

THE MOST MAGICAL CARBON FOOTPRINT

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INTRODUCTION

As more advanced methods of transportation, technology, and entertainment have emerged in current day, the Earth has seen multiple shifts from its natural form. According to The National Academies of Science, Engineering, and Medicine, the extensive release of carbon dioxide into the atmosphere, due to these new technological breakthroughs, is the **leading cause of global warming**. Extreme temperatures, obscure weather patterns, and rising sea levels are all effects of carbon dioxide. Since humans are emitting carbon emissions into the atmosphere, there is no doubt that an industry

as big as The Walt Disney Company has contributed to this pollution is some way, shape, or form. The Walt Disney Company, also known simply as Disney, is a multinational entertainment business that owns cruise lines, merchandise, movies, theme parks, and more. Not only is it assumed that Disney’s carbon footprint is made inside its park, but it is also caused by the **transportation of tourists, merchandise, and food**, that are also associated with the company. Considering that the globe is noticing the consequences of these human actions, Disney must adjust their routine to conserve the planet.

Disney’s contributions are not only a global issue because of its impact on the entire planet, but also because of its international locations. Christine McCarthy, the Senior Executive Vice President and Chief Financial Officer for The Walt Disney Company, acknowledges this effect and states:

“ Regardless of whether we’re talking about a movie, a theme park, an alternative energy plant, or a recycling bin — across the country or around the world — everything that bears our name comes with our commitment to always act ethically, create content and products responsibly, maintain respectful workplaces, invest in communities, and be good stewards of the environment.”



Christine McCarthy
Christine M. McCarthy
 Senior Executive Vice President
 and Chief Financial Officer,
 The Walt Disney Company

The Walt Disney Company is the clear leader in sustainability among its main competitors in the theme park & resort industry

	The Walt Disney Company	Universal Studios	Six Flags Entertainment Corp	SeaWorld Entertainment Inc.
Carbon Footprint	4 trees	3 trees	2 trees	1 tree
Certifications and Awards	4 trees	3 trees	2 trees	1 tree
Waste Management	4 trees	3 trees	2 trees	1 tree
Reduced Energy Consumption	4 trees	3 trees	2 trees	1 tree
Transparency	4 trees	3 trees	2 trees	1 tree

Source: s.environmentalindex.com, pnc.com, green.isa.universal.com, sus.kinabalu.com

Overview > Strengths > Concerns > Recommendation




The Walt Disney Company has been adapting their processes to become **more fuel-efficient**, such as utilizing solar energy and incorporating gondola lifts in their parks, considering they understand their part in the environmental impression. Their comparison amongst other theme parks can be seen in Figure 1.

(Figure 1- Walt Disney Company’s Sustainability Initiative)

As an inspiring designer for a theme park, I hope to one day assist Disney's goal, as well as other prominent theme parks, in limiting their carbon dioxide emissions, as well as incorporating other sustainable ways to maintain the parks energy, water, and guest satisfaction.

RESEARCH QUESTIONS



What is The Walt Disney Company's indirect contribution to carbon emissions through the transportation of guests?

How can this data be utilized to predict the total amount of carbon emissions produced by the transportation of guests to all Disney park locations?

By evaluating the company's carbon inventory regarding transportation, different areas of improvement can be assessed and redesigned for an eco-friendlier outcome. If the amount of carbon Disney produces **decreases**, Disney can become a **role model** to other private sectors and promote a sustainable revolution that only positively impacts the planet.

LITERATURE REVIEW

Research pertaining to theme parks and tourism has been developed into detailed reports, which evaluate their individual roles in the environment, as well as their responsibilities.

CORPORATE SOCIAL RESPONSIBILITY (CSR)

Orlando, Florida is a hotspot for tourism because of the many theme parks located within the city's perimeters. Considering the overpopulation due to tourism in this prominent area, there comes a toll on the

environment, and questions the social responsibilities each park has. In 2010, the report "Corporate Social Responsibility: What are the top Orlando theme parks reporting?" considers what type of corporate social activities the top three Orlando theme parks have stake responsibility for. Corporate Social Responsibility, or CSR, is a **company's standard** for entertainment, employees, and their activities. The researchers, Holcomb, Okumus, and Bilgihan, factor in the **workplace, community, environment,**



and marketplace, to gauge tourism's relationship with employee and guest satisfaction, as well as environmental influences. By using content analysis and interviewing managers of different Orlando theme parks, Holcomb, Okumus, and Bilgihan concluded

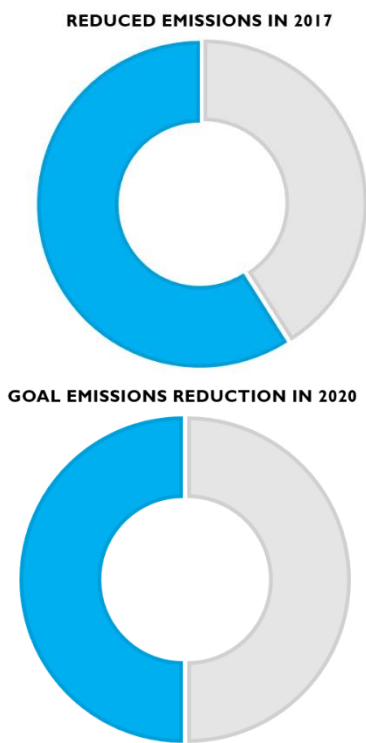


that the Orlando theme parks are tied whole-heartedly to their CSR activities, but The Walt Disney Company proves to have the **most extensive** CSR report. Much of the CSR data is provided to the public, but not flaunted. Companies, like The Walt Disney Company, should display CSR activities more, so that they can profile their company with the efforts that are promoted from within.

UNDERSTANDING CSR AND BACKGROUND

After understanding that theme parks produce much of its carbon emissions inside its parks, resorts, and by transportation, the intense focus on a single entity was decided as the inspiration for this study. The luxury of air travel and vehicles is an overlooked convenience for theme park guests, but still holds a tremendous impact on the

environment. As stated in their 2017 Corporate Social Responsibility report and seen in Figure 2, The Walt Disney Company is on track to reduce their net emissions by **50% in 2020**, from 2012's total emission levels. In 2017, they have achieved the **reduction of 41%** of their total net emissions, so their goal is completely possible. Disney has been practicing these tactics to accomplish their goal for 2020 by “avoiding emissions, reducing emissions through efficiencies, replacing high carbon fuels with low-carbon alternatives, seeking alternative technologies, then using certified carbon credits for remaining emissions.”



An example of how they have altered their release of carbon emissions is through their bus transportation, as it has become more sustainable by using **renewable diesel** made from non-consumable food waste and used cooking oil. This simple adjustment of vehicle fuel has cut this sector's emissions in half. Between 2016 and 2017, Disney has **lowered** its direct emissions by approximately **23,000 pounds of CO₂e**. Eventually, Disney states that their goal is to have zero net greenhouse gas emissions.

(Figure 2- Emission Rates)

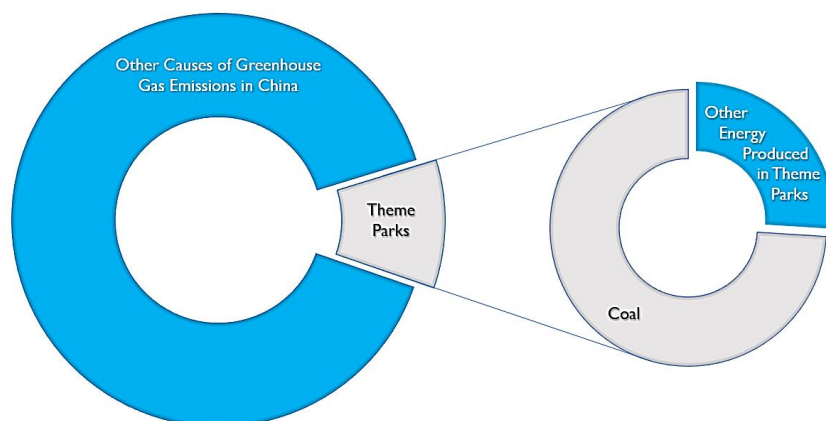


(Figure 3- Walt Disney World Transportation)

CARBON IMPACT OF TOURISM

Though Orlando, Florida is a home for many theme parks in the United States, China obtains some of the greatest attractions, providing tourists with ample opportunities when they visit. Due to its size, China is the **biggest contributor** to carbon emissions and is predicted to reach their carbon emissions peak around 2030. Many people, like the authors Guo, Tian, Zang, Gao, & Chen, ponder the role of theme parks in China in the ongoing production of greenhouse gases. Together, the authors created a report titled “The Role of Industrial Parks in Mitigating Greenhouse Gas Emissions from China” in 2018, which determined this mission. **Energy consumption, population, land area, and geographic coordinates** were all considered in this evaluation. Their methods of research included onsite investigation, research, and questionnaires, which completed the necessary information to declare theme parks’ position in greenhouse gas

pollution. The total theme park energy consumption makes up **10% of the national energy consumption**, as of 2018. Within that percentage, **coal produces 74% of the theme park energy**, as presented below in Figure 4.



(Figure 4- Types of Greenhouse Gases)

After discovering these findings, Guo, Tian, Zang, Gao, & Chen recommend creating a high-resolution inventory of park-level, plant-level, and unit-level data relating to energy infrastructure caused by industrial parks. Then, imbedding this information into **Geographic Information System**, or GIS, would provide both the public and private aspects of industrial parks with carbon emissions knowledge.

With high demand for travel and attractions, tourism became increasingly more prevalent. Tourism, similarly caused by theme parks, provides economic benefits to small islands, but also causes environmental threats

because of the heavy population it attracts. Unfortunately, global tourism is becoming less sustainable. The well-known island, Taiwan, is a very popular destination, and contributes more carbon emissions than the island would if it was not a tourist attraction. Many common carbon polluting factors in places like Taiwan are due to **accommodation, transportation, and tourism activities**. Kang-Ting, Lin, Yu-Hao, Chien-

ROLE OF PARKS IN EMISSIONS

Hung, and Yi-Ting, all contributors to the report “The Carbon Impact of International Tourists to an Island Country,” have analyzed energy consumption of popular tourist activities, administered questionnaires about travel, and estimated the carbon emissions on the island. Without the incorporation of international transportation in their review, they discovered:

Tourist accommodation is the leading cause of carbon emissions in Taiwan.

Considering this finding, the Taiwanese government should reconsider efficiency in tourist hotels and encourage **bed-and-breakfast-like accommodations** that produce lower carbon emissions for guests’ stay.

ECO-INDUSTRIAL PARKS

Population increase causes the consumption of resources, which is geared towards urbanization and population satisfaction. So, the continuous industrialization of dense parks ultimately damages the natural ecosystem. Oh, Kim, and Jeong pursued the controversy of sustainable theme parks, by evaluating Daedeok Technovalley Development (DTV). They propose that eco-industrial parks (EIP) are the **most efficient** method in creating sustainability within this industry. EIP are industrial parks that incorporate the local community into its business, in effort to reduce environmental concerning practices. In their report, “Eco-Industrial Park Design: A Daedeok Technovalley Case Study”, Oh, Kim, and Jeong built their case study through research and analysis. The assessment of **land, air, energy, food, and material** have inspired classified success through the categories of:

Symbiotic Industrial Network Construction

External and Internal Built Environment Design

Cultural Identity Creation

Energy and Material Flow System Planning

EIP prove to have higher sustainable progress than other parks, but still have limitations to aspects of cultural identity creation, symbiotic industrial network construction, and material flow planning. Overall, EIP have an **overall benefit** than it does a negative effect in industrial parks.



METHODOLOGY

The Walt Disney Company has parks all over the world, ranging in different locations in North America, Europe, and Asia. For this study specifically, the information collected will be directed towards the Disney parks that are in the United States.



RESEARCH DESIGN

Though The Walt Disney Company has initiated clear effort in creating an eco-friendlier routine throughout their company, the emissions caused through the transportation of their guests, that is not Disney branded, has yet to be determined. With this in mind, it is important pull data from the guests themselves.

The design of this report is to evaluate the emissions caused by the transportation of guests, utilizing the guests as a primary source for information.



Not only will this report consider the opinions of the people who participate in Disney park attendance but will also collect data that could create a regression, or a customized equation, to provide both The Walt Disney Company and park guests will information about their carbon usage regarding transportation.

Though some of the study's detail will be further explained throughout the report, a general overview can be seen in Figure 5.

OVERVIEW OF REPORT'S DETAILS	
Unit of Analysis	Transportation and Distance
Study Type	Cross-Sectional
Target Population	Disney Park Attendees
Sample Population	Facebook Users and Walt Disney World Cast Members
Type of Statistics	Quantitative (Some Qualitative) and Descriptive Statistics
Independent Variables	Modes of Transportation
Dependent Variables	Carbon Emissions

(Figure 5- Report Overview)

DATA MEASURES

Data is measured through interviews and surveys, providing both qualitative and quantitative data. Both forms of information were chosen, considering the importance of evaluating the physical measurements of guests' locations, as well as their reaction to their carbon emissions output.



Quantitative data, such as distances, length of travel, and other relevant values, is interpreted as significant data that can eventually provide an equation for total carbon emissions.

Non-numeric data, such as opinions, thoughts, and responses to interviews, is considered, in terms of finding a better solution for transportation and understanding the general public's view of Disney's relationship with the environment.



METHODS

After understanding the importance of reducing carbon emissions and their impression on the Earth, transportation was declared the key factor to focus on for this report. Considering the study areas are Disney parks, a **survey** was created surrounding the intention of travel to these locations. Some questions within the survey, created with Qualtrics, were formatted as:



Which Disney park location do you attend most often?

How do you get to the parks location from where you live?

When you are attending a park, how far away is your accommodation, in miles?

Do you consider the consequences that transportation has on our environment when you travel to a Disney Park?

Overall, the survey included questions pertaining to transportation, as well as opinions of sustainability in transportation. Once the 18-question survey was complete, it was released to the public through social media. Since the target population is people who have attended a Disney park, many public **Facebook pages**, like “Disney Conversations with Wishes” and “The Secret Disney Group”, were valuable resources to access this specific audience.

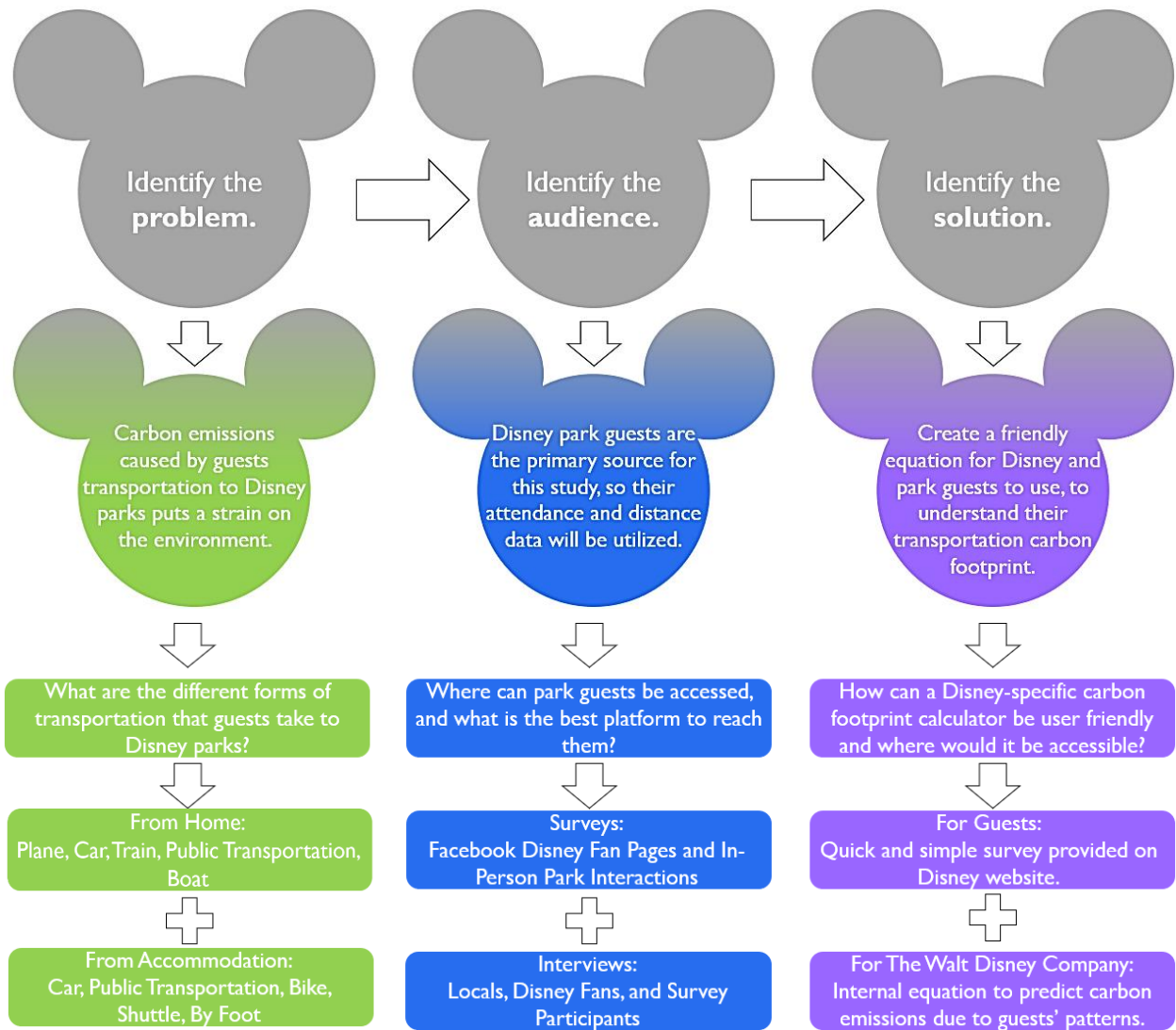
Also, several **interviews** were conducted to recognize the thoughts of a Disney park guest on a more personal level. The guests who were interviewed were picked strategically as individuals who have ample experience in Disney parks. The interviews were conducted in more of a story-telling manner, allowing memories to be recalled and conversation to be dictated by the guests. Randomly selected cast members were interviewed as well.



After the initial collection of data through the online survey, it was determined that more information was needed to get a better estimate of results. The original Qualtrics survey was adjusted to suit an in-person interaction, as well as focused solely on people who travel to Walt Disney World in Orlando, Florida. The second survey was shortened and broken into two sections: First, guests were asked their attendance rate, the number of guests in their party, their length of stay, their home zip code and if they traveled to Walt Disney World from their home. Second, if the guest answered “yes” from the previous question, their specific transportation details were collected from both their home and their accommodation. If a guest answered “no” to traveling from their home to the park, the survey was then completed. The survey was administered to park guests within Walt Disney World.

Though the survey population for this study is any guests who have been to a Disney park, the survey sample collected with the second survey were park goers who were inside Magic Kingdom in Orlando, Florida. The survey sample was not chosen specifically by age, gender, ethnicity, or other defining characteristics, but simply due to convenience. Walt Disney World attendees were approached while in line for rides, as this was the best time to find people who are not in a rush and are willing to participate. After permission was granted from the surrounding park guests, the survey was verbally given, and responses were collected on a single electronic device by the interviewer.

Once all data is collected, the information was compiled and sourced into a descriptive analysis. Though the potential solution of the report is yet to be fulfilled, as the regression is still a work in progress, the **conceptual framework**, as seen below, provides an overview of the report's goals.



RESULTS

DATA RESULTS

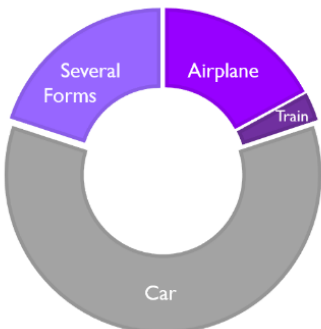
As of March 14th, 2019, there have been a total of 35 responses to the survey. The average age of a participant is approximately **29 years old**, with guests being as young as 18 years old and as old as 60 years old. Of the guests, 63% attend Disneyland Resort in Anaheim, California, and the remaining 37% visit Walt Disney World in Orlando, Florida more often. Walt Disney World may have a lower return rate, but guests spend more days within a single trip at this location, as seen in Figure 6. About half of the guests attend a Disney park just once a year, but the amount of times some guests attend a Disney park within a year ranges up to 48 days.

Please note, the in-person survey method is not included in the results. An explanation will be further discussed in the “How to Grow from Error” section.

Form of Transportation to Each Park	Total Days Attended per Year
Disneyland Resort (Anaheim, California)	51 Days
I travel by train.	7 Days
I travel by driving.	34 Days
I travel by flying and driving.	10 Days
Walt Disney World Resort (Orlando, Florida)	206 Days
I travel by flying.	68 Days
I travel by driving.	95 Days
I travel by flying and driving.	43 Days
Grand Total	257 Days per Year

(Figure 6- Attendance and Transportation to US Disney Parks per Year)

FORM OF TRANSPORTATION TO LOCATION



FORM OF TRANSPORTATION TO PARKS



(Figure 7- Transportation Types to Location and Parks)

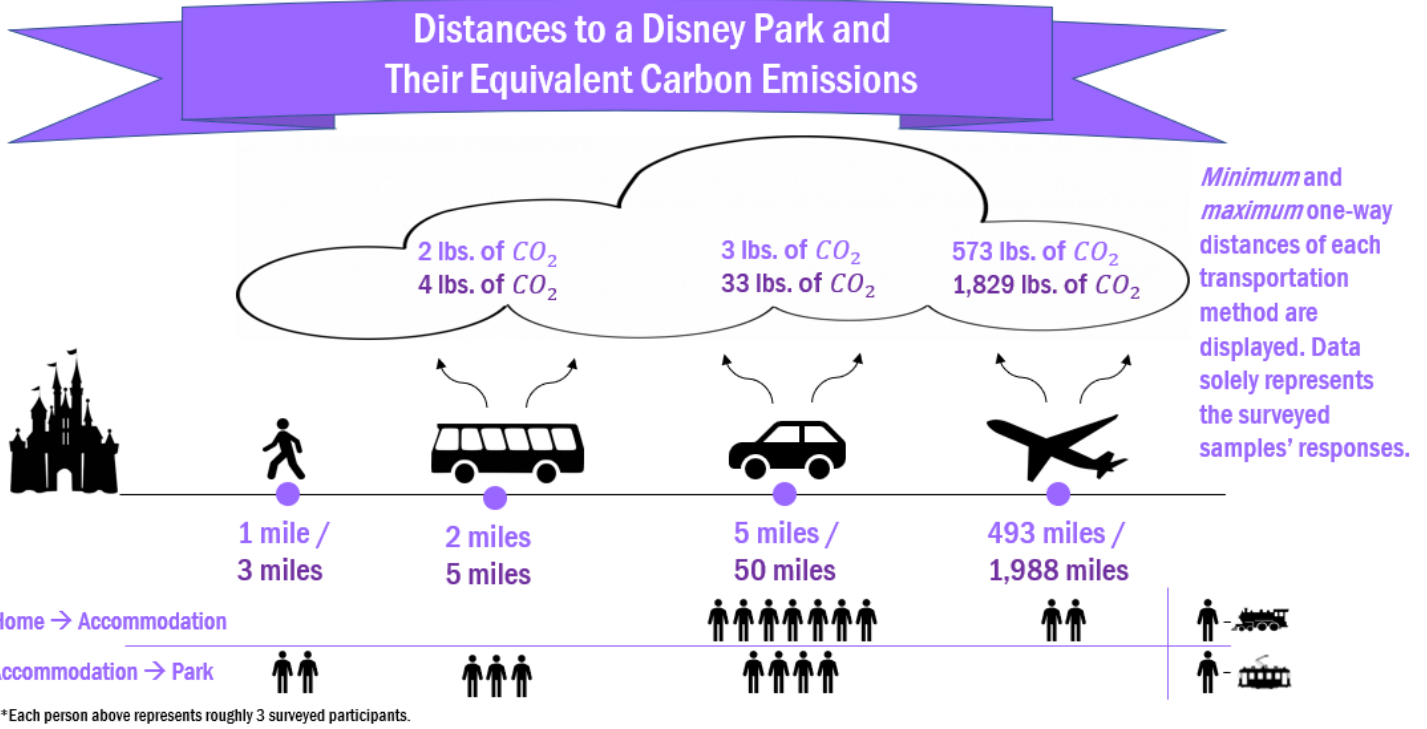
Regarding all data, including outliers, the mean for yearly park attendance is **7.76 days**. To get to the park’s city **60% of the guests travel by car**, 17.14% travel by plane, 2.86% travel by train, and 20% travel by several ‘of these forms of transportation.

When attending the park, the average distance one’s accommodation is from the park is **15.88 miles away**, but guests may stay up to 69 miles away. Transportation to the park from guests’ accommodation varies, as **45.71% travel by car**, 31.43% are transported by shuttle through their accommodation, 20% walk, and 2.86% take public transportation, as seen in Figure 7 and 8.



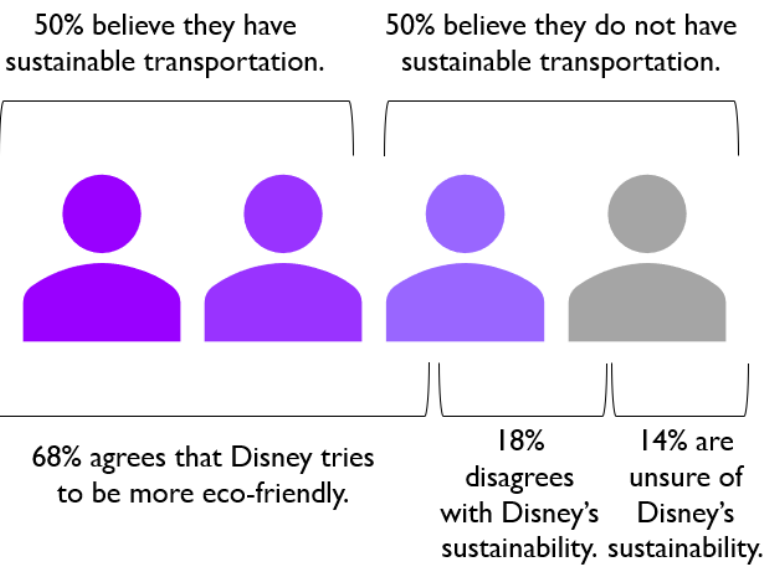
Driving is the leading mode of transportation to Disney Parks and their location.





(Figure 8- Distances and Carbon Emissions Rates)

Regarding The Walt Disney Company's relationship with sustainability, **67.65% of people** agree that Disney attempts to incorporate sustainability within its practices, whereas 17.64% disagree and 14.71% are unsure. About half of the guests believe that their transportation to the park from their homes is sustainable, and each guest agreed to some extent that carbon emissions are important to remain aware of. The last question that was asked in the survey was whether they considered the environmental consequences of their transportation to the parks. **58.52% of guests** do not consider the environmental factors caused by their transportation, while only 20.59% do and 20.59%



(Figure 9- Disney Guests' Sustainability Perspectives)

are unsure, as seen in Figure 9. With these statistics in mind, the closest guest lives 25 miles away from a park, and the farthest guest lives 3,300 miles away from their most highly visited park. The mean average distance a guest lives away from a park is about 935.44 miles, while the median average is 505 miles away from a Disney park, as visualized below in Figure 10.

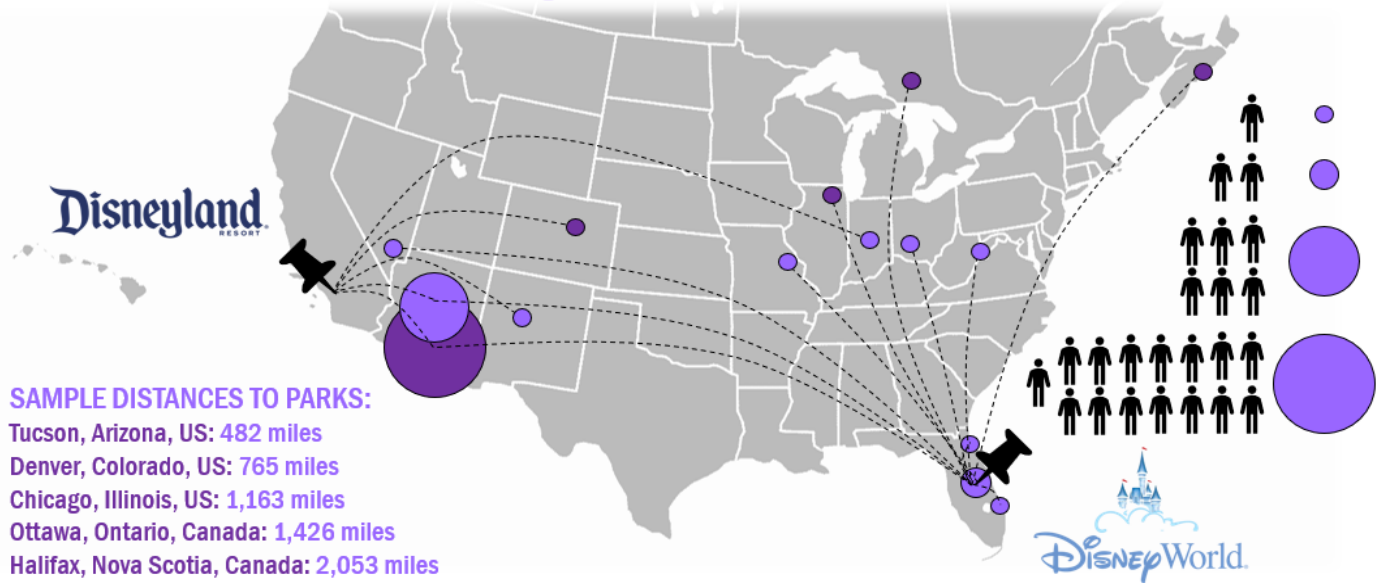
58% do not, 21% do, and 21% are unsure of their environmental factors caused by transportation.

Survey Sample Location and Their Preferred Destination

Farthest Distance: 3,337 miles

Average Distance: 505 miles

Closest Distance: 20 miles



(Figure 10- Location of Guests and Distances to Parks)

INTERVIEWS

Nicholas Stavitski, a current student at the University of Arizona, obtains fond memories of living in Florida during his childhood. Growing up, Stavitski lived in Clermont, Florida, which is located 25 miles away from the Walt Disney World Resort in Orlando, Florida.

“Disney World can be easily compared to a city. It has its own highway-like systems, parking, stores, and its own supply of carbon emissions. Not only are carbon emissions produced by the public transportation to the parks, but also from people renting cars to get there, the delivery of goods, and other vehicle-related transit.”



N. Stavitski
Nicholas Stavitski
 Student,
 University of Arizona



He remembers going to Magic Kingdom, as well as the three other parks often as a child. Vividly, he recalls his family’s car rides to the parks, as he always got very excited passing the entrance sign that states, “where dreams come true.” Past this sign, Stavitski describes Walt Disney World as “its own city.”

Stavitski agrees, with the intense desire for guests to attend this specific Disney location, the tourists have created a trail of carbon emissions extending from their homes in other cities, states, and countries. Besides the external emissions created to get to Orlando, Walt Disney World itself is set up for the “convenience,” or in this case, acceptance, of heavy traffic flow.

On the other hand, Michael Rodriguez, a Tucson, Arizona resident, has always lived at an inconvenient distance from any Disney park. Rodriguez has always been a big Disney fan, ever since he was a child. His most favorite childhood memory at the Disneyland Resort in Anaheim, California was when his best friend joined Rodriguez’s family for a few days at the two parks in the California location. As an 11-year-old, having his best friend during the 6-hour car ride made their travels a great time, as well as much more entertaining. “We always drove a Chevy Silverado out to the parks, and that thing was definitely a gas guzzler.”



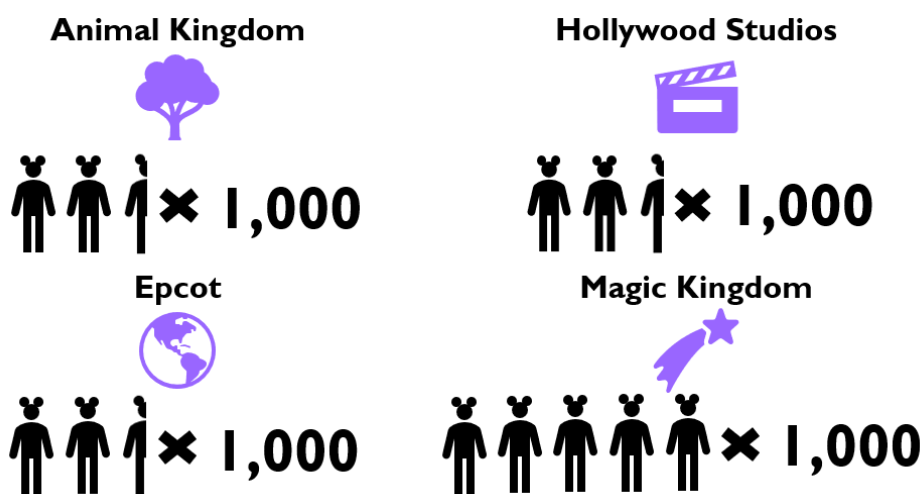
As an adult, Rodriguez has continued to attend Disneyland, but tries to take the most fuel-efficient car he can borrow. Since he understands his desire to attend the parks frequently, he chooses to find the most suitable way to travel.

“I realized as I have gotten older, it benefits me to have something more fuel-efficient. Not only does it save me money and gas but is also better for the environment. Disneyland is continuously building more parking garages and spaces, which must be in response to the high demand of personalized vehicle transportation. To think of the amount of emissions caused by all of these cars, it’s mind-boggling.”



While at Walt Disney World, two interactions with cast members gave better insight to the number of attendees in the park. Though their names will remain confidential, both cast members spoke about the population of Walt Disney World per day. In Magic

Kingdom alone, there is a total between 50,000-60,000 guests each day, with approximately 25,000 guests in each other park. Between Magic Kingdom, Hollywood Studios, Animal Kingdom, and Epcot, Walt Disney World sees around 125,000 individual guests per day, illustrated in Figure 11.



(Figure 11– Walt Disney World Guests’ Attendance per Day)

FINDINGS

After collecting both survey and interview data, it is prevalent that guests acknowledge the importance of their transportation emissions, but they may just not choose to act on it. On average, according to the data collected from the survey, a guest:

Lives roughly 600 miles away from the closest park.

Visits 1 to 8 times a year.

Travel to the park's location and the park itself by car.

Stays 15.88 miles away from the park.



Based on these findings, an estimation for an average guest's one-time attendance can be predicted. Carbon Footprint, a very informative website providing environmental data, a footprint calculator, and business services, was utilized in determining what a single

round trip impact would be. By driving in an average car 600 miles to the city, 31.76 miles to and from the park, and back home, a guest will produce approximately **793.67 pounds of CO_2e** . Let's say a guest decides to visit the survey's average of 8 (7.76 rounded) days per year, broken up between 2 separate visits. Their carbon emissions jump from about 800 pounds of CO_2e to **1,851.88 pounds of CO_2e** , just through annual park visits. This amount is still more than flying 2,532 miles across the United States from Orlando, Florida to Los Angeles, California three times.

SIGNIFICANCE OF RESEARCH

Considering the Earth is seeing a shift in its nature, due to global warming caused by extensive release of carbon emissions, the study has potential as an additional resource to combat extreme carbon pollution. Predicting future attendance trends, along with the guests' transportation behaviors, modifications to Disney's fossil fuel use can be made to counteract the emissions caused to get to the park. Not only can this data be valuable to Disney, but other theme parks as well. Attractions, such as Universal Studios, SeaWorld, and Six Flags, can utilize the regression that can be created from this data, and apply it to their own parks' attendance.

HOW TO GROW FROM ERROR

Considering the small surveyed participant amount, the results cannot be assumed as the behavior for all Disney parks' visitors. For example, a large percentage of the survey participants live in Arizona, which is only one of the many locations where park guests travel from. Also, within the survey, several responses were inaccurate with distance measurements; for example, one response concluded that they were 5,000 miles away from Disneyland, yet only lives about 500 miles away. Due to this skewed data, some percentages may be off, but the overall data still summarizes general insight of guests' behaviors and travel patterns.



(Figure 12- Traffic at Walt Disney World)

Also, the in-person surveys at Walt Disney World were not factored into the results, as there was a lack of information. Due to time constraints and park guests' denial for participation, the in-person survey results were not significant. For example, many guests felt that the survey did not apply to them, as they live near the park. Other guests claimed that they were only at the park on business and not leisure, therefore denying survey participation. The act of approaching guests' may have made them uncomfortable, so if the in-person

surveys were to be attempted again, assistance from a cast member, in uniform, might yield better results. Guests are more willing to speak with a cast member than a stranger. With The Walt Disney Company, contact and internal information deemed difficult to receive, as most of their statistics are confidential or not open to the public. If a cast member in the sustainability department was available as a resource, the results and the information received might have altered the overall findings of the report.

So, with assistance from The Walt Disney Company, survey and report adjustments, and access to more information, both park guests and The Walt Disney Company could utilize the convenience of a carbon emissions calculator, providing the trends of transportation and its effect on the environment.



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