

Athletic Team Travel: The Carbon Footprint of the College of Saint Benedict Athletic

Department's Varsity Team Travel

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Abstract

The current study investigates the carbon footprint of the College of Saint Benedict's Athletic Department varsity team travel. Data was collected from each of the varsity teams based on the mileage from the season's travel for each type of vehicle used. The total mileage was entered into the Clean Air-Cool Planet Carbon Calculator to determine the total carbon dioxide equivalent for the Athletic Department as a whole as well as each varsity team and individual athlete. The Athletic Department emits 433.66 metric tons of carbon dioxide equivalent due to varsity athletic team travel in one academic year, 2010-2011. The researcher provides recommendations for the Athletic Department to take action to reduce this carbon footprint due to transportation.

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Athletic Team Travel: The Carbon Footprint of the College of Saint Benedict Athletic Department's Varsity Team Travel

The 2010-2011 academic year at the College of Saint Benedict and Saint John's University was declared the Year of Sustainability. This has sparked growing interest among the students, faculty, staff and monastics affiliated with the two colleges regarding sustainable practices and how to make the colleges more sustainable. The Office of Sustainability has conducted an energy audit of the different campus departments and how sustainable they are and where they can improve.

According to the Energy Information Administration, transportation produces the most amounts of energy related carbon dioxide emissions by end-use sector compared to residential, commercial and industrial sectors¹. Athletic teams are one of the groups on the college campus that travels a great amount due to competitions and training events away from the campus. Buses are common modes of transportation for teams, which get 6 miles to the gallon². This may be the best mode of transportation for the athletic teams, but the researcher wants to know how the teams can be more environmentally friendly while still participating in their sport and competing at a competitive level.

Carbon dioxide (CO₂) is a greenhouse gas that traps heat from the sun, making Earth a livable planet³. The burning of fossil fuels, such as transportation vehicles, increases CO₂ in the atmosphere⁴. The natural cycle of the earth systems, the Carbon Cycle, has the ability to keep the CO₂ levels on Earth at a sustainable level for life⁵. However, with the increase in CO₂ from

¹ Emissions of Greenhouse Gases Report (2008) eia.gov

² Connie, Trobecs bus company

³ What are greenhouse gases. *Energy Information Association*. Eia.gov

⁴ What are the sources of greenhouse gases. *Energy Information Association*. Eia.gov

⁵ Why are atmospheric levels increasing. *Energy Information Association*. Eia.gov

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vehicle emissions, the balance on Earth is altered. Increase in CO₂ has a direct relationship with global climate change⁶.

The researcher, an athlete, chose to aid the College of Saint Benedict data collection by calculating the total carbon dioxide equivalent emissions from the Athletic Department due to varsity team travel. Many Colleges and Universities have done calculations on their own greenhouse emissions, but the researcher was unable to locate any records specific to Athletic Department team travel emissions.

The College of Saint Benedict is centered on the Benedictine Values, one of which is stewardship. Stewardship is the reverence of all creation and care for the good of the earth⁷. It is important that members of the College of Saint Benedict community live by the core Benedictine Values. By calculating the Athletic Department's carbon footprint, the department is given the capabilities to bring awareness to their impact on the environment and practice stewardship.

The current research examines the total emissions from the transportation of the varsity athletic teams to competition and training events during the 2010-2011 academic year.

Methods

An Athletic Department assistant gathered the numbers used for the calculation of team travel emissions by the College of Saint Benedict Athletic Department from the head coaches of each varsity athletic team. This data collection occurred in October 2010. The coaches used the numbers from the current season, if their season was in progress, or projections based on the team schedule for the upcoming season. The submitted numbers included the location of the away contest, the number of people using the vehicle(s), the type of vehicle(s) used, and the total miles for the trip. The vehicles used by the Athletic Department included vehicles from the

⁶ What effect do greenhouse gases have on climate change. Energy Information Association. Eia.gov

⁷ Mission and Values. Saint Benedict's Monastery. <http://sbm.osb.org/index.php?cID=129>.

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school's Transportation Department, rented vehicles from Trobecs, Holt, Voights, and other similar companies, planes, and individually owned vehicles.

The researcher combined the total miles and passengers from all the teams based on the vehicle used to calculate the emissions from the Athletic Department athletic team travel [see Appendix A].

The Clean Air Cool Planet Carbon Calculator⁸ was used to determine the carbon footprint of the Athletic Department. This software can be found online and is used by the College of Saint Benedict and Saint John's University for evaluations in other departments on campus. The calculator produces a carbon dioxide equivalent (eCO₂) to evaluate the emissions from different energy uses. The researcher only used the transportation functions of the calculator for the data in this study.

Data was entered into the calculator for the athletic teams as a whole as well as each team individually. The total miles were entered into the "student's personal vehicles" to produce the results from the cars and vans used by the athletic teams, "faculty- bus" for the teams bus miles, and "study abroad travel" for the teams plane mileage. It should be noted that the regulations for calculating the carbon footprint of plane mileage is entered for each individual on the flight⁹. Thus, the mileage entered for a team traveling to Puerto Rico is the number of athletes multiplied by the number of miles of the trip. The mileage for every road vehicle is the total number of miles the vehicle travels, as one unit.

⁸ Clean Air-Cool Planet. <http://www.cleanair-coolplanet.org/toolkit/inv-calculator.php>

⁹ Judy Purman, Director of Sustainability, College of Saint Benedict

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Results

Table 1. Total athletic team emissions by vehicle.

	Energy Consumption	CO ₂	CH ₄	N ₂ O	eCO ₂
	MMBtu	kg	kg	kg	Metric Tons
Bus	72.70	5261.53	0.30	0.14	5.31
Car/Van	24.46	1715.21	0.34	0.12	1.76
Airline	2164.90	425051.76	4.19	4.81	426.59
Total	2262.07	432028.50	4.83	5.06	433.66

Table 2. Total athletic team miles.

	Bus (miles)	Car/Van (miles)	Plane (miles)	Total (miles)
Swim/Dive	1090	300	144240	145630
Golf	1350	0	15288	16638
Cross Country	1370	1260	73200	75830
Nordic	1460	1740	0	3200
Volleyball	1600	0	0	1600
Soccer	1745	0	0	1745
Softball	1830	100	65500	67430
Track/Field	1995	860	179100	181955
Tennis	2210	0	26640	28850
Basketball	2835	100	45500	48435
Hockey	3415	0	0	3415
Totals	20900	4360	540468	

Table 3. Total carbon dioxide equivalent in metric tons for each team.

	Bus (eCO ₂ metric tons)	car/van (eCO ₂ metric tons)	Plane (eCO ₂ metric tons)	Total (eCO ₂ metric tons)
Soccer	0.4	0	0	0.4
Volleyball	0.4	0	0	0.4
Hockey	0.9	0	0	0.9
Nordic	0.4	0.7	0	1.1
Golf	0.3	0	11.9	12.2
Tennis	0.6	0	20.7	21.2
Basketball	0.7	0.04	35.3	36.1
Softball	0.5	0	0.6	51.4
Cross Country	0.3	0.5	56.8	57.7
Swim/Dive	0.3	0.1	112	112.4
Track/Field	0.5	0.3	139	139.9

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Table 4. Total carbon dioxide equivalent per athlete.

	# of athletes	eCO ₂
Soccer	29	0.01
Volleyball	20	0.02
Hockey	28	0.03
Nordic Ski	12	0.09
CC	40	1.44
Basketball	25	1.44
Tennis	12	1.77
Golf	6	2.03
Softball	25	2.06
Track & Field	60	2.33
Swim/Dive	30	3.75
Totals	287	1.51

The College of Saint Benedict's Athletic Department emits a total of 433.66 metric tons of eCO₂ in one academic year for transportation of the varsity teams. This is an average of 1.51 metric tons of eCO₂ per athlete in her season. The results above show that the amount released varies based on the team that the athlete is a competitor. To put this into perspective, the goal of the college by 2035 is to be carbon neutral; the College of Saint Benedict's campus fleet (admin cars, campus trucks, mowing equipment, etc.) produced 275 metric tons of eCO₂ in 2010¹⁰. Table one shows the breakdown of the eCO₂ from travel vehicles for the athletic teams as a whole. Table two presents the total miles traveled by each team per vehicle and as a whole athletic team group by vehicle. Table three is the data produced from the Clean Air Cool Planet Carbon Calculator for the eCO₂ in metric tons for each athletic team. Table four is the total eCO₂ per athlete of each team she is a competitor. This table is included to give perspective of what the individual emissions are per athlete. Some teams have as low as 6 athletes while others have 60. This difference may cause one team to produce a large amount of emissions however when it is broken down to the individual level, it is a small amount per athlete and vice versa for the small

¹⁰ Judy Purman, Director of Sustainability, College of Saint Benedict

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teams. (The cross country team is one of the highest emitters as a team, but lays in the middle based on per athlete numbers.)

The soccer and volleyball teams bus miles are in the middle of the data set compared to other sports at the College of Saint Benedict, but due to their lack of flying for training and competition, they have the lowest carbon footprint of all the College of Saint Benedict athletic teams. The Swim/Dive team has the least amount of bus miles but the highest amount of eCO₂ produced per athlete due to the flight miles from traveling. Hockey has the highest amount of bus miles, but has the third lowest amount of CO₂ equivalent per team and per athlete because the team does not travel to competitions by air.

Recommendations

The College of Saint Benedict has a carbon neutral goal by 2035. There are several ways the Athletic department can reduce its carbon footprint emitted from varsity athletic team's transportation. These alternatives will aid in reducing the emissions produced by the team's travel, which will help the Athletic Department to decrease its carbon footprint.

The Athletic Department needs to reevaluate the vehicle usages for the varsity teams' transportation. The teams should use the least amount of vehicles possible when traveling to events. This is an option for teams such as golf, who drive individually to competition and off site practice. The data that the researcher received included teams with 20 passengers using a bus that has the capability of transporting 50 passengers. The teams should ride share with Saint John's University athletic teams who are traveling to the same location. There have been times when a Saint John's and a Saint Ben's team have traveled to the same location and not used the same vehicle, resulting in two half-full vehicles¹¹. This is costly and adds unnecessary emissions to the environment. Middlebury College has accomplished this by rearranging their schedule to

¹¹ The swim and dive teams travel to swim meets in the Twin Cities separately on occasion.

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have the men's and women's basketball teams travel together to games.¹² If there is a way to use smaller vehicles, those should be given priority as they are more fuel-efficient than the larger buses.

There should be a conscience effort to use fuel efficient vehicles as well. This effort will be a quick way to reduce greenhouse gas emissions if the college has access to these vehicles.

The athletic teams should adopt a park in the St. Joseph or surrounding communities and plant trees. Trees store about 13 pounds of carbon annually or 2.6 tons per acre each year¹³. This would mean that the Athletic Department needs to plant about 166 acres of trees each year. That is a lot of trees! Given the amount of time and space the college owns or has access to, this may not be feasible. Planting any amount of this acreage will be beneficial and help the Athletic Department move closer toward its goal of offsetting carbon emissions. By adopting a nearby park, the department will be practicing the Benedictine Value of Community. The teams could each have their own parks where, in addition to planting trees, they clean it up from trash, graffiti, or other needs of the park. In this way, they will also be participating in service to the community.

Carbon offsets are effective options to reduce carbon emissions. They are intangible, financial instruments that offset the carbon produced by those who purchase them. The carbon is "offset" because it is a financial investment in projects that work to reduce greenhouse gas emissions elsewhere¹⁴. They help to fund green energy and jobs where the demand occurs¹⁵. Carbon offsets are a good idea, but may not be the best for the Athletic Department. They will help reduce the net carbon cost to the environment from the Athletic Department's travel, but the

¹² Gardner, Andrew. (June 2009). "Middlebury Athletics Adopts Green Mission"

¹³ Coder, Dr. R.D. (1996). Identified benefits of community trees and forests. University of Georgia

¹⁴ 5.9 Carbon Offsets. AASHE.org

¹⁵ Curtis, Lisa. (2010). "Creating Carbon Offsets: A New Alternative for Colleges and Universities" AASHE.org

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department will not be changing its ways that produce large amounts of carbon emissions. Also, carbon offsets are not local; they may be purchased in Minnesota, but action takes place in a different location, possibly the East Coast.

A massive reduction of eCO₂ would happen if the teams did not fly to competitions. Many of the teams fly for training and competition. Flying produces 98% of the eCO₂ emissions from the team travel. This is not a realistic reduction of the Department's carbon footprint, but it is something to think about when choosing destinations to travel for the athletic teams.

There are alternatives that can be taken on a more local scale to reduce the College of Saint Benedict's Athletic Departments carbon footprint due to varsity team transportation.

The athletic teams should make a conscience effort to reduce, reuse, and recycle. Teams should reduce their purchase of disposable containers such as plastic water bottles, bowls, and utensils. The alternative to these disposable containers is to use reusable water bottles, and bring ceramic bowls and silver ware on the road for their intended purposes. This not only saves waste from entering a landfill, but it saves money. If plastic bottles are used, such as Gatorade, the teams should be sure to recycle these bottles. An alternative to buying plastic Gatorade bottles is to buy the powder. Athletes can use reusable water bottles and not pay for the transportation of water, which has not only monetary but has environmental costs as well. Paper items from event programs and other paper work that is used at events should be recycled as well.

The Athletic Department should invest in green energy in the buildings it uses for sporting events and practices. The temperature should be regulated; a two-degree increase in air conditioning and decrease in heat will save the department money as well as reduce the emissions that are released into the environment. The two-degree change can save up to 2,000

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pounds of carbon dioxide a year¹⁶. Greenhouse gas emissions and money are both saved in the long term due to these slight changes. These are indirect ways for the department to reduce the emissions on the environment from their travel.

Conclusion

Future research needs to be done in relation to the greenhouse gas emissions from the Athletic Department. This data collection was a good start to a much-needed data set, but more needs to be done. This data set did not include the transportation from the coaches to work or practice; many coaches do not live on campus and thus drive to practice or to the bus stop for travel to away competitions. The coach's transportation numbers should be included in the total Athletic Department travel emissions as they, the coaches, are a vital aspect to the team.

The miles from the teams who have off-campus practice sites need to be included. Hockey, tennis, and golf all have off-campus practice locations for some time in their season.

The team managers can record these numbers. A spreadsheet should be created to record the miles for each day the team has practice or competition during the year. It would be very similar to the spreadsheets used in this study: vehicle, miles, number of passengers per vehicle and who the passengers were (i.e. coach, athlete or trainer). This would be a simple task, which will provide very accurate and beneficial information when calculating the carbon footprint of the Athletic Department and the College as a whole.

Future research should also be done to calculate the Athletic Department's total greenhouse gas emissions which will include, in addition to the travel: electricity (lights, heating and cooling) for the facilities and athletic office, athletic gear production and transportation, competition officials' transportation, and the concessions impact.

¹⁶ "Conservation News" (April 2011). Wichita Audubon Society.
<http://www.wichitaaudubon.org/conservation.html>

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A calculation of the Saint John's University Athletic Department greenhouse gas emissions will be valued information to be compared to other Colleges and Universities that have both male and female athletics.

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Appendix A

Vehicle	MPG	Total Miles	Total Passengers	Total Athletes
bus	6	17020	2066	
mini bus	10	3880	200	
van	21	3510	151	
car	25	550	38	
flight		12470	147	
all		37430	2602	287

Basketball	Vehicle	Total miles	Total passengers
25	bus	2835	300
	van	100	37
	flight	1820	25
	all	4755	362
Cross Country	Vehicle	Total miles	Total passengers
40	bus	1370	240
	flight	1830	40
	van	1100	19
	car	160	30
	all	4460	329
Golf	Vehicle	Total miles	Total passengers
6	mini-bus	1350	36
Hockey	Vehicle	Total miles	Total passengers
28	all	3415	336
	55	2230	112
	47	1185	224
Nordic	vehicle	Total miles	Total pass.
12	van	1740	60
	bus	1460	24
	all	3200	84
Soccer	Vehicle	Total mile	Total pass.
29	bus	1745	232

Softball	Vehicle	Total miles	Total pass.
25	bus	1830	175
	flight	2620	25
	van	100	25
	all	4550	225
Track/Field	Vehicle	Total miles	Total pass.
60	bus	1995	475
	car	390	8
	flight	3980	45
	van	470	10
	all	6835	538
Volleyball	Vehicle	Total miles	Total pass.
20	bus	1600	140
Tennis	vehicle	Total miles	Total pass.
12	mini bus	2210	104
	flight	2220	12
	all	4430	116
Swim/Dive	Vehicle	Total miles	Total pass
30	bus	770	144
	mini bus	320	60
	flight		30
	all	1090	204