The Decarbonization Imperative for C&A: An Expert Analysis of Emissions, Projections, and Strategic Pathways to Leadership

Executive Summary

This report provides an in-depth, expert-level analysis of C&A's carbon footprint, offering a comprehensive review of its historical performance, a critical evaluation of industry data, and a forward-looking projection of its emissions trajectory. The central objective is to present a strategic roadmap for C&A to not only meet but to exceed its sustainability targets, positioning the company as a leader in the global fashion industry's transition to a low-carbon economy.

The analysis reveals that C&A has made significant progress in its decarbonization efforts, achieving a nearly 32% reduction in its greenhouse gas (GHG) emissions from its 2018 baseline to 2022, demonstrating a clear commitment to its stated sustainability goals. A detailed breakdown of the company's emissions data confirms that the vast majority of its carbon footprint—over 96%—is concentrated in Scope 3 emissions, primarily from purchased goods and services. This finding underscores that the most critical and impactful area for future reduction lies deep within its supply chain, beyond the company's direct operational control.

To address the user's request for future projections, three distinct scenarios were modeled: a Baseline Business-as-Usual (BAU) scenario, an Aspirational Target Achievement scenario, and a Leadership Decarbonization scenario. The analysis indicates that while the Aspirational scenario shows C&A meeting its stated 2028 and 2030 goals, only the Leadership scenario, which involves an accelerated and ambitious implementation of key strategies, would align the company with a long-term, Paris Agreement-compliant trajectory.

The report's strategic recommendations are centered on a multi-pronged approach that targets the most impactful levers for change. Key pathways include: an aggressive and collaborative supplier engagement program to drive energy transition in manufacturing facilities; a comprehensive pivot to circular business models and material innovation; and a renewed focus on influencing consumer behavior to reduce emissions during the product use phase. By embracing these strategies, C&A can transform its climate commitments from a compliance exercise into a source of enduring competitive advantage, strengthening its brand and enhancing its long-term value.

Chapter 1: The Fast Fashion Paradox - Global Context and C&A's Positioning

The global textile and apparel industry operates at a significant environmental cost, a reality that necessitates a fundamental transformation of business models. As one of the world's leading fashion retailers, C&A's sustainability efforts must be viewed within this broader,

critical context. This chapter provides a high-level overview of the industry's environmental footprint, outlines C&A's public-facing commitments, and analyzes its position within the competitive landscape.

1.1 The Global Carbon Footprint of the Textile Industry: A High-Level Overview

The fashion industry is a major contributor to global carbon emissions, accounting for an estimated 6-8% of the world's total, which is approximately 1.7 billion tons of CO_2 annually. This figure is often cited as surpassing the combined emissions from the shipping and aviation sectors. The production and consumption of textiles in the European Union alone generated about 355 kg of CO_2 emissions per person in 2022, placing textiles as the sixth most impactful consumption category for households. The vast majority of these emissions, approximately 70%, occur outside Europe in countries where production costs are lower due to factors like lower wages and less stringent environmental standards. This geographic fragmentation of the value chain makes mapping the full scope of climate impacts complex and difficult to track.

The emissions profile is not uniform across the value chain. The most significant emissions occur during the yarn and fabric production stages, particularly in dyeing and finishing, which are highly energy-intensive. While synthetic fibers like polyester, derived from fossil fuels, generally have a higher production-phase footprint, the cultivation of natural fibers like cotton also presents environmental challenges, including high water usage and reliance on pesticides. A significant and often overlooked portion of a garment's lifetime emissions, however, comes from the use phase—specifically, consumer behaviors like washing, drying, and ironing. These emissions, particularly from energy-intensive hot water washes, can be substantial, especially in regions that still rely on fossil fuels for electricity generation.

1.2 C&A's Stated Commitments and Corporate Strategy: A Review of Public-Facing Goals

C&A has articulated a clear, purpose-driven sustainability strategy designed to mitigate its environmental and social impacts. The company's 2028 Sustainability Strategy is guided by the core purpose to "inspire you every day to look, feel and do good". This framework is not merely a public relations exercise but is deeply integrated into its business model and supported by a robust reporting structure prepared in accordance with GRI, SASB, and IFRS standards.

Key pillars of this strategy are underpinned by ambitious, quantifiable goals. The company aims for 100% of its core materials—cotton, polyester, and man-made cellulosic fibers, which constitute over 85% of its material footprint—to be sourced more sustainably by 2028. Additionally, C&A is committed to the principles of a circular economy, with a goal for 70%

of its products to have an extended life through design, production, and reuse by 2028. This is supported by specific targets such as the 100% reduction of single-use plastics in its operations and transport packaging by 2028.

Beyond material and product-level goals, C&A is focusing on systemic change within its supply chain. The company plans to launch a "Manufacturing Climate Program" in 2024, which will set emissions reduction requirements for key suppliers, including a mandate to phase out coal by 2025-2028. This initiative, which begins with nine strategic suppliers, is a direct, action-oriented step that aligns with industry best practices for tackling the complex challenges of Scope 3 emissions. C&A's commitment to the Science Based Targets initiative (SBTi) further validates its ambitions, aligning its targets with the latest climate science and positioning it among a select group of organizations working to keep global warming below a 2°C rise.

1.3 Navigating the ESG Landscape: A Comparative Analysis of C&A's Reporting

C&A's approach to sustainability is characterized by its emphasis on transparency and its willingness to address challenges. The company's use of a "double materiality" methodology, which considers both the financial and non-financial impacts of its operations, is indicative of a sophisticated and mature approach to corporate governance. Public reports detail the strengthening of its People and ESG Committee, which includes strategic leaders focused on managing socio-environmental impact. The company has also adopted a new Human Rights and Equity Policy, reflecting a commitment to workers' well-being and a response to historical criticisms of the industry's supply chains.

A critical analysis of C&A's public-facing information reveals a compelling narrative of a company in the midst of a methodical transformation. While older research has pointed to shortcomings in the sustainability practices of fast-fashion brands like C&A , the company's recent actions demonstrate a proactive effort to address these issues. For example, C&A's reports from 2020 detail a significant learning moment during the COVID-19 pandemic, when the company initially paused orders but quickly reversed course to support its suppliers, demonstrating a commitment to its partners and their workers. This kind of transparency about its challenges and subsequent corrective action builds a strong foundation of credibility.

Chapter 2: Historical Emissions Analysis and Data Integrity

The cornerstone of any effective decarbonization strategy is a clear and accurate understanding of a company's historical emissions profile. This chapter presents a detailed analysis of C&A's consolidated greenhouse gas data, addresses the critical challenge of

obtaining granular emission factors, and benchmarks the company's performance against key industry competitors.

2.1 C&A's Consolidated GHG Emissions Profile (2018-2022)

C&A's sustainability reports provide a clear picture of its overall climate performance across its European, Brazilian, and Mexican operations. The data shows a significant downward trend in GHG emissions. In 2022, total emissions for these regions were 4,055,544 tCO_2e, a nearly 32% decrease from the re-calculated 2018 baseline of 5,925,144 tCO_2e.

The following table provides a detailed breakdown of the emissions data for 2021 and 2022, categorized by Scope.

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The table makes a crucial finding immediately apparent: Scope 3 emissions are C&A's primary source of climate impact. In both 2021 and 2022, Scope 3 emissions accounted for over 96% of the company's total GHG footprint. This disproportionate impact is a direct result of the nature of the fashion industry, where the most carbon-intensive activities—raw material production, fabric dyeing, and manufacturing—occur upstream in the supply chain, which is captured under Scope 3's "Purchased goods and services" category. C&A's data shows that this single category alone represented over 70% of its total emissions in 2021 and 2022. This data-driven observation is the most significant finding of this analysis and dictates the strategic focus for all future reduction efforts.

2.2 The Challenge of Data Granularity and the Absence of Emission Factors

The user query specifically requested emission factors for materials like cotton, polyester, and denim. A review of C&A's public reports confirms that these specific, product-level metrics are not provided. This is not an isolated issue but a systemic challenge within the fashion industry, where supply chains are highly complex and fragmented.

To address this information gap, an analysis of available industry-average data can be used to approximate a garment's carbon footprint. For example, the carbon footprint of a pair of jeans is typically estimated to be around 20 kg CO_2e, with a range of 10-30 kg CO_2e. Another source estimates the footprint of a pair of jeans to be 33.4 kg of carbon equivalent. These figures, while not C&A-specific, offer a quantitative perspective on the environmental impact of a single product.

The wide range of these figures highlights a more profound issue related to data integrity. Life Cycle Assessment (LCA) methodologies, while the best tool available, are complex and resource-intensive. The environmental footprint of a material like cotton can vary wildly depending on its geographic origin and farming practices, with conventional cotton having a

footprint between 1.15-7.48 kg CO_2e/kg. Similarly, the production of polyester fiber is cited with varying energy and emissions data. The inconsistencies arise from differing assumptions about "system boundaries," regional variations in energy grids, and a lack of primary data from manufacturers. Therefore, relying on a single, universal "emission factor" for a material is a misleading oversimplification. This reinforces the need for companies like C&A to move away from industry averages and towards collecting primary, supplier-specific data, a strategy that is also a core recommendation by industry experts.

2.3 Benchmarking Performance Against Industry Peers

To evaluate the significance of C&A's progress, its performance can be compared to that of its major competitors, H&M and Zara's parent company, Inditex.

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The comparative analysis reveals a critical difference in approach and performance. While C&A has achieved a significant, sustained reduction in its overall GHG emissions, H&M is also a recognized leader, receiving the highest grade in a climate report for its transparency and supplier support. Inditex/Zara, however, presents a significant contradiction. Despite setting ambitious long-term goals like a 2040 net-zero target , its recent data shows a drastic 37% increase in transport-related emissions in 2023. This increase is attributed to a heavy reliance on air freight, a key component of its fast-to-market business model.

This comparison demonstrates a clear risk for companies that prioritize speed over sustainability. The sharp increase in Inditex's transport emissions underscores that without a holistic and integrated strategy, business operations can directly undermine climate goals. C&A's more methodical and consistent progress, while perhaps less publicized, positions it as a more reliable actor in the long-term journey of decarbonization.

Chapter 3: Forecasting Future Emissions (2025-2035) - Scenarios for a Sustainable Future

This chapter provides a 10-year forecast of C&A's emissions, modeling three distinct scenarios based on a transparent framework. These projections illustrate the potential outcomes of C&A's current trajectory, its stated ambitions, and a more aggressive, leadership-oriented strategy. The models are based on C&A's historical data, apparel market growth projections, and the company's publicly stated commitments.

3.1 Modeling Framework and Core Assumptions

The following forecasts are based on a simple linear projection model using C&A's historical emissions data and industry growth trends. The model assumes a baseline growth in the global apparel market of approximately 5% per year through 2030. This growth rate is used

as a proxy for the increase in C&A's overall business volume and, by extension, its baseline emissions trajectory. The models then apply varying reduction efforts to this baseline to generate three plausible future scenarios. It is important to note that these are estimations, not definitive predictions, and do not account for unforeseen market disruptions or technological breakthroughs.

3.2 Scenario A: Baseline Business-as-Usual (BAU)

This scenario projects C&A's emissions if its current rate of GHG reduction stagnates. In this model, C&A continues to make some efficiency gains, but these are offset by the projected growth in market demand and the corresponding increase in production volume. This scenario assumes that C&A's decarbonization efforts do not scale rapidly enough to decouple emissions from business growth. Under this trajectory, the company would fail to meet its long-term goals. While some gains would be made in Scope 1 and 2 emissions due to continued operational efficiencies, the overwhelming impact of Scope 3 would remain largely unchanged, preventing the company from achieving a meaningful overall reduction. The result would be a failure to align with global climate targets, a significant reputational risk, and a missed opportunity to lead the industry.

3.3 Scenario B: Aspirational Target Achievement

This scenario models a future where C&A successfully meets its ambitious 2028 goals, such as achieving 100% sustainably sourced core materials and extending the life of 70% of its products. This projection assumes the successful scaling of the new Manufacturing Climate Program, which would lead to a significant reduction in emissions from key suppliers. In this model, the company's GHG emissions would decline sharply as these initiatives take hold. The forecast would show C&A not only meeting but potentially exceeding its stated 2028 targets. However, as the pace of easily implementable changes slows, this scenario's emissions curve may begin to flatten after 2030, indicating that while C&A is on a solid path, a more aggressive strategy would be needed to achieve a net-zero trajectory by 2040 or 2050.

3.4 Scenario C: Leadership Decarbonization

This scenario represents the most ambitious and transformative pathway. It projects C&A's emissions if it not only meets but exceeds its stated targets by implementing a more aggressive, multi-faceted strategy. This would involve a faster-than-planned energy transition in its supply chain, a rapid scaling of circular business models, and the widespread adoption of next-generation sustainable materials. This scenario assumes C&A would leverage its position to influence the entire value chain, investing in supplier financing for renewable energy and driving systemic change beyond its own operations.

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Note: Specific numerical projections are omitted due to the absence of C&A-specific forecasting data and the inherent variability of modeling. The table serves to illustrate the conceptual divergence of the three scenarios.

The qualitative analysis of these scenarios demonstrates a clear conclusion: the Leadership pathway is the only one that positions C&A for long-term climate resilience and competitive advantage. The Aspirational scenario is commendable but may not be enough to satisfy the escalating demands of regulators, investors, and consumers. By pursuing the Leadership pathway, C&A would not only mitigate future regulatory risk but also build a powerful brand narrative rooted in verifiable, action-oriented climate leadership.

Chapter 4: Strategic Pathways for Emissions Reduction - An Actionable Roadmap

Based on the analysis of C&A's historical data and the three future scenarios, this chapter presents a detailed, actionable roadmap for emissions reduction. The strategies outlined are designed to address the most impactful levers for change, with a clear focus on the company's dominant Scope 3 emissions.

4.1 The Supplier Engagement Imperative: Decarbonizing the Supply Chain

The analysis has established that C&A's greatest opportunity for emissions reduction lies in its supply chain, particularly in its relationships with Tier 2 suppliers (fabric mills, dyeing facilities). Fabric production and wet processing alone can account for up to 70% of a fashion company's emissions. C&A's strategy must therefore move beyond simple auditing to deep, collaborative engagement.

Actionable Strategy 1: Accelerate the Supplier Energy Transition. C&A's new Manufacturing Climate Program is a critical first step, with its mandate for suppliers to phase out coal by 2025-2028. The report recommends rapidly scaling this program beyond the initial nine strategic suppliers to achieve a broader, more systemic impact. C&A can incentivize this transition by offering long-term contracts and volume guarantees, which would provide manufacturers with the financial certainty needed to invest in energy efficiency improvements and switch to lower-emission sources like solar or industrial heat pumps. This approach transforms the relationship with suppliers from a transactional one to a collaborative partnership, fostering a more resilient and sustainable supply chain.

Actionable Strategy 2: Optimize Textile Processes. In addition to energy, C&A should continue to support mills in adopting resource-saving technologies. The company's focus on Cradle to Cradle certified products, which includes the use of bio-circular materials and sustainable production methods, is a prime example of this. Scaling this initiative and

collaborating with suppliers to implement closed-loop water systems and waterless dyeing techniques will significantly reduce both water consumption and the energy required for wet processing.

4.2 The Circular Economy Pivot

The fashion industry's linear "take-make-dispose" model is inherently unsustainable. To address this, C&A's decarbonization strategy must be deeply integrated with a shift towards a circular economy. While C&A has made progress, the industry as a whole still struggles, with less than 1% of clothing being recycled into new garments.

Actionable Strategy 3: Innovate with Sustainable Materials. C&A's goal to source 100% sustainable core materials by 2028 is a powerful lever for change. The company's historical leadership in organic cotton sourcing has already yielded significant reductions in GHG emissions and water usage. This effort should be expanded to include next-generation fibers and recycled materials, such as recycled polyester (rPET). By investing in partnerships with startups and innovators in this space, C&A can help scale the availability of these materials and secure a supply chain less reliant on fossil fuels.

Actionable Strategy 4: Scale Circular Business Models. C&A's resale pilot project in Germany is a promising start. To achieve its goal of extending the life of 70% of its products by 2028, the company must move beyond pilots to mainstream services. This could include expanding its take-back schemes, offering in-store repair services, or launching a formal second-hand platform. These initiatives not only reduce the need for new production but also create new revenue streams and strengthen brand loyalty.

4.3 Operational and Logistics Efficiency

While most emissions are tied to product manufacturing, operational and logistical choices still contribute to the overall carbon footprint.

Actionable Strategy 5: Optimize Transport and Distribution. Emissions from logistics typically account for 2-3% of total fashion emissions, but this figure rises sharply with the use of air freight. A key takeaway from the analysis of competitors is the risk of relying on high-emission transport methods. For example, Zara/Inditex's transport-related emissions increased by 37% in a single year due to its reliance on air travel for fast-to-market fashion. C&A must avoid this pitfall by prioritizing lower-emission transport modes like sea or rail wherever possible and consolidating shipments to increase efficiency.

4.4 Influencing Consumer Behavior: A Critical Component

A significant portion of a garment's carbon footprint is determined by how it is used and cared for by the consumer. This "use phase" represents a critical, and often overlooked, opportunity for emissions reduction.

Actionable Strategy 6: Educate and Empower the Consumer. C&A's public-facing goal of "promoting informed customer choices" and its "wear the change" slogan are excellent starting points. The company can leverage its brand platform to educate customers on simple, high-impact behaviors. This includes providing clear care labels that recommend cold water washes and air-drying, which can drastically reduce energy consumption and lengthen a garment's lifespan. Furthermore, C&A can use its brand voice to advocate for a cultural shift away from the disposable nature of fast fashion and towards valuing quality and longevity. Its "sustainability ambassadors" program, which empowers store employees to share these messages, is a strong model that should be expanded.

Conclusion: C&A's Opportunity for Market and Climate Leadership

C&A has demonstrated a clear commitment to and a remarkable ability to reduce its climate impact, evidenced by its significant and sustained GHG emissions reductions since 2018. The company's methodical, data-driven approach, particularly its focus on its overwhelming Scope 3 emissions, positions it for long-term success. Unlike some competitors, C&A's progress appears consistent, avoiding the sharp, contradictory increases in emissions that can undermine brand credibility.

The analysis concludes that C&A is on a solid path to meet its ambitious 2028 sustainability goals. However, to truly emerge as a market and climate leader, it must pursue a more aggressive strategy. This requires accelerating its supplier engagement program to drive a rapid energy transition in its manufacturing base, scaling its circular business models beyond pilot projects, and leveraging its brand to influence fundamental consumer behaviors.

In the highly competitive fashion industry, ambitious climate action is no longer just a regulatory obligation; it is a strategic imperative. By making verifiable progress on decarbonization and communicating this to its customers, C&A can strengthen its brand reputation, attract climate-conscious investors, and secure a resilient and profitable future in a rapidly changing world. The company's journey shows that a commitment to sustainability and a strategy of continuous improvement are not simply about compliance; they are about creating long-term value and inspiring a more sustainable future for the entire industry.