Tapestry, Inc.

Tapestry Environmental Product Impact Calculator (T-EPIC) version 2.0

Methodology Summary

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Version 1
NON-CONFIDENTIAL

Document Purpose

Tapestry, Inc., the parent company of Coach and kate spade new york, is dedicated to understanding and improving its products' life cycle environmental impacts. This document describes the Tapestry Environmental Product Impact Calculator (T-EPIC), commissioned by Tapestry and developed by WSP. T-EPIC estimates life cycle greenhouse gas (GHG) emissions and waste from the Coachtopia sub-brand of sustainability-focused leather goods (LG), footwear (FW), and ready-to-wear (RTW) apparel. T-EPIC provides carbon and waste footprints per unit product by combining data from product bills of materials (BOMs), which contain all the materials needed to manufacture the product, with representative emission factors from leading environmental impact databases and data from the Coachtopia supply chain for each product category for transport, use, repair, and end-of-life (EOL). T-EPIC version 2 is based on a life cycle assessment (LCA) framework and was critically reviewed by a panel of three experts who confirmed that the tool aligns with ISO standards 14040 and 14044 for LCA.

Items in the Coachtopia sub-brand are designed to maximize the use of recycled and factory scrap materials, thereby reducing the emissions and waste footprints of the products. T-EPIC compares environmental impacts between Coachtopia products and hypothetical baseline products made from virgin materials, providing insights that are intended to be shared both within Coach to inform design decisions and externally to provide information on the products' impacts to the company's stakeholders. T-EPIC can be used to identify GHG emission hot spots of products' life cycle stages and analyze options to reduce the GHG impact, such as switching to lower carbon intensity materials and evaluating material circularity options.

This report provides a summary of T-EPIC version 2.0, including the assessment boundary, assumptions, and primary data sources. More details are available in the critically reviewed LCA report and addendums for T-EPIC version 1.0, T-EPIC version 2.0, and the T-EPIC product second life model.

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System Boundary and Data Sources

The product system is ‘cradle-to-grave,’ including raw material extraction and refining, recycled material processing, manufacturing, distribution and retail, use by the consumer, product recycling and reimagining, and disposal at end-of-life. In T-EPIC, manufacturing specifically refers to tier-1 supplier activities, while textile and parts production are grouped with raw materials and refining. Table 1 provides an overview of the life cycle stages, a summary of calculation methods and data sources, assumptions and included or excluded processes. It is divided into one column for the GHG assessment method and one column for the waste assessment method.

Background data on GHG emissions for inputs to the systems come primarily from two databases, Higg MSI and ecoinvent, supplemented by a small number of product-specific documents. Higg is a technology platform that helps consumer goods companies measure and improve their supply chain's sustainability, from which material and manufacturing impacts were sourced for many materials specific to the Coachtopia supply chain. ecoinvent is a well-established life cycle inventory database which was used to assess GHG emissions from materials, processing, and transportation. Table 2 gives a complete overview of the data sources.

Coachtopia products contain recycled materials for key components. T-EPIC applies the recycled content approach to calculate impacts from materials that can be recycled, or that generate recyclable materials during manufacturing. This aligns with the background data from Higg and ecoinvent. In the recycled content approach, environmental impacts from manufacturing are all assigned to the primary product. Therefore, recycled materials, both from factory recaptured materials and post-consumer, come with zero “upstream” environmental impact. Processing and transportation of recycled materials, however, are included in those materials’ environmental impacts.

Comparisons of Coachtopia products to standard products are based on hypothetical baseline products that are identical to Coachtopia products in every way except that they are not made with any recycled materials. As such, the only difference is the sourcing of raw materials. Manufacturing, distribution, use and end-of-life remain the same.

Infrastructure and capital goods are not included for modelled processes due to their small contribution to the overall impact balanced with the time required to collect these data. Some data sources, such as ecoinvent, include the impacts of depreciable capital.

Table 1: T-EPIC calculation methods and data sources for GHG and waste assessments by life cycle stage.

Stage	Step	Method for GHG Assessment	Method for Waste Assessment
Product	**Raw Material Supply** Data sources Higg MSI ecoinvent Supplier data Coach	The extraction, production, and treatment of virgin, non-renewable and renewable primary and secondary materials and energy were included. Certain materials, such as tags and thread, known to contribute less than 1% to total product weight were excluded due to a lack of data availability. Transportation between extraction, processing, and manufacturing of raw materials was not modeled, though upstream transportation of some materials was included in background datasets. Packaging materials for the raw materials and semi-finished goods were not considered in this study. Some novel materials used in Coachtopia products had no direct match in the available background datasets. For these materials, WSP evaluated their cradle-to-gate GHG emissions based on data available from the manufacturers. For example: • Recycled leather fiber materials: WSP conducted life cycle assessments of several of these materials based on manurafacturer data and/or life cycle inventory data from third party reports, using datasets localized to Coach's supplier country of origin • Scrap leather: reused scrap leather from previous Coach product systems has no material GHG emissions, consistent with the recycled content modeling approach • Recycled polyethylene: WSP used raw materials inventories to estimate the GHG emissions from manufacturing of parts made from recycled polyethylene, using datasets localized to Coach's supplier country of origin • NFC tags: WSP used supplier specifications and measurements by Coach to model the GHG emissions from manufacturing of NFC tags	Waste generated during raw material extraction, and was excluded due to a lack of available data. Packaging waste from materials supply chains from raw materials extraction to product manufacturing was excluded due to a lack of available data.
	Transport Data sources ecoinvent Coach	Transportation of the raw materials and semi-finished goods to the manufacturing site was included for all included materials. The specific locations of suppliers and the manufacturing sites was used to calculate transport distances. Where facility addresses were not available, distances were based on the city or country of origin. It was assumed that truck transport took place to the closest port, followed by sea shipping to the closest port of the factory, and last-mile delivery by truck.	Assumed no waste during transportation.
	Manufacturing Data sources Higg FEM Munasinghe, Druckman, & Dissanayake (2021)	Manufacturing GHG emissions were estimated based on the total facility GHG emissions and the number of products manufactured at the facility. These data were gathered from Higg FEM, which contains primary data from Coachtopia suppliers, for the most recent reporting year. No distinction could be made between different kinds of products, as such, the GHG emissions per unit are identical for all products manufactured at a particular facility. Coachtopia RTW suppliers did not have GHG emissions data available in the FEM database. These were instead estimated based on results from a meta-review (Munasinghe, Druckman, & Dissanayake, 2021) based on the average GHG emissions for cotton t-shirts.	Waste generated on the factory floor during cutting, sewing, skiving, and similar processes was included. The waste from manufacturing was estimated by the difference between the gross materials weight in the BOM and the final product weight. Information on the types of packaging used for the products was provided by Coach. Other sources of waste from factory offices, meals, and general operations were excluded due to a lack of available data.

Stage	Step	Method for GHG Assessment	Method for Waste Assessment
Distribution	**Inbound Transport** Data sources ecoinvent	Transportation of finished products from manufacturers to distribution centers (DCs) was included for all products. The specific locations of manufacturing sites and DCs was used to calculate transport distances. Weighted per-product average transportation distances were estimated based on the share of products produced from each supplier stored at each DC. Routes were modeled as truck transport to the closest port, followed by sea shipping to the port closest to the factory and port-to-factory delivery by truck. Air freight of products was also modeled using a similar method based on the percentage of Coachtopia products moved by air in the previous year. Product weight during transportation included the item weight and an average of packaging weight for the relevant product category (i.e., LG, SLG, FW, RTW). Due to the structure of Coachtopia BOMs, some packaging materials may be listed twice in T-EPIC, potentially leading to an overestimate in GHG emissions due to overestimation of packaged product weights.	Assumed no waste during transportation.
	Distribution Center Data sources EIA eGRID EPA	The energy consumption of DCs was estimated using the 2018 Commercial Buildings Energy Consumption Survey (EIA, 2022) and the floor area of each location used for Coachtopia products. For sites outside of the United States, climate zones were used to select the appropriate energy consumption estimates. eGRID and natural gas emission factors from the US Environmental Protection Agency (EPA) were applied to the energy consumption to generate GHG emissions estimates. GHG emissions from each DC were divided equally among all Coachtopia products at that location.	Bulk packaging of the finished products were assumed to be discarded at the distribution centers. For example, it was assumed that the pellets used in the bulk packing were used only once. The difference between the outer packaging and the inner packaging was considered waste at this stage.
	Outgoing Transport Data sources ecoinvent	Transport of the product from the DC to RS and from DC to customer (e-commerce) store was included for all products. The specific locations of DCs and RS were used to calculate transport distances. Weighted per-product average transportation distances were estimated based on the share of products expected to be stored at each DC and sold at each RS. Transport from the distribution center to e-commerce customers was based on the average Coach e-commerce distribution distances by air transport and truck transport.	Assumed no waste during transportation.
Retail	**Retail Stores** Data sources EIA eGRID	Energy consumed by the retail stores. The energy burdens are allocated based on the average number of units in the store. If this data was not available, the Coachtopia floor area share was estimated. The energy consumption of the stores facilities is estimated using data by the US Energy Information Administration (EIA), specifically the 2018 Commercial Buildings Energy Consumption Survey (EIA, 2022), together with the floor area with the store and share of Coachtopia products at the location. Emissions & Generation Resource Integrated Database (eGRID) and natural gas emission factors from the EPA were applied to energy consumption. These sources were also applied to international sites by matching them with US locations with similar climate zones. The transportation of products purchased at the retail store to the home of the customer was not considered.	The difference betweeen the outer packaging and the inner packaging was considered waste at this stage.

Stage	Step	Method for GHG Assessment	Method for Waste Assessment
Use	**Use** <u>Data sources</u> Cotton Inc (2016) ecoinvent	Use phase emission factors were estimated based on the care instructions provided by Coach to the customer. For RTW items, this included regular machine washing and machine drying. For most LG and FTW, no relevant care practices were identified. Though Coach typically recommends occasional leather care for handbags, the environmental impacts were expected to be minor. For the newly introduced Loop products, Coach typically recommends occasional washing and air drying. Those impacts are included based on data for washing RTW. Average washing and drying practices for RTW and Loop items were based on data from Cotton Inc (2016) for t-shirts and casual collared shirts. Energy, water, and detergent inputs for machine washing and drying were applied to all Coachtopia RTW items based on a typical wash load size of 4.04 kg and a drying load size of 4.13 kg. The same average product weight (225 grams for a t-shirt and 275 grams for a casual collared shirt) in the Cotton Inc study was considered in this study. As such the RTW use burdens are equal for all RTW items, regardless of individual product weight. Use phase burdens for Loop products are lower because washing is expected to be less frequent for handbags than for RTW items. Washer and dryer efficiencies were selected based on common statistics from American home appliance manufacturers. Average US emissions for electricity, natural gas and detergent manufacturing from ecoinvent were used to generate use phase GHG emissions estimates.	Consumer packaging of the product is considered waste at this stage. For e-commerce and (Re)Loved shipments, distribution and consumer packaging are both considered waste at this stage. Auxiliary waste (detergent containers, etc) from the use phase were excluded.
Repair	**Repair, (Re)Loved** <u>Data sources</u> Coach ecoinvent Higg MSI	Energy use data from the Coach repair facility in North Bergen, NJ, supply chain data from product repairs, and the total number of repair and (Re)Loved products from 2024. were used to estimate manufacturing, packaging and transportation emissions for second life products. Materials GHG emissions were modeled based on 26 total case studies of five representative repair and five representative Coach (Re)Loved categories. Some materials used to repair Coach products were not available in the datasets developed for Coachtopia. These materials were matched with similar materials in the available datasets (leather and certain hardware pieces). Hardware without close matches in the existing materials datasets were modeled using ecoinvent processes.	The Coach repair and (Re)Loved facility recycles all waste, so waste is not modeled at this stage.
End-of-life	**Disposal** <u>Data sources</u> EPA WARM	Three different disposal methods were applied to waste materials throughout the supply chain: recycling, landfilling and incineration. Emissions factors for recycling, landfilling and incineration of packaging, manufacturing, and product waste were modeled using the EPA's Waste Reduction Model (WARM) processes for paper, plastic, and general municipal solid waste. Recycling, landfilling and incineration rates were modeled using US averages based on guidance from Coach. All factory floor waste and products at EoL were represented by municipal solid waste because leather and textiles-specific waste processes were not available. These factors does not include transport to the landfill site, per EPA documentation. All Coachtopia product were assumed to be disposed of at end of life.	The weight of Coachtopia products is used as the waste quantity at final product disposal. The weight of materials added during repair and (Re)Loved operations is considered waste at end-of-life for repaired and (Re)Loved products.

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Table 2: The databases and references sourced for T-EPIC and for what application they are used.

Database / reference	Source for
Higg (Higg, 2024) MSI 3.11	Material (textile, leather, hardware) GHG emissions
Higg (Higg, 2025) FEM	Manufacturing facility GHG emissions
Ecoinvent v3.8 and v3.11 (Wernet et al., 2016)	Electricity in use phase, transportation, chemicals. Used as background data for WSP modeling of Near Field Communication (NFC) tags, recycled leather fiber material, and plastic.
US eGRID (EPA, 2023)	Electricity-related emissions for distribution centers and retail stores.
EPA WARM version 16 (US EPA, 2023)	Landfilling, incineration, recycling processes and GHG emissions
Confidential suppliers (2022, 2023) of recycled leather	Activity and emission data for manufacturing of recycled leather
Munasinghe, Druckman, & Dissanayake (2021)	Manufacturing burdens for RTW