the reporting period	#	GRI 401-1	HR management system, MOM employment records
	Full-time female employees departed	Total number of full-time female employees who left the company during the reporting period	#	GRI 401-1	HR management system, MOM employment records
	Male turnover rate	Proportion of full-time male employees who departed during the reporting period relative to the total number of full-time male employees as of the end of the reporting period	%	GRI 401-1	HR management system, MOM employment records
	Female turnover rate	Proportion of full-time female employees who departed during the reporting period relative to the total number of full-time female employees as of the end of the reporting period	%	GRI 401-1	HR management system, MOM employment records
Gender Pay	Gender pay gap	Percentage differences between the median gross earnings of full-time male and female employees within the company, divided by the median full-time male employees' salary reported using five bands (0%, 1-5%, 6-10%, 11-20%, and above 20%)	%	GRI 405-2	HR management system, Payroll records, CPF contribution statements
Training & Development	Total training hours	Total number of hours of formal training provided to all employees during the reporting period for learning and development, including vocational training, paid educational leave, and externally funded courses	hr	GRI 404-1	HR management system, Training attendance records (e.g., SkillsFuture Singapore (SSG))
	Total training cost	Total expenditure incurred by the company on employee training and development during the reporting period, including course fees and training materials	S$	GRI 404-1	HR management system, Training attendance records (e.g., SkillsFuture Singapore (SSG))
	Employees trained	Total number of individual employees who completed at least one formal training programme during the reporting period	#	GRI 404-1	HR management system, Training attendance records (e.g., SkillsFuture Singapore (SSG))

Workplace Fatalities	Work-related fatalities	Total number of employee deaths resulting from occupational diseases or work-related injuries while performing work that is controlled by the company, during the reporting period	#	GRI 403-9, Singapore's Workplace Safety and Health Act (WSHA)	MOM incident reports, Work Injury Compensation Act (WICA) claims records
Workplace Injuries	Work-related injuries	Total number of recordable work-related injuries sustained by employees during the reporting period, including major injuries that require hospitalisation or result in four or more days of medical leave, as defined under Singapore's WSHA	#	GRI 403-9, Singapore's WSHA	MOM incident reports, Work Injury Compensation Act (WICA) claims records
Misconduct Incidents	Company policy violations	Total number of confirmed incidents in which employees were found to have violated the company's internal code of conduct or business ethics policies during the reporting period	#	GRI 2-27	HR disciplinary records, Internal audit reports, Whistleblowing channel reports
	Workplace harassment cases	Total number of formally reported workplace harassment cases during the reporting period, including sexual harassment, bullying, and intimidation	#	GRI 406-1, Tripartite Alliance for Fair & Progressive Employment Practices (TAFEP)	HR grievance records, Internal audit reports, MOM or TAFEP case referral records
Employee Welfare & Benefits	Annual leave	Total number of paid annual leave days granted to a full-time employee per year, over and above statutory public holidays.	# per year	GRI 401-2, Singapore Employment Act	HR leave management system, Employment contracts
	Family care leave	Total number of paid leave days provided to a full-time employee per year to care for immediate family members who are ill or in need of care, including spouse, children, parents, or in-laws. This is a discretionary benefit beyond statutory entitlements.	# per year	GRI 401-2	HR leave management system, Employment contracts

	Childcare leave	Total number of paid childcare leave days granted to an eligible employee-parent per year to take care of the children	# per year	GRI 401-2, GRI 401-3, Singapore Employment Act	HR leave management system, Employment contracts
	Training and education leave	Total number of paid leave days granted to a full-time employee per year to attend approved training programmes, courses, or examinations	# per year	GRI 401-2	HR leave management system, Employment contracts, Training records
	Volunteer leave	Total number of paid volunteer leave days granted to a full-time employee per year to participate in approved community service or corporate social responsibility activities during working hours	# per year	GRI 401-2	HR leave management system, Employment contracts
	Work from home arrangements	Total number of approved work-from-home days permitted per full-time employee per week under the company's flexible work arrangement (FWA) policy	# per week	GRI 401-2	HR policy documentation, Employment contracts, FWA agreements
Volunteering	Paid volunteering hours	Total number of hours contributed by employees to approved community or social causes during paid working hours (e.g., charity work, mentoring, environmental clean-ups sanctioned by the company) in the reporting year	hr	GRI 413-1	Volunteer leave records, HR management system, Volunteering attendance logs
	Unpaid volunteering hours	Total number of hours contributed by employees to approved community or social causes outside of paid working hours voluntarily, during the reporting period	hr	GRI 413-1	Employee self-reported volunteering logs, Corporate volunteering platform records
	Employees participated in paid volunteering	Total number of individual employees who engaged in at least one paid volunteering activity during the reporting year	#	GRI 413-1	Volunteer leave records, HR management system, Volunteering attendance logs
	Employees participated in unpaid volunteering	Total number of individual employees who engaged in at least one unpaid volunteering activity during the reporting year	#	GRI 413-1	Employee self-reported volunteering logs, Corporate volunteering platform records

Satisfaction surveys	Customer satisfaction surveys	Indicates whether the company conducts formal customer satisfaction surveys or equivalent feedback mechanisms (e.g., Net Promoter Score, Feedback forms) during the reporting year	Yes/No	GRI 2-29	Customer survey records, Customer Relationship Management (CRM) system feedback
	Employee satisfaction surveys	Indicates whether the company conducts formal employee satisfaction surveys or equivalent feedback mechanisms (e.g., Net Promoter Score, Feedback forms), during the reporting year	Yes/No	GRI 2-29	Internal survey records, HR management system

Governance					
Metrics	**Indicators**	**Description**	**Unit**	**Framework Alignment**	**Source(s)**
Board Gender Diversity	Male board members	Total number of male-identifying directors serving on the company's board of directors, as of the end of the reporting period	#	GRI 405-1; GRI 2-9; SGX S7; Singapore Code of Corporate Governance 2018, MAS	Board meeting minutes, Annual report
	Female board members	Total number of female-identifying directors serving on the company's board of directors, as of the end of the reporting period	#	GRI 405-1; GRI 2-9; SGX S7; Singapore Code of Corporate Governance 2018, MAS	Board meeting minutes, Annual report
Boad Age Diversity	Young board members (age < 30)	Number of board of directors below 30 years of age, as of the end of the reporting period	#	GRI 405-1; GRI 2-9; SGX S7; Singapore Code of Corporate Governance 2018, MAS	Board meeting minutes, Annual report
	Medium-aged board members (age 30 – 50)	Total number of board of directors between 30 and 50 years of age, as of the end of the reporting period	#	GRI 405-1; GRI 2-9; SGX S7; Singapore Code of Corporate Governance 2018, MAS	Board meeting minutes, Annual report
	Senior board members (age > 50)	Total number of board of directors above 50 years of age, as of the end of the reporting period	#	GRI 405-1; GRI 2-9; SGX S7; Singapore Code of Corporate Governance 2018, MAS	Board meeting minutes, Annual report
Unethical Behaviour	Corruption incidents	Total number of confirmed incidents involving abuse of entrusted power for personal or organisational gain, including bribery, fraud, collusion and money laundering during the reporting period	#	GRI 205-3; GRI 2-27	Internal audit reports, Legal and compliance records, Whistleblowing channel reports
	Conflict of interest	Total number of confirmed incidents where a personal, financial, or professional interest of an employee or governance body member improperly influenced, or had the potential to	#	GRI 205-3; GRI 2-27	Internal audit reports, Legal and compliance records, Whistleblowing channel reports

		improperly influence, a business decision or action during the reporting period.			
	Regulatory non-compliance	Total number of confirmed instances of non-compliance with laws and regulations during the reporting period, resulting in monetary fines, and non-monetary sanctions imposed by the regulatory authorities	#	GRI 2-27	Legal and compliance records, Regulatory penalty notices, Court or tribunal records
Data Security	Cyberattacks	Total number of confirmed incidents of unauthorised access, intrusion or disruption to the company's information system, networks, or digital infrastructure during the reporting period	#	GRI 418-1; Personal Data Protection Act (PDPA) 2012	IT security incident logs, Cybersecurity vendor reports, Internal IT audit records
	Privacy breaches	Total number of confirmed incidents involving unauthorised access to, loss of, or disclosure of personal data belonging to customers, employees, or other individuals during the reporting period.	#	GRI 418-1; Personal Data Protection Act (PDPA) 2012	IT security incident logs, PDPC breach notification records, Internal IT audit records
Emissions Reduction Target	Scope 1 Absolute emissions reduction target	The total quantity of scope 1 emissions reduction the company has formally committed to achieving relative to a defined base year, independent of changes in business activity or output levels, including the target quantity and timeline committed to	tCO_2e	GRI 305-5; Science Based Targets initiative (SBTi)	Published sustainability reports, Annual report, SBTi target dashboard, Company climate commitments
	Scope 2 Absolute emissions reduction target	The total quantity of scope 2 emissions reduction the company has formally committed to achieving relative to a defined base year, independent of changes in business activity or output levels, including the target quantity and timeline committed to	tCO_2e	GRI 305-5; Science Based Targets initiative (SBTi)	Published sustainability reports, Annual report, SBTi target dashboard, Company climate commitments
	Scope 1 Percentage emissions reduction target	The percentage reduction in scope 1 emissions the company has formally committed to achieving relative to a defined base year,	%	GRI 305-5; Science Based Targets initiative (SBTi)	Published sustainability reports, Annual report, SBTi target dashboard,

		including the target percentage and timeline committed to			Company climate commitments
	Scope 2 Percentage emissions reduction target	The percentage reduction in scope 2 emissions the company has formally committed to achieving relative to a defined base year, including the target percentage and timeline committed to	%	GRI 305-5; Science Based Targets initiative (SBTi)	Published sustainability reports, Annual report, SBTi target dashboard, Company climate commitments
	Net-zero emissions target	Indicates whether the company has committed to achieving net-zero greenhouse gas emissions by a specified target year, including the scope of emissions covered and any interim milestones, aligned with recognised net-zero frameworks	Yes/No	GRI 305-5; Science Based Targets initiative (SBTi)	Published sustainability reports, Annual report, SBTi target dashboard
Sustainability Personnel	Chief Sustainability Officer (CSO)	Indicates whether the company has a designated Chief Sustainability Officer (CSO) or equivalent senior executive role with formal responsibility for overseeing the company's sustainability strategy and performance during the reporting period	Yes/No	GRI 2-9; GRI 2-13	Company organisational chart, Annual report
	Sustainability Committee	Indicates whether the company has established a formal sustainability committee or equivalent governance body responsible for reviewing and overseeing sustainability-related policies, targets, and disclosures during the reporting period	Yes/No	GRI 2-9; GRI 2-13	Board committee charters, Annual report
	Sustainability Professionals	Total number of employees with a dedicated sustainability-related role or formally assigned sustainability responsibilities within the company, as of the end of the reporting period	#	GRI 2-13; SGX Sustainability Reporting Guide 2023	HR management system, Company organisational chart
ESG Rating	Rating Agency	Name of any external ESG rating agency or platform that has assessed the company's ESG performance during the reporting period (e.g., EcoVadis, MSCI, Sustainalytics, ESGpedia)	Rating Score	GRI 2-3	ESG rating certificates, Rating agency assessment reports, Company sustainability disclosures

ESG Certification	Certification Type	Name and standard of any sustainability certification obtained or maintained by the company during the reporting period, including the certifying body and the year of attainment or renewal (e.g., ISO 14001, Green Mark, B Corporation)	#	GRI 2-3; ISO 14001; BCA Green Mark; B Corporation	Certifications, Third-party audit reports, Certifying body records

Appendix B – Financial Proxies for Valuation Metrics

Financial Proxies for Environmental Pillar					
Financial Proxies	**Country**	**Type**	**Source**	**Year**	**Reference Link**
Carbon Tax	Singapore	Financial	National Climate Change Secretariat (NCCS)	2024	Click to link to report
Social Cost of Carbon	Global	Impact	Environmental Protection Agency (EPA)	2023	Click to link to report
Fuel Price					
- Petrol Price (95 Octane)	Singapore	Financial	Global Petrol Prices	2025	Click to link to report
- Petrol Price (92 Octane)	Singapore	Financial	CEIC	2024	Click to link to report
- Diesel Price	Singapore	Financial	CEIC	2024	Click to link to report
- Natural Gas	Singapore	Financial	Global Petrol Prices	2025	Click to link to report
- Coal Price	Singapore	Financial	Intratec	2025	Click to link to report
Electricity Tariff	Singapore	Financial	SPGroup	2026	Click to link to report
Renewable Energy Certificate (REC)	Singapore	Financial	Energy Market Authority (EMA)	2023	Click to link to report
Power Purchase Agreement (PPA)	Singapore	Financial	Union	2026	Click to link to report
Water Tariff	Singapore	Financial	SingStat	2026	Click to link to report
Water Externalities Cost	Global	Impact	Trellis	2024	Click to link to report
Waste Disposal Fee	Singapore	Financial	National Environment Agency (NEA)	2025	Click to link to report
Environmental Impact of Waste	Global	Impact	Li et. al.	2023	Click to link to report
Waste Management (Recycling)	Global	Impact	Gull et al.	2022	Click to link to report

Financial Proxies for Social Pillar					
Financial Proxies	**Country**	**Type**	**Source**	**Year**	**Reference Link**
Premium of Gender Diversity	Global	Impact	Herring, C.	2009	Click to link to report
Premium of Age Diversity	Global	Impact	PwC	2023	Click to link to report
Employee Turnover Rate	Global	Impact	Work Institute	2025	Click to link to report
Avg. Training and Development Cost per Hour	Global	Financial	Association for Talent Development (ATD)	2022	Click to link to report
Avg. Training and Development Cost per Worker	Global	Financial	Lorri Freifeld	2025	Click to link to report
Premium of Training and Development	Global	Impact	OECD	2021	Click to link to report

Workplace Injuries Cost	Singapore	Financial	Ministry of Manpower (MOM)	2024	Click to link to report
Workplace Injuries Social Cost	Global	Impact	International Labour Office (ILO)	2013	Click to link to report
Workplace Fatalities Cost	Singapore	Financial	Ministry of Manpower (MOM)	2024	Click to link to report
Workplace Fatalities Social Cost	Global	Impact	International Labour Office (ILO)	2011	Click to link to report

Financial Proxies for Governance Pillar					
Financial Proxies	**Country**	**Type**	**Source**	**Year**	**Reference Link**
Employee Stock or Equity Option	Global	Impact	Dasilas	2024	Click to link to report
Premium of Female Leadership	Global	Impact	Low, D. C. M., Roberts, H., & Whiting, R. H.	2015	Click to link to report
Premium of Board Age Diversity	Global	Impact	Fernández-Temprano, M. A., & Tejerina-Gaite, F.	2020	Click to link to report
Cyber Attacks	Global	Impact	Kamiya, Kang, Kim, Milidonis & Stultz	2018	Click to link to report
ESG Certifications					
- BCorp Certification Fee	Singapore	Financial	BCorp	2026	Click to link to report
- LEED Certification Premium	Global	Impact	Cushman & Wakefield	2022	Click to link to report
- EDGE Certification Fee	Global	Financial	EDGE	2026	Click to link to report
- EDGE Registration Fee	Global	Financial	EDGE	2026	Click to link to report
- ISO14001 Premium	Global	Impact	Arocena et. al.	2020	Click to link to report
- ISO14001 Cost	Singapore	Financial	Mosaic Consultancy	2025	Click to link to report
- United Nations Global Compact Community Fee	Singapore	Financial	UNGC	2024	Click to link to report
- EcoVadis Certification Fee	Global	Financial	Ecovadis	2026	Click to link to report