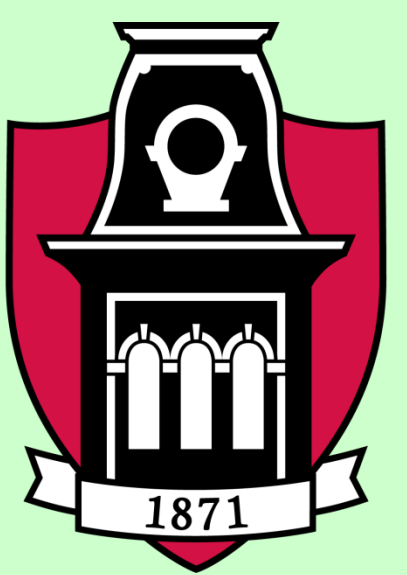


Carbon Emissions from Commuters to the University of Arkansas

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Geology, Sustainability



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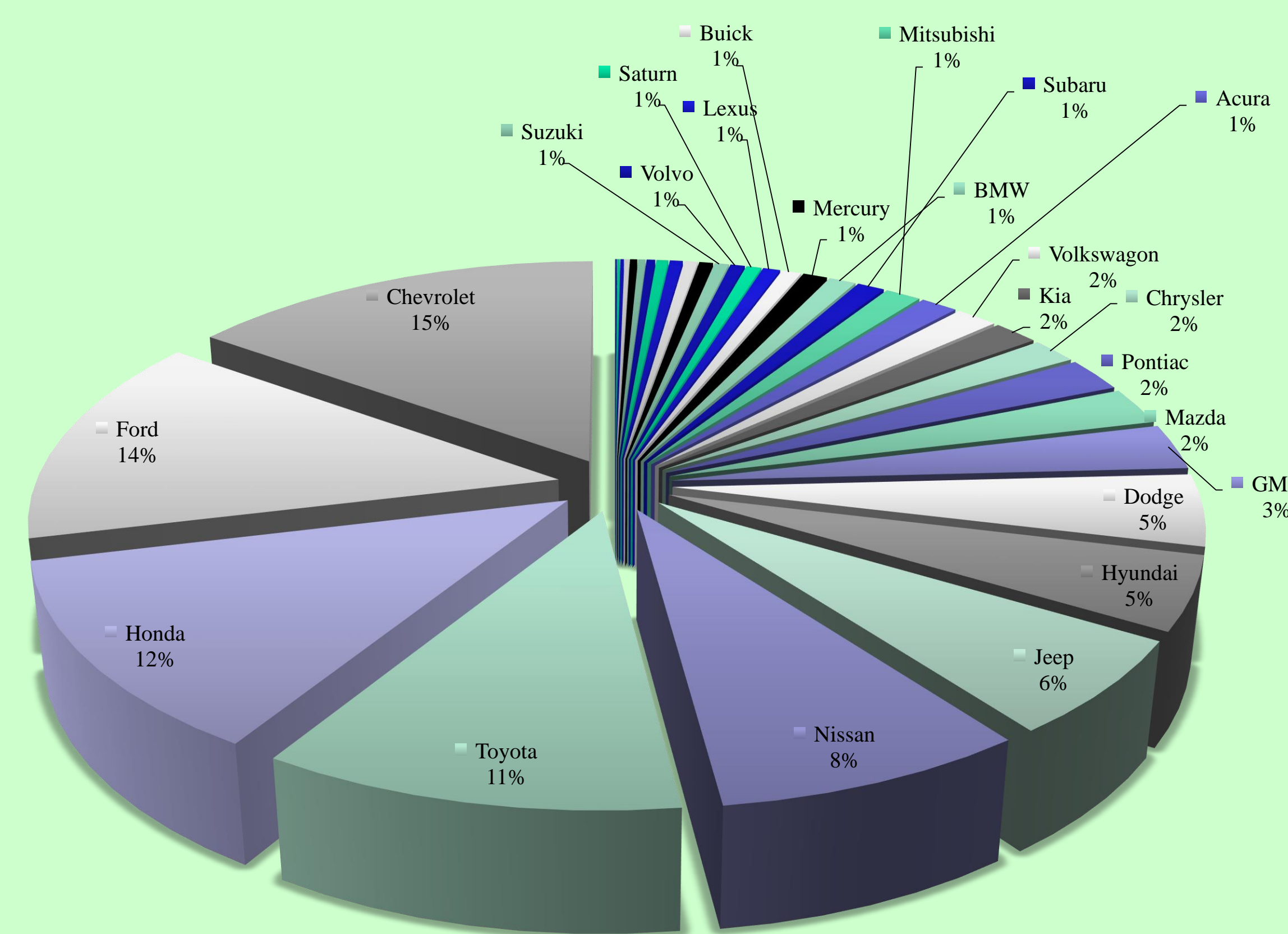
The Problem

Following the University of Arkansas' commitment to grow and progress in a sustainable nature, I became interested in the amount of carbon produced from all faculty and students who drive to campus. In order to calculate the carbon emissions from commuters to the university I had to first find the round trip distance each individual commuter makes on a daily basis and the fuel economy of the vehicle. Using parking pass permits records from the University of Arkansas Department of Transit and Parking I was able to obtain all the required information and construct an estimate of our total carbon emissions produced during a semester. This project will mark the first attempt at recording our carbon emissions from those who drive to campus. In order to be better educated regarding our carbon footprint at the university as a whole, we need to continue to calculate our carbon output in the transportation sector.

Sustainability

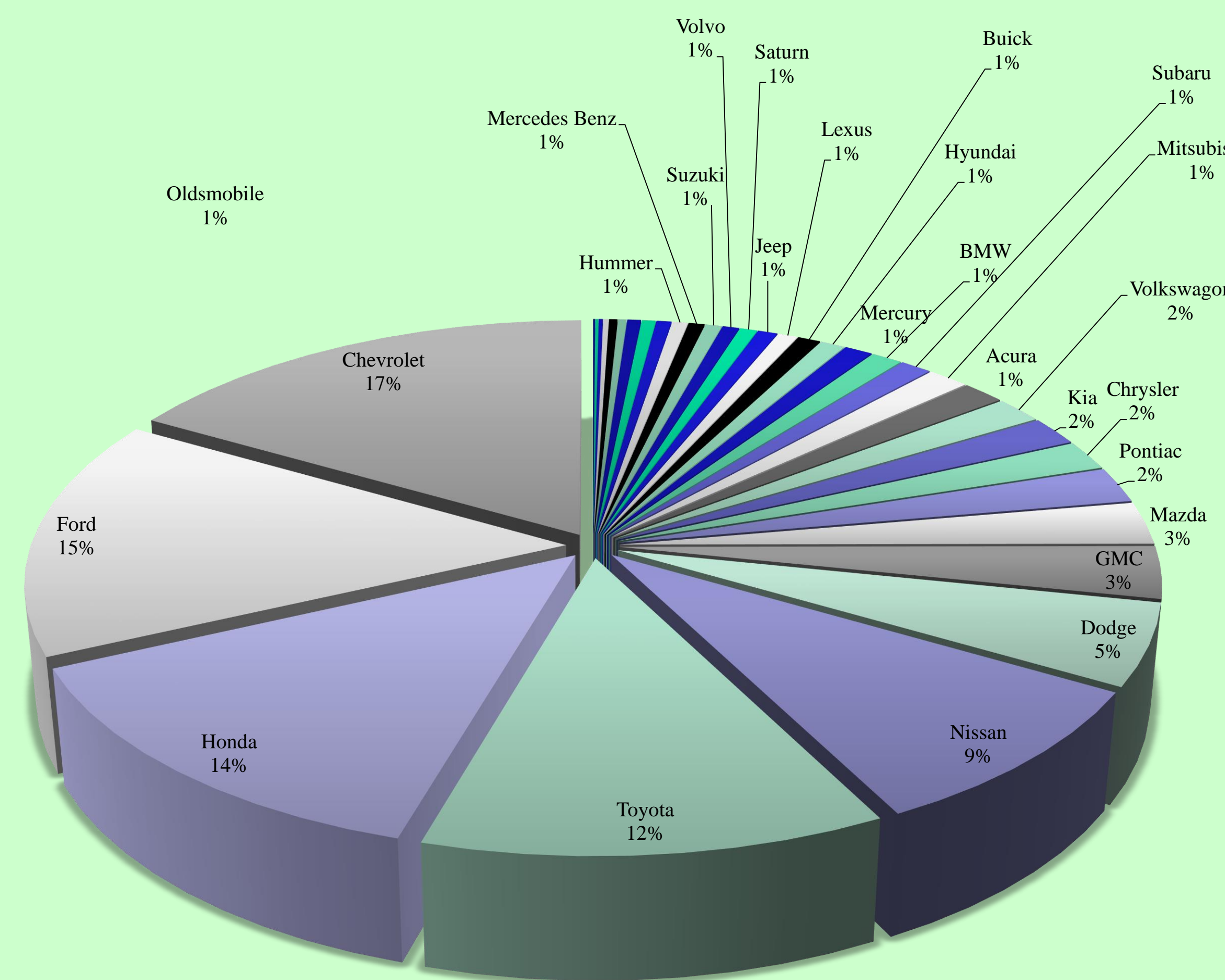
This project directly estimates the amount of carbon that the individuals who drive to campus everyday produce. The results of this project provide an estimate of where we are currently with regards to carbon emissions. In order to monitor our progress toward a sustainable future we need to have a benchmark to compare our findings to. This project establishes that precedent. The scope for this project was restricted due to the unreliability in the data. In order to gain a better understanding of our impact on the University's carbon footprint as a whole we must ensure that useable records are kept. I am hopeful that this first glance into the carbon output directly related to commuting sparks interest in my peers and drives further research and monitoring of emissions.

Percent of Total Carbon Emissions of Each Make of Vehicle



This pie chart illustrates the percentage each make of car accounts for from the total weight of CO₂ produced in a semester (676.07 tons, or 1,352,152.64 lbs. Makes that accounted for less than .5% of the total weight were not included in the legend. These include: Audi, Cadillac, Geo, Hummer, Infinity, Isuzu, Jaguar, Land Rover, Lincoln, Mercedes Benz, Mini, Oldsmobile, Plymouth, Rover, Saab, and Scion.

Percent of Total Fuel Used per Day by Each Make of Vehicle



This pie chart illustrates the percentage of fuel that each make of car consumes during a semester worth of commutes. Makes that account for less than .5% of the total gallons of gas consumed during the semester (76,479.18 gallons) were excluded from the legend. These makes include: Hummer, Oldsmobile, Infinity, Cadillac, Lincoln, Scion, Geo, Audi, Isuzu, Land Rover, Jaguar, Sab, Rover, Plymouth, Mini

This picture shows an example of how I organized the data after it was received from the Department of Parking and Transit. Of the 14,768 permits they issued, only 1,938 (13.12%) were deemed as reliable data.

Methods

Using the parking pass records I was able to obtain the round trip mileage for each vehicle via MapQuest. Also, I was able to average the recent fuel economy estimations for the models of the cars by using the United States Department of Energy Fuel Economy Standards to give an estimation of the fuel efficiency of the car in miles per gallon. Multiplying the round trip mileage by the MPG returned the number of gallons of gas used in a trip for the specific individual. The process was repeated for each permit. It was assumed that if the car was registered on campus it would not be commuting. If the permit was registered to an address that was outside of 40 miles from the University of Arkansas it was assumed to be unrealistic data and was not used. Summing all of the gallons of gas used by commuters in a round trip we were able to determine the total gallons of gas consumed during travel to campus. The total gallons of gas consumed in one day was then multiplied by the pounds of carbon emitted from combusting one gallon of gasoline (17.68 lbs.). This returned the weight of carbon emitted per day in pounds. Multiplying this number by 73, the typical number of days in the college semester, I found the total carbon emissions for commuters in a semester.

Discussion

This project taught me valuable computation and data analysis skills as well as provided me with an opportunity to further explore my interests in the natural systems of the Earth. Working on this project gave me a valuable researching and time management experience. I hope that further analysis of the carbon emissions from the transportation sector of the university stems more ideas on ways to cut our carbon output. I also hope that my project marks the beginning of a new interest in carbon emissions in my peers.