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DEVELOPING A NET-ZERO STRATEGY FOR A FASHION SME USING SBTi: A CASE STUDY OF TORAJAMELO

PENGEMBANGAN STRATEGI NET-ZERO UNTUK UMKM FESYEN MENGGUNAKAN SBTi: STUDI KASUS TORAJAMELO

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ABSTRACT

The fashion industry contributes an estimated 2–8% of global greenhouse gas (GHG) emissions, prompting growing pressure for decarbonization across the value chain. While large multinational companies are progressively matching net-zero goals and the Science-Based Targets initiative (SBTi), small and medium-sized businesses (SMEs) usually face significant barrier in translating these frameworks into practical strategies. This study explore how ambitious and operationally practical a credible, science-aligned decarbonization road plan could be for TORAJAMELO, an Indonesian ethical fashion company. The study begin by establishing TORAJAMELO's 2024 baseline emission using the Greenhouse Gas Protocol, resulting in a total of 19.04 tCO_2e. The majority of emissions come from Scope 2 electricity use (63%), followed by Scope 3 emissions from business travel, purchase of goods and service, upstream and downstream transportation and distribution to employee commuting. Based on the SBTi's Absolute Contraction Approach, the company is projected to reduce its Scope 2 emissions by 58.8% by 2034 and 90% by 2050 to align with the 1.5°C climate goal. Twenty mitigation strategies were generated to establish the Net-Zero Roadmap for TORAJAMELO. This study demonstrate that SMEs like TORAJAMELO can adopt science-based climate targets and set an actionable strategies to achieve the target. The Net-Zero roadmap provide a realistic and strategic foundation for long-term climate action aligned with both operational capacity and sustainability goals..

Keywords: *Net-zero roadmap, sustainable fashion, SME decarbonization, climate mitigation*

ABSTRAK

Industri fesyen menyumbang sekitar 2–8% dari total emisi gas rumah kaca (GRK) global, sehingga mendorong tekanan yang semakin besar untuk melakukan dekarbonisasi di seluruh rantai nilainya. Meskipun perusahaan multinasional secara progresif mulai menyesuaikan diri dengan target net-zero dan inisiatif Science-Based Targets (SBTi), usaha kecil dan menengah (UMKM) umumnya menghadapi tantangan besar dalam menerjemahkan kerangka kerja tersebut ke dalam strategi praktis yang dapat diimplementasikan. Studi ini mengeksplorasi bagaimana TORAJAMELO—sebuah usaha fesyen asal Indonesia—dapat mengembangkan peta jalan dekarbonisasi yang kredibel, sejalan dengan sains, serta ambisius namun tetap realistis secara operasional. Studi ini dimulai dengan menghitung dan menetapkan baseline emisi GRK TORAJAMELO tahun 2024 menggunakan acuan pedoman Greenhouse Gas Protocol, yang menghasilkan total emisi sebesar 19,04 tCO_2e. Mayoritas emisi berasal dari pengunaan Listrik (Scope 2) sebesar 63%, diikuti oleh emisi Scope 3 yang berasal dari perjalanan bisnis, pembelian barang dan jasam transportasi hulu dan hilir, hingga perjalanan karyawan. Berdasarkan pendekatan Absolute Contraction dari SBTi, TORAJAMELO diproyeksikan untuk mengurangi emisi scope 2 sebesar 58,8% pada tahun 2034 dan 90% pada tahun 2050 agar selaras dengan target iklim 1,5°C. Sebanyak dua puluh strategi mitigasi berhasil diidentifikasi dan membentuk peta jalan Net-Zero untuk TORAJAMELO. Studi ini menunjukkan bahwa UMKM speerti TORAJAMELO dapat mengadopsi target iklim berbasis sains and membuat strategi mitigasi yang dapat dicapai pada tahun 2050. Peta jalan Net-zero ini memberikan fondasi yang realistis dan strategis untuk aksi iklim jangka panjang yang selaras dengan kapasitas operasional dan tujuan keberlanjutan perusahaan.

Kata Kunci: Strategi net-zero, fesyen berkelanjutan, dekarbonisasi UMKM, mitigasi perubahan iklim, SBTi.

INTRODUCTION

In recent years, the major environmental and social effects of the worldwide fashion business have drawn criticism. The rise of fast fashion – a strategy that combine rapid production

with trend-driven design – has contributed to mass production of low-cost garments with short life cycles and regular turnover (Cachon & Swinney, 2011). Although fast fashion enable companies to meet unpredictable consumer demand, it has also fuelled environmental problems due to overproduction and hyper-consumption which cause an alarming increase in textile waste. Fast fashion's accelerated cycle result in enormous environmental footprints with the industry contribute to an estimated 2-8% of annual global greenhouse gas emissions by 2023, an increase of 4% from 2018 (Sadowski et al., 2021). These impacts are especially concerning given the broader environmental context. In 2024, the Potsdam Institute for Climate Impact Research reported that six out of nine planetary boundaries have now been crossed – including climate change, biosphere integrity, land-system change and biogeochemical flows – therefore endangering the earth's resilience and long-term habitability (Richardson et al., 2023). These planetary boundaries are interconnected and exceeding one can lead to a cascading effect that push other beyond safe limit (Steffen et al., 2015). The current trajectory of the fashion industry, rooted in unsustainable pattern of consumption and production, undermine global effort to meet the Sustainable Development Goals and the Paris Agreement on Climate Change. In response to the urgent need for action, the United Nations Framework Convention on Climate Change (UNFCCC) launched the Fashion Industry Charter for Climate Action in 2018, renewed in 2021. The Charter aims to guide the fashion sector toward net-zero greenhouse gas emissions (GHG) by 2050. As of 2023, 42 leading fashion companies have committed to reducing their aggregated Scope 1 and 2 emissions by 47% by 2030 (UNFCCC, 2023). These global efforts reflect growing recognition that the fashion industry must transform at all level—from global supply chains to small local brands—to mitigate climate risks and restore environmental balance.

Amongst these global challenges, Indonesia has emerged as a noteworthy example of a localized, culturally rooted movement toward sustainable fashion. Driven by growing environmental awareness and a desire to preserve its rich cultural heritage, Indonesia's fashion sector is undergoing a transformation that aligns with global sustainability goals while uplifting local communities (Larissa & Titisari, 2023). A number of Indonesian brands have taken the lead in championing sustainable practices. SukkhaCitta apply a farm-to-closet model, using natural dyes and handwoven fabric to produce garment that honor ancestral wisdom. Sejauh Mata Memandang transform textile waste into timeless design while contributing to environmental regeneration. Among these pioneers, TORAJAMELO stand out as a social enterprise that integrate environmental sustainability, social empowerment, and cultural preservation. Founded in Toraja in 2008, TORAJAMELO work with over 1,200 rural women weavers across Sulawesi, East Nusa Tenggara, and West Timor (TORAJAMELO, 2025). The organization support indigenous weaving practice while enabling economic independence for women, promote ethical supply chain, and contribute to low-impact production. Through its mission, TORAJAMELO exemplifies how sustainable fashion can be a vehicle for both ecological restoration and social justice. The adoption of sustainability practice offer multiple strategic benefit for fashion enterprises such as TORAJAMELO,

contribute to both business resilience and positive societal outcome. In line with the goals of the global Fashion Industry Charter for Climate Action, the enterprise is working toward transitioning its business model toward net-zero emission. This alignment enhance TORAJAMELO's credibility and reputation in an industry that increasingly shaped by environmentally conscious consumers and stakeholders, while also ensuring long-term competitiveness.

The primary challenge that TORAJAMELO faces is establishing a climate action strategies that aligned with global standards set by the Fashion Industry Charter for Climate Action and the Science-Based Targets initiative (SBTi). As a purpose-driven social enterprise, TORAJAMELO is committed to transitioning its business model into a net-zero operation while preserving Indonesia's indigenous weaving heritage and empowering rural women. However, for TORAJAMELO to achieve measurable and credible progress in reducing greenhouse gas emissions and adhering to global sustainability standards, they face a significant challenge. This include a target setting on clear emission reduction target and create a decarbonization roadmap.

LITERATURE REVIEW

The Fashion Industry Charter for Climate Action, launched under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) in 2018, is an industry-led initiative aimed at driving the fashion sector toward net-zero greenhouse gas emissions by 2050 (UNFCCC, 2023). The Charter outline a commitment to limit global temperature rise to 1.5°C above pre-industrial levels as stated in the Paris Agreement. Signatories, including brands, retailers, and supplier organizations, pledge to set science-based targets to halve emission by 2030, and implement sustainable practice across the value chain. The initiative emphasize collaborative action, transparency, and the adoption of low-carbon solutions to transform the fashion industry into a more sustainable and climate-resilient sector.

The Science Based Targets initiative (SBTi) provide a framework for apparel and footwear companies to set greenhouse gas (GHG) emission reduction target in line with climate science and the goal of the Paris Agreement (Sadowski et al., 2019). As fashion industry has a significant environmental impact, the SBTi establish sector-specific guidance to assist companies on carbon assessment formulation and mitigation strategies. The "Apparel and Footwear Sector Science-Based Targets Guidance" outline methodologies for setting target across Scope 1 (direct emissions), Scope 2 (indirect emissions from purchased energy), and Scope 3 (all other indirect emissions, include those from the supply chain).

These two frameworks complement each other. The Fashion Industry Charter acts as an overarching roadmap that set industry-wide aspiration and foster collaboration, while SBTi provide companies with a structured methodology to implement and verify their emission reduction effort. Together, they offer a comprehensive approach, guiding the fashion industry toward a low-carbon and climate-resilient future.

Fashion companies must first establish a GHG emission baseline to reduce their emission using the GHG Protocol, the world's most widely used standard for emission accounting. The baseline provide a reference point for

setting reduction target and tracking progress over time. GHG emissions calculation must follow the GHG Protocol methodology that incorporate primary data, industry-standard emission factors, and regional considerations. Due to the scale and operational model of TORAJAMELO that involve a decentralized network of artisans, supply chain partners, and logistics providers, the emission factor-based calculation approach is the most appropriate method for estimating its GHG emissions. This approach allows TORAJAMELO to use standardized emission factors from reliable sources like the GHG Protocol, IPCC, Textile Exchange, Higg Index, and regional energy databases, ensuring consistency and comparability in emissions reporting.

Based SBTi's Net-Zero Standard (SBTi, 2024), there are two target setting can be used : near-term science-based targets which typically 5-10 years and long-term net-zero target which has longer period 15-20 years or through 2050 at the latest. Companies are required to set both near-term and long-term emission reduction targets as part of the standard. The near-term target drive immediate action on emissions cut, while long-term target map out decarbonization strategy by 2050 that consisten with a net-zero future. The level of ambition on the emission reductions under the standard has a goal to limit the warming to 1.5^{o}C. For scope 1 and 2 emissions, the targets must align with a 1.5^{o}C pathway for both near and long-term timeframes. In practice, this means companies must reduce scope 1 and 2 emission at a consistent rate with the global decarbonization agenda to stay within 1.5oC. For scope 3, near-terms targets must align with "well-below 2^{o}C" pathways. As for the long-term targets must reach the 1.5^{o}C level of ambitions.

Climate policy research recognize that addressing the complex and multifaceted risks of global warming requires a three-pronged strategy. Rather than relying on a mitigation-only approach – which has proven insufficient- a more comprehensive and integrated framework is needed, one that combines adaptation, mitigation, and amelioration as complementary pillars of effective and resilient climate action (Aldy & Zeckhauser, 2020).

Adaptation in the climate context refers to adjustments in natural or human systems in response to actual or expected climatic effects (UNFCCC, 2016). In simpler terms, adaptation means taking action to reduce the damage and risk from climate change that we cannot avoided. The role of adaptation is vital as certain levels of warming are already established due to past emissions; effective adaptation can enhance resilience and protect lives and infrastructure in the face of stronger storms, heatwaves, and other climate extremes (UNFCCC, 2016). However, adaptation has important limitations. It does not address the root cause of climate change (greenhouse gas concentrations) and thus cannot by itself stop global warming. Nonetheless, as the reality of unavoidable climate impacts become clearer, adaptation is becoming essential and it complement mitigation efforts.

Mitigation refers to efforts aimed at addressing the root cause of climate change by reducing greenhouse gas emissions and enhancing carbon sinks (IPCC, 2022b). In practice, mitigation encompasses measures to prevent or slow climate change by tackling its source: for example, phasing out fossil fuels in favor of renewable energy, improving energy efficiency, curbing deforestation, and developing low-carbon technologies. The primary goal of

mitigation is to stabilize or lower atmospheric GHG concentrations so that global temperature rise is limited.

Amelioration denotes a set of strategies – often reffered to as geoengineering – that aim to directly reduce the magnitude or impact of climate change, without necessarily reducing emissions at the source (Aldy & Zeckhauser, 2020).

METHOD

The overall methodology of this study to develop a comprehensive decarbonization roadmap for TORAJAMELO follows the GHG Protocol, Science-Based Targets Initiative (SBTi), and Fashion Industry Charter for Climate Action (UNFCCC) standard.

Data Collection

The data collection process follow the GHG Protocol Corporate Accounting and Reporting Standard, which requires clear and consistent activity data to calculate emissions across Scope 1, 2, and 3 in a reliable way. Internal operational data from TORAJAMELO related to activity levels for each GHG emission source category (e.g., electricity usage, business travel logs, transportation records, wast generation, procurement volumes) which are used to calculate emission across Scope 1, 2, and 3. Secondary data use external references such as academic journals, government publications, country-specific emission factors (e.g., from Indonesia's Ministry of Energy or waste sector databases), and international databases (e.g., IPCC, US EPA, ICAO) to determine appropriate emission factor for each activity.

Data Analysis

The emissions from Scope 1, 2, and 3 was calculated in accordance with the GHG Protocol Corporate Standard and it form the baseline year data for TORAJAMELO. This emissions inventory represents the organization's current climate footprint and provides the foundation for setting and tracking future reduction targets.

The SBTi Near-term Target Setting Tool will be used to establish short- to medium-term emissions reduction targets. The tool apply the absolute contraction method, that require a minimum linear annual reduction rate (typically 4.2% per year for a 1.5°C pathway). This tool help to calculate the total amount of GHG emissions that must be reduced each year to stay on track with the selected temperature scenario. The results will be used to define annual targets for Scope 1, 2 and 3.

The Science-Based Targets initiative Net-Zero Tool will be used to model long-term emission reduction pathway toward achieving net-zero by 2050. This tool calculate both interim target and the residual emissions that may require neutralization (e.g., carbon removals or offsets) at the target year. Like the near-term tool, it also apply the absolute approach, focus on actual emission reduction rather than intensity per output.

The result generated from the GHG Protocol-based emissions inventory and the SBTi target-setting tools have been synthesized into a comprehensive decarbonization strategy roadmap for TORAJAMELO. This roadmap includes:

- Defined annual emissions reduction target through 2034 and 2050;
- Total emission to be reduced in alignment with near-term and long-term science-based targets;
- Specific mitigation recommendations across Scope 1, Scope 2, and Scope 3 emission categories.

RESULT AND DISCUSSION

Greenhouse Gas Emission Inventory

TORAJAMELO operate as a purpose-driven fashion enterprise under the AHANA platform, bridging ethical producers, sustainable material innovators, and environmentally conscious consumers. The business process starts with the procurement of raw materials from two main sources: community-based women weavers and sustainable material suppliers such as Mycl.bio, known for its bio-based alternatives like mycelium leather. These materials are delivered to TORAJAMELO's office before being forwarded to third-party manufacturers for processing, including cutting, stitching, and finishing. Although production is outsourced, TORAJAMELO retains control over supplier selection, quality assurance, and ethical compliance. Finished goods are then distributed through B2B channels (e.g., retailers and corporate buyers) and B2C channels (via AHANA retail and online platforms).

In defining the boundary for GHG emissions calculation, this study applies the operational control approach, where only activities directly managed or influenced by TORAJAMELO are included. Accordingly, Scope 1, 2 and 3 emissions from third-party vendors and suppliers are excluded. Instead, the analysis focuses on emissions generated from TORAJAMELO's own electricity use, procurement decisions, transportation coordination, and business travel. The following table summarizes the classification of TORAJAMELO's business activities across emission scopes, providing a basis for the emissions quantification.

Table 1. TORAJAMELO Data Activity

Scope	Category	TORAJAMELO Business Activity
1	Not Applicable	Not Applicable
2	Purchased electricity, steam, heating & cooling for own use	Electricity consumption from the TORAJAMELO's operations
3	Purchased Good and Services	Data on the purchased of goods and services of TORAJAMELO
3	Upstream transportation and distribution	Transportation of raw materials to the TORAJAMELO office and/or production house
3	Waste Generated in operations	Waste generated from TORAJAMELO's operations
3	Business travel	Business travel by all TORAJAMELO employees
3	Employee commuting	Employee commute to TORAJAMELO's office
8	Downstream transportation and distribution	Transportation from TORAJAMELO to the customer

Source: research result

This study apply a combination of country-specific, regional, and global emission factors to calculate TORAJAMELO's GHG emissions across scope 1, 2, and 3. Indonesia-specific emission factor were prioritized where available, it's used in the electricity emission calculation and waste management emission using emission factor from Directorate General of Electricity, Ministry of Energy and Mineral Resources and Gianyar Waste Management Project – Indonesia's waste management carbon credit project. However, due to the limited availability of local emission factors for all categories, regional – APAC region and global datasets from recognized sources such as Climatiq – US EPA, New Zealand Ministry for the Environment and credible journal were used as substitutes for transportation, product usage and material treatment.

The total greenhouse gas (GHG) emission calculated for TORAJAMELO

in the base year 2024 amount to 19.04 tCO_2e. This inventory include emission from Scope 2 and Scope 3 categories, while Scope 1 emission are not applicable due to the absence of company-owned vehicles or on-site combustion activities, also due to the nature of business process of TORAJAMELO.

Table 2. TORAJAMELO GHG Emission

Scope	Category	Emission Value (tCO_2e)
2	Purchased electricity, steam, heating & cooling for own use	11.99
3	Purchased Good and Services	0.15
3	Upstream transportation and distribution	0.03
3	Waste Generated in operations	-0.01
3	Business travel	4.00
3	Employee commuting	2.87
8	Downstream transportation and distribution	0.02
	Total	19.04

Source: research result

In total, TORAJAMELO's GHG inventory comprises emission from Scope 2 and Scope 3, with Scope 2 account for the majority at 63% of total emission—primarily driven by electricity consumption in its office operation. The remaining 37% originates from Scope 3 activities, including business travel, employee commuting, upstream and downstream logistics, purchased goods and services, and waste generation. This emissions profile reflects TORAJAMELO's operational model, where direct emissions (Scope 1) are not applicable, and most climate impacts come from indirect energy use and value chain activities.

Table 3. TORAJAMELO Emission Profile

Scope	Emission Value (tCO_2e)	%Contribution
2	11.99	63%
3	0.15	37%
Total	19.04	100%

Source: research result

SBTi Target Setting

The study apply the Science Based Targets initiative (SBTi) Near-Term Tool using the Absolute Contraction Approach to align its emissions reduction strategy with global climate goals. The calculation was based on the company's Scope 1 and Scope 2 emissions for the base year 2024, with a target year set for 2034- a 10-year period for short to medium term strategy.

Using the 1.5℃ scenario pathway, the SBTi tool calculates a required reduction of 58.8% in Scope 2 emissions by 2034. This result in a target of reducing Scope 2 emissions from 11.99 tCO_2e to 5 tCO_2e over a ten-year period. The projected reduction is illustrated in the tool's graph output, which shows a steady, linear decline in Scope 2 emissions between 2024 and 2034, consistent with the required decarbonization trajectory. The output also generates a formal commitment statement:

"TORAJAMELO commits to reduce Scope 2 emissions 58.8% by 2034 from a 2024 base year, aligned with limiting global temperature rise to 1.5°C."

In addition to set a near-term target for Scope 2, this study also assessed TORAJAMELO Scope 3 emissions using the SBTi Near-Term Tool under the Absolute Contraction Approach. This align with best practice in the fashion industry, where the majority of emission typically arise from upstream and downstream value chain activities such as raw material sourcing, transportation, and business travel.

The total Scope 3 emissions calculated for TORAJAMELO in the base year 2024 amount to 7.1 tCO_2e. Based on the tool scenario options, two reduction scenarios were analyzed:

- Under the WB2C (Well-Below 2°C) pathway, TORAJAMELO would commit to reduce Scope 3 emissions by 35% by 2034 that bring the total emission down to 4.6 tCO_2e.
- Under the more ambitious 1.5°C scenario which align with global climate goal and the Fashion Charter ambition, TORAJAMELO would commit to a 58.8% reduction which target the Scope 3 emission of only 2.9 tCO_2e by 2034.

Given the fashion industry's high reliance on Scope 3 activities, TORAJAMELO recognizes the strategic importance of addressing these indirect emissions and has voluntary modelled both scenarios—despite Scope 3 targets being optional for SMEs under SBTi guidelines.

As for the SBTi Net-Zero target, The absolute contraction approach was used and apply the cross-sector pathway that correlate with fashion sector, TORAJAMELO commits to a 90% absolute reduction in Scope 1 and 2 emissions by 2050, reaching a residual emission of 1.20 tCO_2e. This target is in full compliance with the SBTi Net-Zero Standard, which requires at least a 90–95% reduction in direct emissions by 2050. TORAJAMELO's trajectory also align with the Fashion Industry Charter for Climate Action's net-zero objective that provide long-term credibility to its emissions reduction strategy.

In the base year 2024, TORAJAMELO's total GHG emissions from Scope 1, 2, and 3 amounted to 19.04 tCO_2e, with the largest share coming from Scope 2 (electricity use) and Scope 3 activities such as business travel, employee commuting, and purchased goods and services. The use of the absolute contraction approach aligned with the 1.5°C scenario, TORAJAMELO commits to reduce its total emission by 90% by the year 2050 where there is remain of a residual emission of 1.90 tCO_2e.

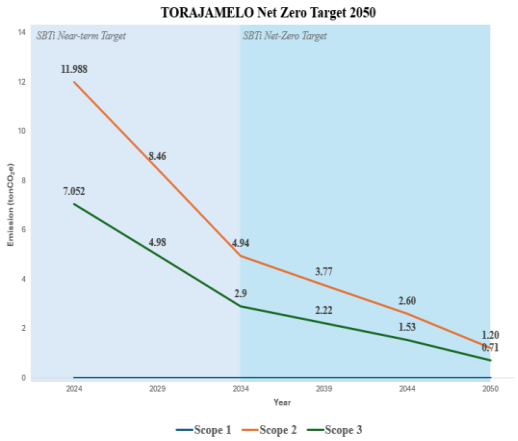

Figure 1. TORAJAMELO Net-Zero Raodmap

Source: research result

TORAJAMELO Mitigation Strategies

TORAJAMELO's Net-Zero Strategy is focused on the mitigation principles, which emphasize an emission reduction at the source as the most effective way to address climate change. As a sustainable fashion enterprise with a distributed value chain, TORAJAMELO's strategy is anchored on practical and high-impact mitigation actions that target its operational and supply chain emissions while at the same time aligned with the SBTi Net-Zero Standard and the Fashion Industry Charter for Climate Action. There are 20 the mitigation actions have been identified in this study. The Net-zero strategy timeline will set out for near-term in 2034 and long term in 2050 with an average of 5.8% annual reduction until 2034 and 4.7% annual reduction target from 2035 to 2050.

Electricity consumption at the TORAJAMELO office contribute

around 63% of the company's total GHG emissions (11.99 tCO_2e out of 19.04 tCO_2e in 2024). This finding show that electricity consumption is the largest single emissions source across all scopes.

Table 4 TORAJAMELO's Mitigation Strategies

Scope	Category	Emission (tCO_2e)	Mitigation Strategy
2	Purchased electricity, steam, heating & cooling for own use	11.99	1. Install rooftop solar PV at TORAJAMELO's office 2. Adopt work-from-home (WFH) arrngements, e.g. 2 days/week work from office will reduce around 60% of daily energy consumption. 3. Implement daily energy-saving rules and campaigns.
2	Purchased Good and Services	0.15	1. Source low-carbon materials where these materials typically have lower carbon footprints than conventional textiles. 2. Optimize procurement planning and order volumes to help cut both emission and administrative overhead. 3. Expand local and regional supplier networks to minimize from long distance transport. 4. Engage suppliers in sustainability capacity building such as introducing basic carbon literacy, emissions tracking, or greener production practice.
3	Upstream transportation and distribution	0.03	1. Partner with low-emission and carbon-neutral logistic providers 2. Consolidate shipments and encourage bulk deliveries 3. Minimize packaging size and weight to reduce both emission and cost in distribution. 4. Shift to lower-emission transport mode
3	Waste Generated in operations	-0.01	1. Enhance waste segregation protocols to enhance recovery rates and improve accuracy of carbon sink attribution in the GHG inventory. 2. Continue partnerships with responsible waste service to have a traceable recycling, composting and reporting mechanism that aligned with the verified emissions factor.
3	Business travel	4.00	1. Replace non-essential travel with virtual alternatives 2. Bunsle site visits and combine agendas to reduce number of travel events and maximizes value per kilometer travelled. 3. Promote low-carbon mode of transport 4. Track travel data to inform decision-making
3	Employee commuting	2.87	1. Promote low-emission commuting mode such as e-bikes, bicycles, or public transportation. 2. Subsidize or incentivies use of public transport 3. Enable hybrid work policies to reduce employee commute
3	Downstream transportation and distribution	0.02	1. Partner with low-emission and carbon-neutral logistic providers 2. Consolidate shipments and encourage bulk deliveries 3. Minimize packaging size and weight to reduce both emission and cost in distribution. 4. Shift to lower-emission transport mode

Source: author analysis

As Scope 1 and 2 emissions are the most controllable within a company's operations, it is critical for TORAJAMELO to develop a robust mitigation strategy to achieve its near-term and net-zero targets.

Scope 3 emissions account for 37% of TORAJAMELO's total GHG footprint consist of upstream and downstream activities across its value chain—including purchased goods and materials, business travel, employee commuting, logistics, and operational waste generation. While these emissions fall outside of TORAJAMELO's direct operational control, they represent critical levers for climate impact reduction, especially in the fashion sector, where supply chain emissions typically dominate total footprints.

TORAJAMELO align its commitment with the Science-Based Target initative (SBTi) to reduce its Scope 3 emissions by 58.8% by 2034 from its 2024 baseline. This target is consistent with the 1.5°C decarbonization pathway and reinforces the company's role in driving sustainability beyond its internal operations. The success of achieving this level of reduction will require a multi-faceted mitigation strategy that engages supply chain partners, enhances operational efficiency, and fosters behavioral change among staff.

In addition to reduce emissions at the source through mitigation, TORAJAMELO's climate strategy also incorporates amelioration measures—actions that help reduce the climate impact of its products during and after their use phase. While the company's emissions footprint from product usage is minimal (as outlined in the GHG inventory), TORAJAMELO proactively minimizes its downstream climate impact through design choices, customer education, and its Re-Melo lifetime care initiative.

TORAJAMELO's products are designed to avoid reliance on emission-intensive maintenance practices. The company's product manual explicitly discourages the use of electric appliances such as washing machines or irons, which are typically associated with higher energy use. Instead, TORAJAMELO provides clear care instructions to customers, emphasizing hand washing, natural detergents, and air drying. These practices reduce both energy consumption and microplastic pollution, reinforcing low-impact use over the product lifecycle.

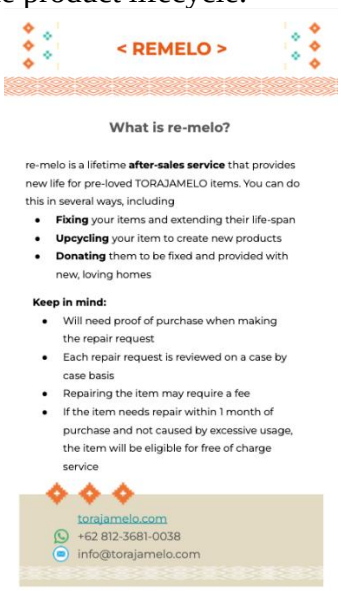

Figure 2. TORAJAMELO Amelioration strategy
Source: TORAJAMELO Product Instructions

This proactive strategy reflects a strong commitment not only to responsible production, but also to customer engagement and post-purchase sustainability—showing how fashion SMEs can embed amelioration into their business model. As the fashion industry grapples with overconsumption and short product lifecycles, TORAJAMELO's Re-Melo program offers a tangible pathway to support

climate goals through durability, reuse, and emotional value retention.

CONCLUSION

This study set out to support TORAJAMELO, a sustainable Indonesian fashion enterprise, in designing a credible and actionable net-zero emissions strategy in line with global standard framework such as the Fashion Industry Charter for Climate Action and the Science-Based Targets initiative (SBTi). The study successfully established a 2024 emissions baseline of 19.04 tCO_2e using the GHG Protocol, with Scope 2 electricity use emerging as the largest contributor (63%), followed by Scope 3 emissions from business travel, upstream and downstream transportation and distribution, waste generation, purchase of goods and services and employee commuting.

The target-setting process follows the SBTi's Absolute Contraction Approach, under which TORAJAMELO's near-term target is to reduce Scope 2 emissions by 58.8% by 2034 and 90% reduction by 2050, in alignment with the 1.5°C climate goal. Although Scope 1 emissions are not applicable, the company also extended its decarbonization target in Scope 3 emission that apply the same 2034 and 2050 reduction target. This reflect TORAJAMELO's strong commitment to holistic emission reduction across its value chain.

SUGGESTION

A future study could focus on integration of climate adaptation strategies and circular economy principles into TORAJAMELO's roadmap to complement emissions reduction effort. In addition to that, conducting impact assessments of TORAJAMELO's social and cultural contributions, alongside environmental metrics, would strengthen the company's triple-bottom-line reporting and stakeholder communication.

Another promising area for further research is the calculation of product-level carbon footprints for TORAJAMELO's key offerings. This would enable the company to pursue carbon-neutral product certification, enhancing its transparency, brand differentiation, and appeal to environmentally conscious consumers and markets

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