

WHITE PAPER
MARCH 2016

DOES SHOPPING BEHAVIOR IMPACT SUSTAINABILITY?

The environmental and
socioeconomic impact of mall
and online shopping behaviors

“The difference in the environmental impact of shopping at physical stores versus online rests on a number of factors. As this paper makes clear, consumer choice about the number of items purchased, the likelihood of returns and the ability to combine trips can help make shopping in person the lower impact choice. We welcome this contribution from Simon on the ongoing discussion about how to improve the sustainability of all of our shopping choices.”

— **Jason Mathers**, Senior Manager, Supply Chain Logistics
Environmental Defense Fund (EDF)

“CDP envisions a prosperous global economic system that operates within sustainable environmental boundaries and prevents dangerous climate change. Purchasing decisions, both by large multi-national organizations and individuals alike, are an important lever for influencing this change. There are many factors that can impact the sustainability of purchasing decisions and this research from Simon pursues an important area of consideration as it relates to the sustainability of individual purchasing decisions.”

— **Dexter Galvin**, Head of Supply Chain
CDP

“This report on the sustainability implications of shopping practices is an interesting and well-conceived analysis of the relative impacts of online versus mall shopping. The analysts have been highly detailed, transparent, and scrupulous in their modeling. The report is particularly interesting because it lays out a convincing analysis with a clear and, for some of us, counterintuitive conclusion - that under a set of realistic assumptions about consumer behavior, mall shopping has a lower greenhouse gas impact than online shopping.”

— **Kenneth R. Richards**, Professor of Environmental and Energy Policy
School of Public and Environmental Affairs, Indiana University

“Throughout this report Simon has demonstrated consistent commitment to utilizing rigorous life-cycle assessment methodology and report process transparency. In addition, for assumptions made in the report, Simon utilized a data-driven approach, including use of their own retail data. As a result, the report achieves credibility that allows consumers to understand the impacts of shopping behavior. For retail and real estate industry leaders, the report credibility provides a comprehensive analysis that creates a useful foundation to help advance sustainability initiatives through the value chain.”

— **Kyle Tanger**, Director Sustainability and Energy
Deloitte Consulting LLP

“Simon has taken significant measures to improve efficiencies within our own operations. With this study, we wanted to look outward and better understand the sustainability impacts different shopping behaviors have on the environment. Gaining a better understanding of this will help us prioritize sustainability initiatives differently, engage tenants with new ideas, and communicate with shoppers. Throughout this analysis we have engaged with key external stakeholders and have received valuable feedback that we appreciate and have shared.”

— **Mona Benisi**, Senior Director of Sustainability
Simon Property Group

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“Is there a difference in how I buy products?” or “What is the environmental impact of buying products online versus in a mall?”

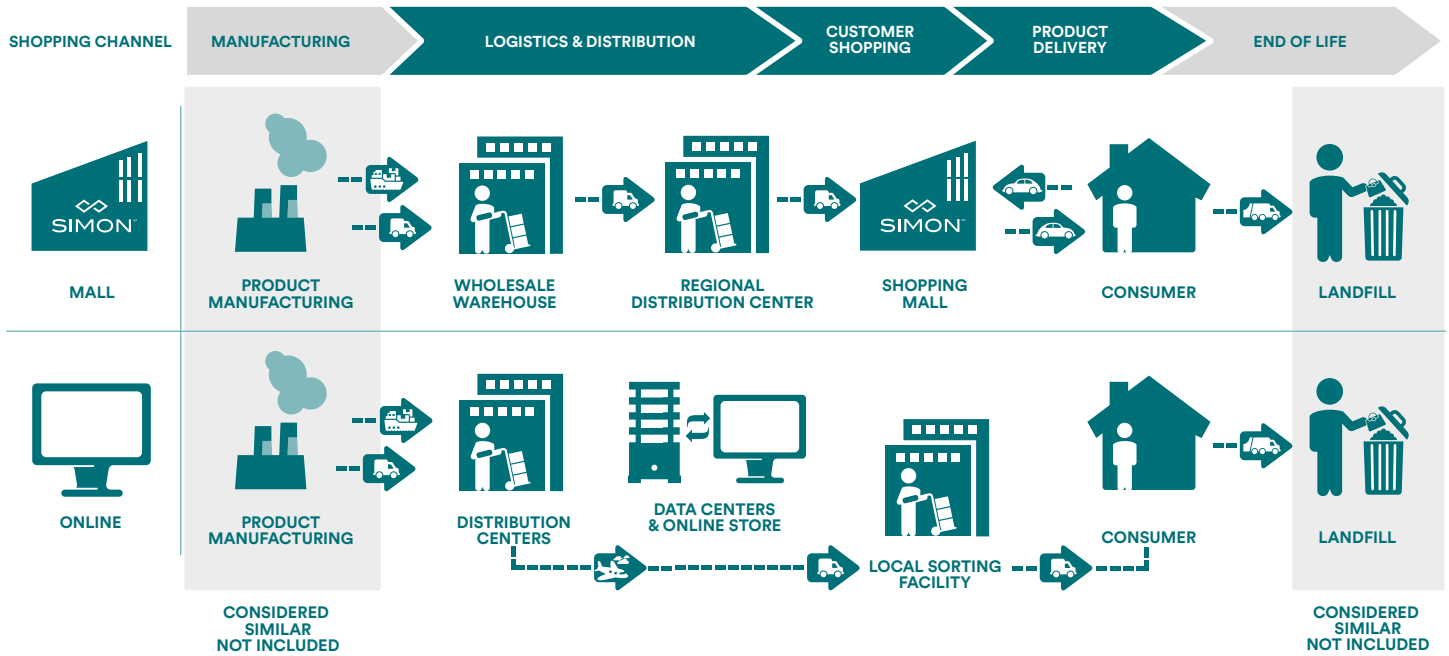
Today's shoppers have more choices to purchase a wide variety of product than ever before. They can go to the nearest mall, order things online, or even order online and pick up in-store. They also have more options for returning items - shoppers can mail them back or return to a nearby store. Whatever the case, consumers now have the ability to shop "anything, anywhere, anytime."

While retailers work hard to deliver convenience and evolving expectations, shopping behaviors do have environmental and socioeconomic impacts. Nationally, malls represent greater than 50% of U.S. retail sales, and given the numerous shopping options today, an increasing number of shoppers are concerned about the environmental impact of shopping.

At Simon, sustainability is an important consideration for our leaders, employees and customers alike. Understanding these sustainability impacts helps to formulate strategies to best serve mall guests and retailers within our properties. The Simon team has been focused on the environmental impact of shopping and developed a data-driven methodology to understand the sustainability impacts of online versus mall shopping.

To understand the environmental impacts, Simon, in conjunction with research partner Deloitte Consulting, used a “cradle to grave” Life Cycle Analysis (LCA) which examines the environmental impacts of all material, energy and fuels attributable to a product or service in its lifecycle. The research examined a combination of four retail products’ journeys from their manufacturing to their end of life when shopped in a mall or online. The four products selected include: women’s tops, women’s shoes, coffee makers and wine glasses. Referred to as the “basket of products,” these products were chosen based on Simon data on typical customer purchases. Many products are manufactured in the same way, regardless of how consumers buy them, thus the study was designed to be purely comparative in nature and only measured the aspects of a product’s footprint that were different. Green House Gas (GHG) emissions were used as the environmental measure because they are the cause of climate change. The main contributors that affect the level of GHG emissions in either shopping experience include transportation fuels, building energy usage, and packaging differences. Using GHGs was an effective way to combine multiple impacts into an easier to understand format. The life cycle of how products are typically created, transported, and sold in a mall and online is illustrated in Graph A1.

Graph A1



The research focused on the life cycle phases that have differences between mall and online shopping, and it took into account how customers actually utilize each of the services within each life cycle phase. For example, it considered the average car type people would drive to the mall; the number of people who would drive together to the mall; and the idea that shoppers combine mall shopping trips with other errands. For online shopping, the research considered issues like product returns. Shoppers generally buy multiple sizes of the same product and online retailers enable more product returns by offering free or discounted returns. Table A1 describes the differences.

Table A1

PHASE	MALL	DIFFERENCE	ONLINE
LOGISTICS & DISTRIBUTION	Fuel consumed in transporting the good from the wholesale warehouse to the mall		Fuel consumed in transporting the good from distribution center to local sorting facility
	Energy consumed in the regional distribution center		
CUSTOMER SHOPPING	Energy consumed in the mall		Energy consumed at the data centers and in using personal devices such as desktop computers required to support customer's online shopping
PRODUCT DELIVERY	Individual product packaging i.e. shopping bags		Individual product packaging used to send products i.e. corrugated boxes, bubble wraps, etc.
	Fuel consumed in customer travel to the mall and back for shopping		Fuel consumed in the last mile delivery
	Fuel consumed in customer travel to return the products bought		Fuel and data center and personal device energy consumed in returning the product using delivery to return to distribution center

Fuel Emissions

Energy Emissions

Packaging Emissions

Each symbol represents 1,000 metric tons of CO2 emissions

Equivalent to

2.4 million miles driven by an average US passenger car

WHAT'S THE BIG PICTURE?

The research showed that if all of the people who come to a mall each year were to purchase a combination of four products, it would result in an average of 14.3 million products bought every year from an average mall.¹ The results of the LCA show that each year, online shopping has a 7% larger environmental impact than mall shopping if shoppers bought the same number of products (i.e. 14.3 million) in a brick-and-mortar mall as they did in an online store. This is summarized in Table A2.

Table A2

PHASE	FUEL EMISSIONS	ENERGY EMISSIONS	PACKAGING EMISSIONS	TOTAL EMISSION	% OF RESPECTIVE TOTALS
LOGISTICS & DISTRIBUTION					
MALL	6,197	1,616		7,814	21%
ONLINE	10,951			10,951	27%
CUSTOMER SHOPPING					
MALL		10,264		10,264	27%
ONLINE		1,976		1,976	5%
PRODUCT DELIVERY					
MALL	19,325		308	19,633	52%
ONLINE	24,847	163	2,359	27,369	68%
TOTAL FOR MALL	25,523	11,880	308	37,710	100%
TOTAL FOR ONLINE	35,798	2,139	2,359	40,295	100%

This shows emissions from malls 7% lower than online

2,585

<=Difference



6.2 million miles driven by an average US passenger car

THE IMPACT DIFFERENCE IS THE SAME AS:



68,000 incandescent bulbs replaced with CFLs

All emissions in Table A2 are in metric tons of CO₂e

The research provides telling insights into why mall shopping has a smaller environmental impact compared to online shopping. Among the findings are:

- Customers travel to the mall in groups. The average group buys approximately 4.5 products per trip. The greater number of people traveling together and buying a higher number of products per trip lowers the average fuel burned to buy each product. Therefore, it lowers the environmental impact per product bought.

¹ Number of visitors to an average mall annually x percentage of adult visitors x percentage of adults shopping x average number of products bought by an adult = 14.3 million

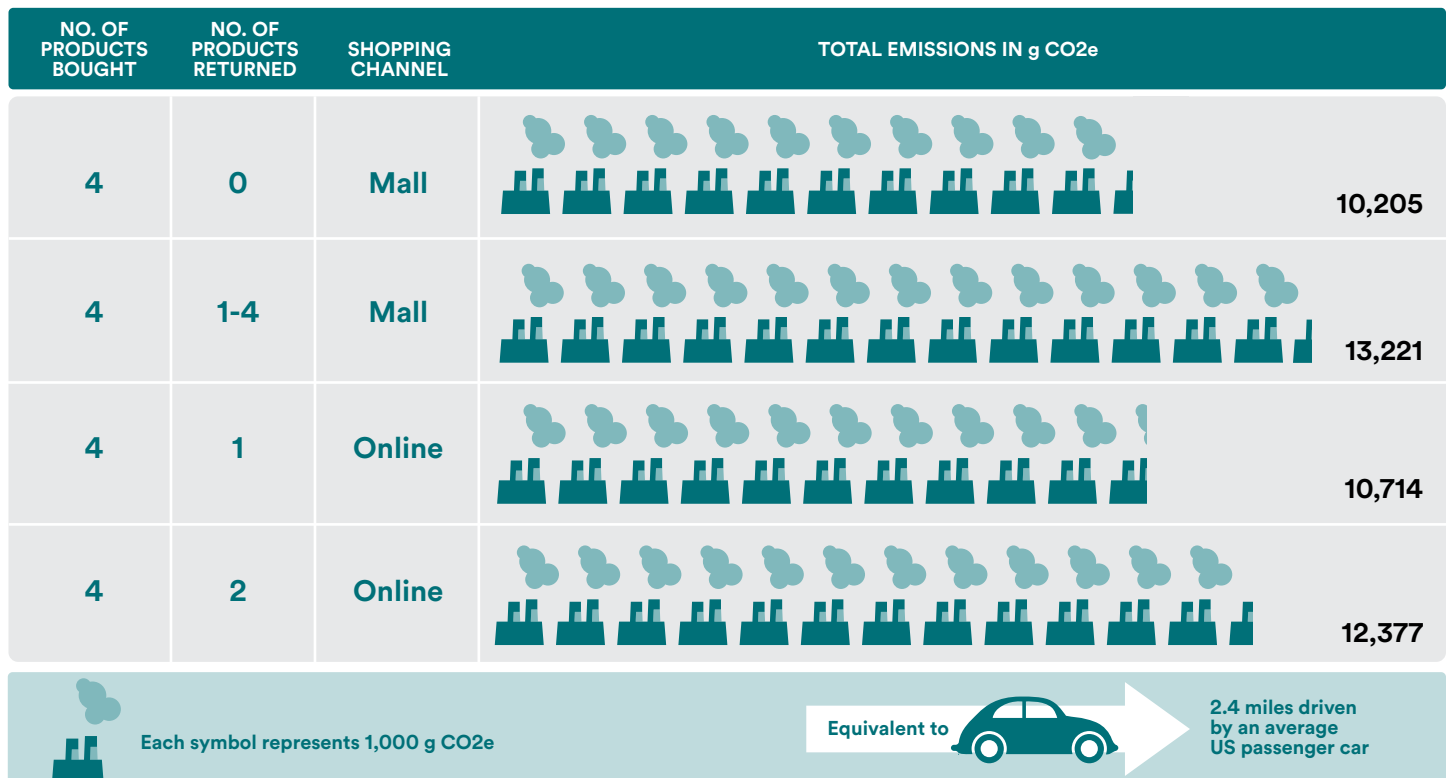
- Shoppers tend to return a greater number of products bought online versus when purchased at a brick-and-mortar store. The research indicates that 33% of online purchases are returned versus 7% of brick-and-mortar purchases.² This considerably increases the impact of online returns.
- Packaging used for the delivery of online orders (corrugated boxes, bubble wrap, etc.) has a greater overall environmental impact compared with the plastic or paper tote bags mall shoppers may use upon buying or returning their purchase.

Furthermore, the physical presence of malls in the local economy provides jobs and taxes (sales and property tax) to your local economy. The research shows that physical retail generates five times more jobs than online shopping for the same value of sales.³ Each mall can generate anywhere between a few hundred-thousand to a hundred-million dollars worth of sales and property tax in a year depending on the size of the mall and mall sales.

WHAT DOES THIS MEAN FOR ME?

The study provides potential guidelines and insights for consumers to consider when it comes to how their shopping habits may impact the environment. Table A4 details the differences between mall versus online shopping, and notes the impact of product returns. Product returns are more common when customers purchase products online versus in the mall, and the environmental impacts can really add up. Specifically, if shoppers buy four products online and return two because they do not fit or the color wasn't right, the impact is more than 21% higher compared with buying the same products at the mall and not having to return them because they have been tried on. That's a big difference.

Table A4



² Banjo, Shelly, "Rampant Returns Plague E-Retailers." WSJ. Wall Street Journal, 22 Dec. 2013. Web. 03 Nov. 2015.
³ Deloitte Analysis, National Retail Federation Insight Center, Bureau of Labor Statistics

Additionally, a visit to the mall often includes other activities such as dining, errands and other forms of entertainment. If done separately (either online or physically), these additional activities add more energy and fuel emissions. Going to the mall usually involves social interactions with family and friends, providing personal social interactions and memories.

Previous studies comparing mall and online shopping have mostly compared emissions from buying one item from one channel versus the other. This study creates a realistic representation of shopping behaviors and tests the dependence of the results on variables. Therefore, considerations on how a basket of products, distances traveled to the mall, how many people travel together, other stops during a trip to mall shopping, and product returns all factor into a more holistic analysis. Adding socioeconomic issues to the mix also showcases the impact to local economies and help to show the impact of strategic shopping choices.

CONCLUSION

In analyzing shopping data that represents actual customer behaviors for mall and online shopping, Simon has shown that mall shopping represents a better sustainability performance over online shopping. Furthermore, in an age when consumers are increasingly demanding same-day or fast delivery, which requires more resources such as fuel to fulfill, the negative impact of online shopping is likely to worsen even more. Put simply, the choices customers make regarding how they buy products and how they utilize product return options have clear impacts on the environmental footprint.

Though the research shows how mall shopping can be beneficial, Simon continues to invest in and improve its malls. Simon's legacy of environmental and energy leadership is something we are proud of, but more importantly, it motivates us to improve even more in the future. Some prime examples include Simon's focus on new lighting, energy efficiency updates, options for electric cars and many more innovations. We know these options are important to shoppers, and they are important to us.

