Furman’s Carbon Footprint: Contributions by Furman Faculty and Staff During the Daily Commute to Campus

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Abstract
Sustainability has become a major issue around the world as more and more people realize the impacts of wasteful consumption and unlimited growth. As a result, colleges and universities across the country are beginning to study environmental impacts of their own operation and take steps to reduce natural resource consumption. Furman University put a major emphasis on sustainability in 1987 with the adoption of a new strategic plan. Since that time, the Board of Trustees unanimously agreed to “strengthen our commitment to the environment by promoting sustainability through educational programs, campus operations /construction practices and public awareness initiatives” (Presidents Report, 2008). One aspect of this commitment is an effort to catalogue Furman’s carbon emissions and calculate the University’s total carbon footprint. This project will help with determining emissions from Furman faculty and staff resulting from the commute to and from work. Home addresses of Furman faculty and staff were obtained from the Personnel Office at Furman and were then geocoded into lat/long coordinates. The driving distance to Furman was then calculated and analyzed. Results shows that 41% of Furman employees live within five miles of campus. Using average fuel efficiency data obtained from the Department of Transportation, the total carbon emissions for employee commutes per year comes to 2637.5 tons of CO₂. The commute to and from Furman by its employees over the course of a year creates tremendous emissions.

Introduction
Cataloguing carbon dioxide emissions is a core area of Furman’s commitment to sustainability. Furman is just one of many schools that have begun this process. The process includes cataloguing emissions, finding areas where emissions can be reduced, and designing and implementing programs to reduce these emissions. One aspect of the calculating the carbon footprint of the university involves the emissions resulting from employees commuting from home to work and back. While Furman is a leader in green building and emission reductions through saving energy in its physical plant, the Committee on Sustainability is tasked with calculating all emissions related to the everyday operation of the university.

This project addresses the emissions from faculty and staff that occur during the daily commute to work at Furman. The addresses of all Furman faculty and staff were mapped in Google maps, and a webpage was set up to display this information (Figure 1). The website is currently http://gis.furman.edu/~rutledge/facstaff.htm, though the website address will change in the future. The information on the website is all public information, and it will be possible to continually update the data. This website can help Furman faculty and staff recognize the fact that many live in close proximity to each other and have the opportunity to carpool with one, or perhaps many, other employees.

Results
Individual employee addresses were mapped using ArcGIS and the total driving distance from their homes to the campus was calculated. Using ArcGIS, a map was created showing those addresses that lie within ten miles of the campus, with zones under five miles subdivided by mile (Figure 3).

Figure 3. Map view of northeastern South Carolina with the addresses of Furman faculty and staff marked. Circles represent distance from Furman up to ten miles with those below five subdivided by mile.

Figure 4 breaks down the distribution of faculty and staff addresses throughout the six buffer layers. One fact that could be of interest to the Committee on Sustainability is the number of faculty and staff who live within one mile of the center of the campus. This opens the possibility of encouraging employees to walk or bike to campus, which could significantly reduce emissions.

Carbon dioxide emissions from the transportation sector in the United States account for one third of total emissions. The Department of Transportation’s Research and Innovative Technology Administration gives the average fuel efficiency of cars and other two-axle vehicles (trucks, SUVs) (Figure 2). Figure 2 shows how fuel efficiency has risen, slowly, but steadily, over the last 24 years, but for cars only. It is discouraging to note that other vehicles show a decrease in fuel efficiency since 1995. Though some Furman employees walk, bike, or carpool to work, the majority drive, which contributes 19.6 lbs. of CO₂ for every gallon of gasoline burned. Therefore, the daily commute to work contributes a significant portion of carbon emissions to Furman’s total carbon footprint.

Figure 2. This chart shows the average fuel efficiency for cars and all other four wheeled vehicles from 1980 through 2004.

Source
Furman Faculty and Staff addresses – Furman University Personnel Office Fuel efficiency data – U.S. Department of Transportation, Research and Innovative Technology Administration

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