WARREN WILSON COLLEGE
GREENHOUSE GAS AND FUEL USE INVENTORY

2004- 2005 Academic Year

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Greenhouse Gas Executive Summary

What is a greenhouse gas inventory, and what is a fuel use survey?

A fuel use survey simply calculates how much fuel a business or an institution uses. A greenhouse gas (GHG) inventory calculates the greenhouse gases emitted by an institution or business. One can often easily conduct a fuel use survey and a GHG inventory in tandem.

Where do the largest emissions come from, and where is the fuel largely used on campus?

Warren Wilson College uses energy in a number of sectors, including electricity, natural gas, campus fleet gas and diesel, staff and faculty commuting, student driving, and worldwide flights. Non-energy sources of greenhouse gases include solid waste and agricultural emissions.

How much does the College spend on energy?

The College spends approximately $300,000 on electricity, $90,000 on natural gas, and $45,000 on fleet fuel. Other fuel costs that were not calculated include: worldwide flights, off-campus gas purchases, and propane expenses.

Within each sector, where is the fuel used, and from where are the GHG's emitted?

Within each sector a handful of large buildings accounts for most of the total energy used. Within the electricity sector, ten buildings use 73% of the College's total electricity use. The combined energy use of Devries gym and the Gladfelter dining hall accounts for 29% of the schools total electricity use. Warren Wilson College uses 4.4 million kWh annually, at a cost of $300,000.

Within the natural gas sector, ten of 38 campus meters use 71% of the College's total natural gas consumption. However, this number may be misleading because the largest gas meter on campus handles approximately 35% of all the natural gas and serves approximately 13 separate buildings. Second to the energy use recorded by the largest campus meter, the College swimming pool, and the Kittredge theatre are the two largest consumers of natural gas, respectively. The College annually consumes 230,000 therms, at a cost of approximately $90,000.

Within the campus fleet sector, the College farm, and the campus motor pool use 50% of all gas and diesel consumed by the College. Landscaping, public safety, and the natural resource crew are the 3rd, 4th and 5th largest consumers of gasoline and diesel, respectively. Eleven percent of fuel used by the College is diesel, while 89% is gasoline. The college annually uses about 22,500 gallons of fuel, at a cost of approximately $50,000.

The commuting of Staff, Faculty, and Students also use a significant amount of energy. Staff and faculty currently use approximately 35,000 gallons of fuel, while students use approximately 25,000 gallons of fuel. In total, staff, faculty, and students use

approximately 60,000 gallons of fuel, and drive an estimated combined total of 1.5 million miles annually. This inventory also presents an estimate of the fuel use and resulting greenhouse gas emissions from Worldwide flights.

Non-energy sources of greenhouse gases include methane from landfill waste and the digestion of cattle, as well as nitrous oxide emissions from manure management and agricultural fertilizer use.

This Survey did not include all possible sources of the College's GHG emissions. Missing pieces that may contribute significantly to GHG production include sewage decomposition, propane use, use of coke by the campus blacksmith shop, extended academic field trip gas use, and the possible emissions of HCFC's, primarily by air conditioning systems.

What sectors emit the most GHG's, and use the most energy?

Because the amount of GHG's released relates directly to the amount of fuel used, a comparison of GHG emissions enables a comparison of fuel use. Of the total GHG emissions, electricity generates 47%, natural gas creates 23%, the fleet gas sector generates 5%, staff and faculty commuting emits 7%, student driving generates 4%, worldwide flights emit 6%, agricultural activities create 3%, and solid waste emits 5% of the College's total GHG's.

What can we do to minimize our fuel use and greenhouse gas emissions?

If the College addresses the biggest users first, it will have a maximum impact. The College can lower it's fuel use and greenhouse gas emissions in a number of ways. If the College focuses on lowering electricity consumption, it should first look for ways to reduce consumption by the few largest users. For example, by converting the gym's heating system from electricity to another more efficient mode of heating, such as natural gas, we would most likely cut electricity use dramatically. The College should also consider installing more efficient lighting and other electricity saving devices throughout the Gym and other large electricity consuming buildings.

The College should also explore more efficient heating options in the largest two or three users of natural gas. For example, installing a solar hot water heater on the roof of the pool building could significantly lower gas consumption attributed to the College pool. Warren Wilson College has already had success with solar hot water in the newly constructed Ecodorm, as well as other passive solar heating systems in Witherspoon, The Ecodorm, and the Orr Cottage.

The College should also strive to buy more fuel-efficient vehicles when possible, as well as finding ways to reduce transportation emissions and energy use. In many of the other sectors, more simple methods of reduction, such as reducing driving or decreasing the amount of solid waste we generate could reduce GHG emissions.

How can this survey be improved?

A number of emissions sources, such as Propane, Blacksmithing, and Admissions travel, HCFC emissions, sewage treatment emissions, and emissions resulting from the

Asheville city bus that comes to campus were not included in this inventory. This survey also did not include the fuel use of on-campus staff and faculty homes. By including these sources the inventory could be significantly improved.

Many of the data collection methods relied on slender data and assumptions. By instituting a system that directly records fuel use, (such as off campus gas purchases) the survey's accuracy would greatly improve.

Greenhouse Gas Inventory Summary

Greenhouse Gas Inventories and Fuel Use Surveys

For those unfamiliar with Greenhouse gas inventories, a greenhouse gas (GHG) inventory calculates the greenhouse gases emitted by an institution or business. While this survey primarily serves as a greenhouse gas inventory, it also functions as a fuel use survey to calculate how much fuel the College uses. Because the two are so similar one can often easily conduct a fuel use survey and a GHG inventory in tandem.

Purposes

These data were collected for a number of purposes. This inventory quantifies the College's impact on global warming and provides a baseline that can be used to compare the College's performance from year to year. The information gathered regarding the fuel use of individual entities also allows the College to target the largest energy consumers on campus for possible reduction.

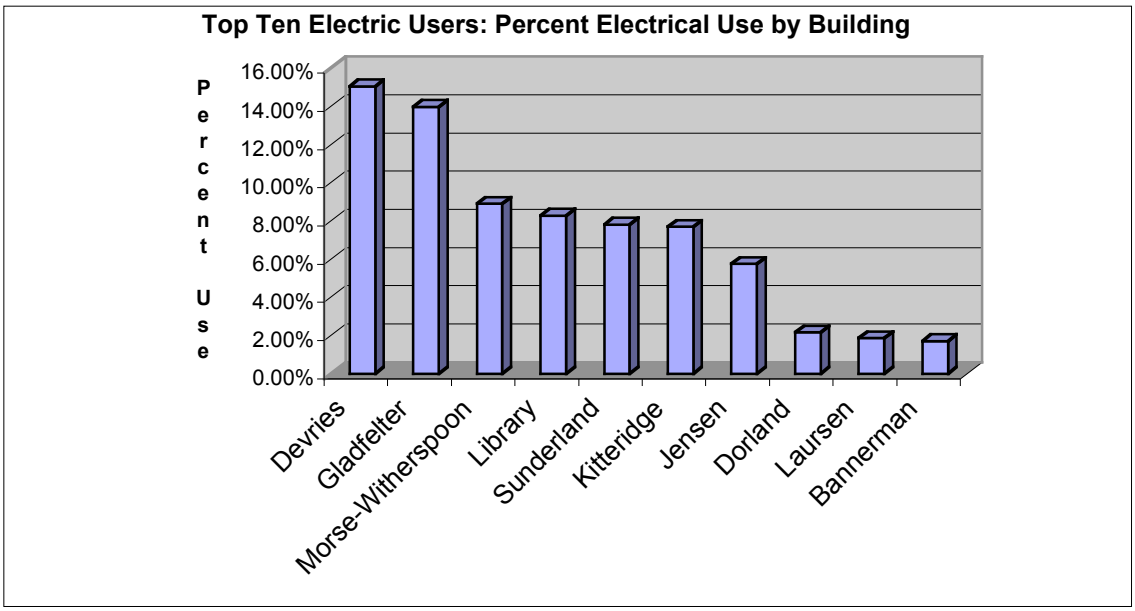
Emissions Sectors: Included and Non-Included

Within the College, many different sectors use fuel and emit greenhouse gases. The fuel use sectors addressed in this survey include: electricity, natural gas, campus fleet gas and diesel, staff and faculty commuting, student driving, the FMTS boiler, and worldwide flights. Non-fuel greenhouse gas sectors include solid waste and agricultural emissions. Some omitted fuel sectors include: propane emissions, coke burned by the campus blacksmith shop, emissions from the Asheville City bus that stops at the College, admissions travel, and off-campus academic fleet trips greater than 250 miles. Omitted \non-fuel GHG emissions sectors include sewage decomposition and possible emissions of HCFC's (hydrochlorofluorocarbons) from the various on-campus refrigerant systems.

Electricity

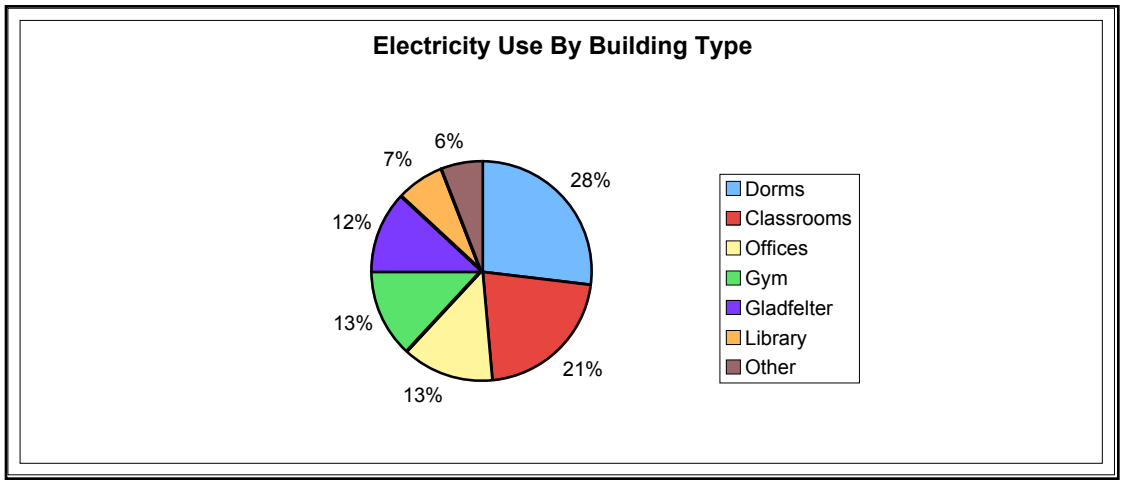
Within the electricity sector, a handful of large buildings accounts for most of the total energy used. The top ten electricity-using buildings use 73% of the College's total electricity consumption. Below, Figure 1 shows the top ten electricity using buildings.

Figure 1.



The combined energy use of Devries gym and the Gladfelter dining hall accounts for 29% of the school's total electricity use. Many of the top ten electricity using buildings have a large square footage and are located in main campus. Figure 2 shows electricity use by building type.

Figure 2.



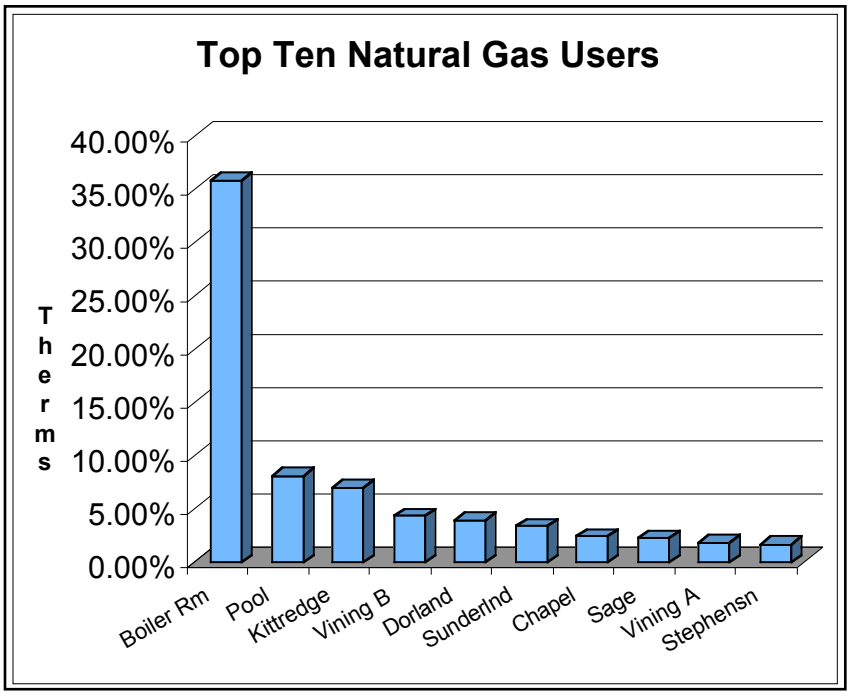
The College dorms use 28% percent of the schools electricity, while classrooms use 21% and offices use 13% of the College's total electricity. The three next largest sectors are single buildings. The Devries Gym, Gladfelter Cafeteria, and the Library all use

considerable portions of the total electricity use. Overall, Warren Wilson College uses 4.4 million kWh annually, at a cost of $300,000.

Natural Gas

Within the natural gas sector, ten of 38 campus meters sources use 71% of all the College's natural gas. Figure 3 shows the top ten natural gas consuming campus buildings.

Figure 3.



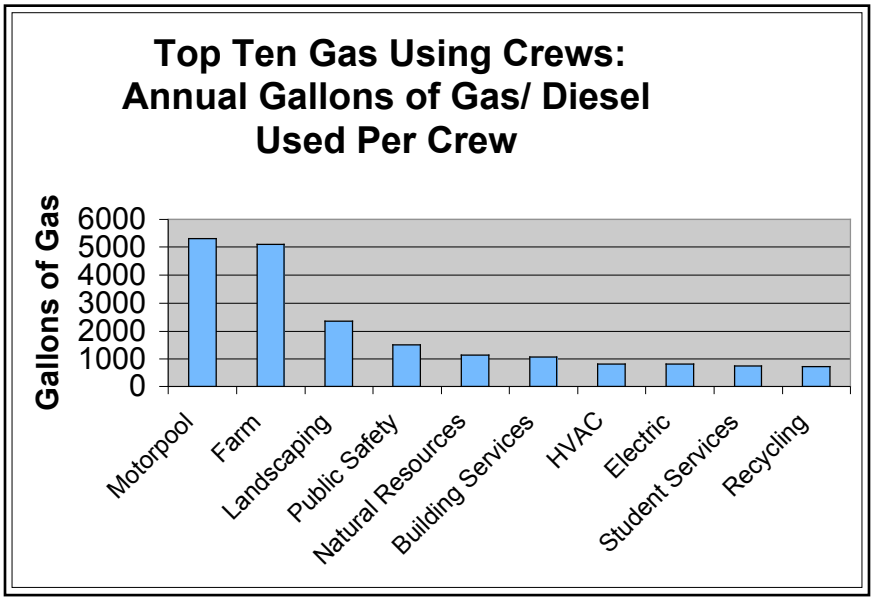
However, the consumption of the largest meter source on campus (Boiler room) may be misleading because the Boiler room meter, unlike the rest of the meters, serves approximately 13 separate buildings. The College is unable to determine how much natural gas goes to each building that is associated with the Boiler room's total consumption. The College swimming pool consumes the second largest amount of the College's natural gas, while the Kittredge theatre is the third largest consumer. Other significant users of natural gas include: Vining B (which also contains Vining C's consumption in the graph above), as well as Dorland, and Sunderland. In contrast to patterns of electricity use where the largest users were large main campus buildings, many of the top ten natural gas consuming buildings are dorms. The two buildings on

campus consuming the least amount of natural gas are the relatively new Ballfield C and Ecodorm, respectively using approximately 1% and 0.6% of the College's total natural gas consumption. In summary, the College annually consumes 230,000 therms of natural gas at an annual cost of approximately $90,000.

Campus Fleet

The Campus Fleet sector includes the vehicle use by the College's various student work crews and vehicle use that transports students to service, athletic, and academic events. Within the campus fleet sector, the College farm and the campus motorpool consume a combined 50% of all gas and diesel used by the College. The motorpool maintains and fuels all vehicles that are used for off-campus travel. The top ten fuel consuming crews are shown in Figure 4.

Figure 4



Less significant, but large users of fuel are: landscaping, public safety, and the natural resource crew. Eleven percent of the total amount of fuel used by the College is diesel, while 89% is gasoline. Of that diesel, approximately 20% was biodiesel, meaning diesel fuel that is derived from vegetable oils. The college annually uses approximately 20,000 gallons of gasoline and 2,500 gallons of Diesel, at a cost of approximately $50,000.

Faculty and Staff Commuting

Surveys sent through the campus mail were used to estimate the gas consumption of commuting staff and faculty. A survey was delivered to every box. Out of the 294 surveys sent out, 39% of the surveys were returned. Using these surveys, the total fuel use of the commuting staff and faculty was estimated to be approximately 35,000 gallons of fuel per year. In total, staff and faculty drive about 875,000 miles per year. On average, a staff or faculty member will use approximately 120 gallons of gasoline for commuting purposes each year.

Student Driving

Students also use a significant amount of fuel while driving off-campus. A survey similar to the staff and faculty survey was conducted to determine the gas usage of students. The Survey was administered to on-campus resident students in person, while off-campus day students received the survey in their mailboxes. The return rate on the day student surveys was 11%. One hundred and sixty two semi-random surveys were also conducted in person with on-campus students. These two surveys were then used to estimate how much gasoline the student body uses throughout the year. In total, students use approximately 25,000 gallons of fuel per year. Of that total, day students use 80% of the gas. Leaving residential students with a consumption of approximately 20% of the total student gas use, or 5,000 gallons of Gasoline annually.

Worldwide Flights

The emissions of the College's Worldwide program's flights were also included in this survey. In total, the Worldwide program flew approximately 88,000 miles. The fuel use and the airplane's consequent emissions were calculated from a preexisting formula published by the U.S. Department of Transportation that converts per passenger miles (planes total emissions by mile, divided by total number of passengers) into fuel use and emissions. The estimated fuel use of the flights is approximately 4.4 billion Btu's, resulting in the emission of approximately 700,000 lbs. of GHG's.

Solid Waste

The disposal of solid waste also generates greenhouse gases, specifically through the release of methane from the waste after the College's waste is buried at the landfill. In

order to generate this number, an emission coefficient was used to convert the total poundage of landfill waste into an estimate of a poundage of methane released from the waste. Annually, the College sends approximately 360 short tons of waste to the landfill.

Agriculture

Agricultural practices also generate GHG emissions. Methane is emitted largely from the internal digestion of cattle. The application of fertilizer also results in the emission of greenhouse gases, specifically nitrous oxide. An emissions coefficient was used to convert the number and cattle or the pounds of fertilizer used into poundage of their respective greenhouse gases.

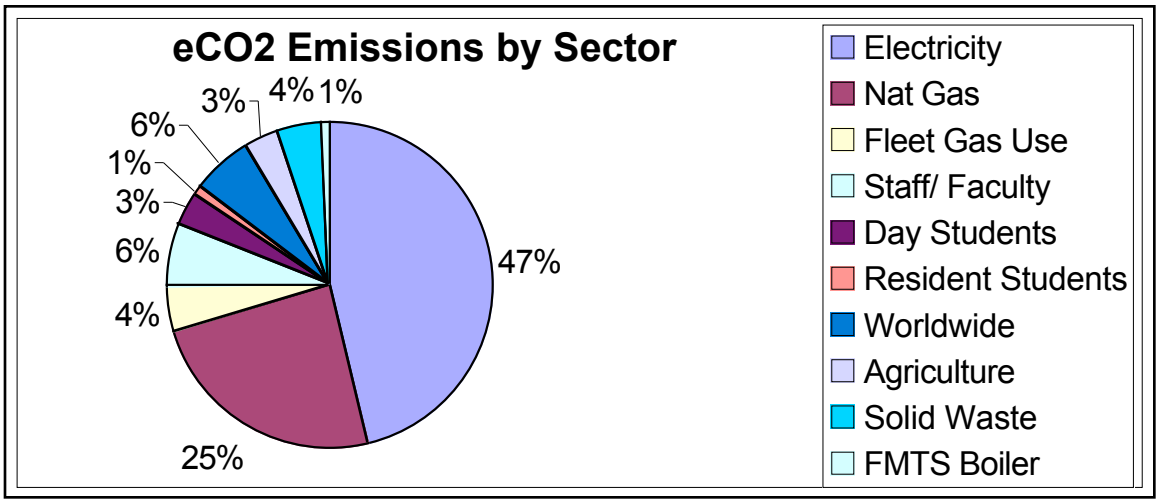
Comparing Units and Greenhouse Gas Weighting

Emission coefficients allow the conversion of energy units, such as kilowatt-hours or therms, to be transferred into comparable units, such as pounds of carbon dioxide. Using emissions coefficients one can determine the amount of carbon dioxide, methane, and nitrous oxides that are released from burning certain amounts of energy. However, different greenhouse gases have different impacts on the global climate. Due to their different impacts, different gases should be appropriately weighed for a meaningful comparison between gases. For example nitrous oxide has 310 times the impact of carbon dioxide on global warming, while methane has 21 times the impact of carbon dioxide. In order to facilitate the comparison of the various sectors, all gases are converted into a unit called a carbon dioxide equivalent (eCO_2) One pound of methane equals 21 pounds of carbon dioxide equivalent, while one pound of nitrous oxide equals 310 pounds of carbon dioxide equivalent.

Comparing Greenhouse Gas Emissions Between Sectors.

Once converted to a standard unit, the gases can be compared. Figure 5 shows the Carbon dioxide equivalents broken down by sector.

Figure 5 Carbon Dioxide Equivalent Emissions by Sector



Electricity accounts for 47% of the College's greenhouse gas emissions, while natural gas accounts for 25%. These two sources alone make up approximately 70% of the schools total greenhouse gas emissions. Fleet gas use accounts for 4%, staff and faculty driving make up 6%, and student driving accounts for 4% of the total gas and diesel that is consumed by the College. Worldwide emissions make up 6% of the College's emissions, while agriculture, solid waste, and the FMTS boiler respectively generate 3%, 5%, and 1% of the College's total emission.

Recommendations to Reduce Fuel Use and Greenhouse Gas Emissions

The question to be asked throughout the recommendation section is "What is the most effective way to reduce our emissions?" There are a number of possible ways the College can lower fuel use and greenhouse gas emissions. By addressing the biggest users first the College will have a maximum impact.

Electricity Recommendations

If the College focuses on lowering electricity consumption, it should first look for ways to reduce consumption by the few largest users. Initial efforts should focus on reducing the electricity use of the Devries gym, which uses approximately 15% of the

College's electricity and costs the College $34,000 annually. There are many things that could be done to reduce Devries' electricity consumption. By converting the gym's heating system from ceiling mounted electric heat to another more efficient mode of heating, such as natural gas, we would most likely cut electricity use dramatically. Day lighting could also be used to reduce the need for the electric lights during day use. The College should also consider installing more efficient lighting and other electricity saving devices throughout the gym and other large electricity consuming buildings. Figure 1 (pg. 8) also illustrates that many of the largest electricity consumers are air-conditioned. The College should investigate the feasibility of alternative cooling systems in some of the buildings shown in Figure 1.

Natural Gas Recommendations

The College should also explore more efficient heating options in buildings with a high demand for natural gas. For example, installing a solar hot water heater on the roof of the pool building could significantly lower gas consumption attributed to the College swimming pool. Warren Wilson College has already had success with solar hot water in the newly constructed Ecodorm, as well as other passive solar heating systems in Witherspoon, the Ecodorm, and the Orr Cottage.

Campus Fleet Recommendations

In order to lower campus fleet emissions, the College should also strive to purchase only the most fuel-efficient vehicles. To ensure that more thought is given to gas mileage when purchasing new vehicles, the College could implement a vehicle-purchasing standard that would require a certain fuel efficiency for different classes of vehicles. The college could also pass average fleet-wide fuel efficiency standards, requiring the campus fleet to maintain a specific average fuel efficiency. The College should also strive to find ways to reduce commuting emissions from staff, faculty, and students. The recent addition of an Asheville city bus stop on campus has most likely cut student transportation emissions. The recent addition of 20% biodiesel in our diesel mix effectively reduced that amount of fossil-derived carbon dioxide that was emitted into the atmosphere. While this emissions reduction was not taken into account in this survey,

Biodiesel is said to reduce fossil derived greenhouse gas emissions by approximately 70%.[1] Ethanol should also be considered for the campus fleet as another alternative fuel. Ethanol can be mixed up to 10% in gasoline and safely run in un-modified regular gasoline engines.

Areas for Improvement in Inventory

This greenhouse gas inventory could be improved in many ways. By incorporating some of the omitted sectors (propane, coke, HCFC, admissions travel, sewage treatment, and bus emissions) the inventory would be greatly improved.

The inventory could also look at the impact of the campus forest's absorption of carbon dioxide, as well as the impact of using 20% biodiesel in the fleet sector on carbon dioxide emissions. Both of these sectors have the net impact of offsetting some of the College's GHG emissions.

The methods of gathering the data of this inventory could also be improved. The way that off-campus fleet fuel was calculated, as well as Worldwide flight mileage bordered on the edge of guess work. Many aspects of fuel use are not recorded, and many times emissions are based on sub par data. Within the staff, faculty, and student fuel use surveys, the sample size of the day student survey should be enlarged to generate more reliable data.

Certain assumptions of this inventory should also be investigated. For instance, if the assumption that the College's solid waste is put into an un-flared landfill turns out to be incorrect, landfill emissions would be reduced 21 times over. The inventory would also be improved if the initial record keeping of fuel-use was improved within the office or crew in which the fuel was used, especially within large fuel using sectors. This would prevent the necessity of after the fact assumptions about fuel use.

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[1] "Life Cycle inventory of Biodiesel and Petroleum Diesel for Use in an Urban Bus". US Department of Energy, US Department of Agriculture. 1998

In Detail Methods and Data by Sector

Electricity Inventory Methods and Data:

Methods:

Electricity data was gathered from the Progress Energy website, which provides monthly bills for all 58 on-campus electricity meters.

In order to access the web site, located at www.progress-energy.com, the password and User ID must be obtained from the Accounting Office. Once at the site, follow links to large commercial/ industrial / governmental section for the Carolinas. Then follow the link to Energy Resource Center. Here the website prompts the user for a user ID and a password. Since the data for this inventory was gathered the website has changed much for the better, in terms of both accessibility and utility. The data was then pulled off Progress Energy's website and formatted to summarize individual building electricity consumption as well as the resulting emissions from the electricity consumption.

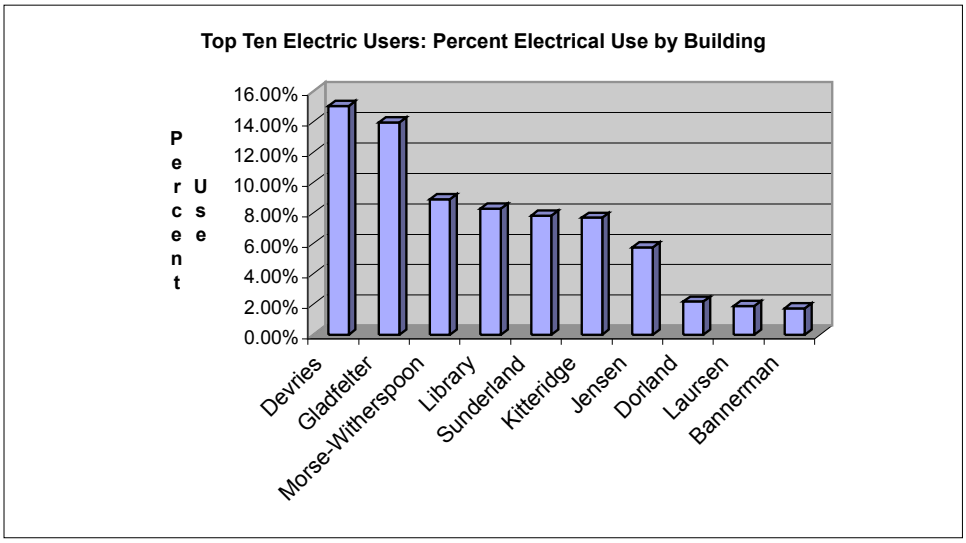
In the following charts the data gathered from Progress Energy is displayed in terms of monthly consumption, cost, and percentage of total use.

Electricity Use By Building: August 2004 to July 2005

	Buildings	Totals (kWh)	Percentage of total use	Above 5%	Cost
1	Art Barn	26,263	0.605		$2,299.59
2	Ballfield A	53,760	1.239		$4,248.38
3	Ballfield B	49,580	1.143		$3,851.00
4	Ballfield C	49,240	1.135		$3,826.27
5	Barn Storage BLDG	17,450	0.402		$1,689.19
6	Bryson Gym	21,054	0.485		$1,848.78
7	Carson #514	26,010	0.600		$2,211.47
8	Chapel	22,047	0.508		$1,926.02
9	Christian ED	33,580	0.774		$2,738.93
10	Craft Shop	12,739	0.294		$1,223.39
11	Devries Gym	653,000	15.054	!	$34,618.90
12	Dodge	30,945	0.713		$2,554.71
13	Dorland BLDG	94,320	2.174		$5,573.36
14	Ecodorm	28,429	0.655		$2,381.30
15	Fletcher	21,936	0.506		$2,015.88
16	FMTS	70,680	1.629		$5,817.34
17	Garden Cabin	8,843	0.204		$938.86
18	Garden- Pump 7-04 NIU	0	0.000		$144.00
19	Gladfelter BDG- A-C	606,400	13.980	!	$42,970.49
20	Gladfelter Lighting	617	0.014		$200.34
21	Greenhouse	7,929	0.183		$852.12
22	Health Center #407	9,350	0.216		$960.02
23	Horse Barn	4,430	0.102		$539.99
24	Jensen	249,200	5.745	!	$19,216.20
25	Kitteridge Complex	333,600	7.691	!	$19,817.50
26	Laursen	81,320	1.875		$5,443.99
27	Library- Bannerman	74,384	1.715		$5,567.34
28	Log Cabin	24,437	0.563		$2,102.45
29	Metered Service (ANTC)	45,991	1.060		$3,714.65
30	Metered-Not In Use 1000	135	0.003		$156.35
31	Morse-Witherspoon	386,600	8.912	!	$28,645.48
32	MTR Service	2,860	0.066		$405.25
33	North Enterence Sign	728	0.017		$210.41
34	NRC Shed	1,534	0.035		$284.22
35	Ogg	68,960	1.590		$5,189.85
36	Pavilion	415	0.010		$181.81
37	Piggery	12,056	0.278		$1,180.71
38	Ransom B	28,672	0.661		$2,360.54
39	Recycling CTR	10,077	0.232		$1,123.03
40	Red Garden Shed	1,641	0.038		$293.67
41	Sage Building	30,822	0.711		$2,539.78
42	Schafer A	59,529	1.372		$4,537.40
43	Schafer B	51,070	1.177		$3,953.68
44	Schafer C	52,453	1.209		$4,051.79
45	Sheppard Building	13,726	0.316		$1,312.16
46	South Enterance Sign	857	0.020		$222.11
47	Spidel Building	24,070	0.555		$2,157.68
48	St Clair BLDG	19,988	0.461		$1,778.51
49	Stephenson	23,711	0.547		$2,047.33
50	Sunderland	338,880	7.812	!	$19,168.64
51	Sutton	37,726	0.870		$3,026.21
52	Temp Board (Library)	359,520	8.288	!	$21,485.21
53	The Boiler #610	31,800	0.733		$2,706.59
54	The Farm Office	9,210	0.212		$965.27
55	Tractor Shed 8-04	2,533	0.058		$375.81
56	Vining A	45,000	1.037		$2,723.78
57	Vining B	65,280	1.505		$4,279.55
58	White Barn	345	0.008		$175.53
	Total	**4,337,732**	100.000		**$298,830.81**

Top Ten Electricity Users: 2004-2005

	Buildings	Totals (kWh)	Percentage of total use	Cost
1	Devries	653,000	15.05%	$34,618.90
2	Gladfelter	606,400	13.98%	$42,970.49
3	Morse-Withspn	386,600	8.91%	$28,645.48
4	Library	359,520	8.29%	$21,485.21
5	Sunderland	338,880	7.81%	$19,168.64
6	Kitteridge	333,600	7.69%	$19,817.50
7	Jensen	249,200	5.74%	$19,216.20
8	Dorland	94,320	2.17%	$5,573.36
9	Laursen	81,320	1.87%	$5,443.99
10	Bannerman	74,384	1.71%	$5,567.34
	Total kWh	**3,177,224**		**$202,507.11**
	Percentage of Whole	**73.2%**		**67.8%**
11	FMTS	70,680	1.63%	$5,817.34
12	Ogg	68,960	1.59%	$5,189.85
13	Vining B	65,280	1.50%	$4,279.55



Electricity Usage By Meter / Building (kWh)

Building Name	August	Sep	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Totals
ANTC (metered serv.)	3,054	3,753	3,874	3,978	4,737	4,926	4,669	4,498	4,864	3,671	2,142	1,825	**45,991**
Art Barn	493	1,858	2,369	2,926	4,034	1,220	2,997	2,766	3,870	2,973	422	335	**26,263**
Ballfield A	3,420	4,520	4,840	5,400	5,400	4,940	5,260	5,160	5,340	4,120	2,660	2,700	**53,760**
Ballfield B	3,020	3,960	4,440	4,700	4,960	4,620	4,720	4,620	4,920	3,740	2,480	3,400	**49,580**
Ballfield C	3,080	4,340	4,400	4,760	5,020	4,900	4,960	4,940	4,880	3,740	1,940	2,280	**49,240**
Barn Storage BLDG	916	880	705	829	1,580	2,229	3,926	2,082	1,374	1,170	882	877	**17,450**
Bryson Gym	1,494	1,402	1,271	1,611	1,726	1,517	2,350	1,835	1,350	1,227	1,608	3,663	**21,054**
Carson #514	2,186	2,518	2,386	2,398	2,216	2,035	2,336	2,283	2,103	1,907	1,740	1,902	**26,010**
Chapel	1,036	1,441	1,804	1,896	3,013	2,010	2,196	2,067	2,112	1,957	1,238	1,277	**22,047**
Christian ED	2,820	3,180	2,140	2,300	2,920	2,220	2,320	2,300	2,460	2,520	2,800	5,600	**33,580**
Craft Shop	744	802	801	1,130	1,224	1,390	1,160	1,232	1,103	1,355	1,573	225	**12,739**
Devries Gym	47,000	46,250	56,750	49,250	56,000	63,000	61,250	63,750	58,250	48,750	50,250	52,500	**653,000**
Dodge	3,220	2,882	2,981	2,652	2,949	2,334	2,315	2,294	2,450	2,257	2,390	2,221	**30,945**
Dorland BLDG	6,720	7,680	8,320	8,080	8,720	8,480	8,680	7,920	8,600	6,480	6,600	8,040	**94,320**
Ecodorm	1,851	2,283	2,487	2,404	3,017	2,073	2,729	2,557	2,596	2,146	1,752	2,534	**28,429**
Fletcher	3,129	2,507	2,228	2,107	1,924	720	2,111	1,304	1,462	1,245	1,102	2,097	**21,936**
FMTS	4,140	3,900	4,520	5,240	8,400	9,540	9,160	7,760	5,000	4,020	3,980	5,020	**70,680**
Garden Cabin	804	674	778	721	857	423	1,026	742	599	544	718	957	**8,843**
Garden- Pump 7-04													**0**
Gladfelter BDG- A-C	58,600	61,500	56,300	50,000	43,600	40,400	45,000	41,700	47,700	44,400	43,400	73,800	**606,400**
Gladfelter Lighting	8	52	61	56	65	67	58	54	54	45	45	52	**617**
Greenhouse	1,043	781	615	380	405	393	447	574	1,190	705	589	807	**7,929**
Health Center #407	527	701	481	583	1,116	1,109	1,187	1,251	1,260	496	274	365	**9,350**
Horse Barn	117	67	72	74	716	702	1,115	914	161	58	140	294	**4,430**
Jensen	14,300	17,800	14,300	15,100	29,300	31,800	33,100	28,700	17,100	14,700	12,100	20,900	**249,200**
Kitteridge Complex	37,500	33,600	24,900	19,800	27,000	25,200	27,900	28,500	21,600	23,400	25,200	39,000	**333,600**
Laursen	4,720	4,080	5,000	5,680	10,440	11,120	11,000	10,400	6,200	4,560	3,560	4,560	**81,320**
Library (Temp Board)	26,960	30,360	31,320	29,200	26,720	23,480	26,960	28,080	35,960	33,520	30,480	36,480	**359,520**
Library- Bannerman	6,315	6,879	6,257	5,703	6,007	5,583	6,698	6,480	6,724	6,319	4,927	6,492	**74,384**
Log Cabin	2,255	2,043	2,009	1,907	2,120	1,848	2,053	1,999	2,161	2,057	1,728	2,257	**24,437**
Metered-Not In Use					72	62		1					**135**
Morse-Witherspoon	30,700	32,900	32,500	26,200	32,600	40,100	39,500	39,700	40,700	31,100	17,800	22,800	**386,600**
MTR Service	109	150	118	186	441	442	529	351	182	149	105	98	**2,860**
North Enterence Sign	54	59	67	60	79	76	65	61	60	49	47	51	**728**
NRC Shed	35	43	58	56	208	203	63	553	94	47	70	104	**1,534**

Ogg	7,080	6,000	5,840	4,960	5,640	5,600	5,080	5,280	5,640	5,160	5,480	7,200	**68,960**
Pavilion	77	18	17	35	8	16	13	23	23	24	27	134	**415**
Piggery	1,008	1,161	926	558	1,023	1,351	1,489	1,649	587	524	810	970	**12,056**
Ransom B	3,864	1,838	990	843	717	1,063	1,653	1,150	1,823	3,293	3,469	7,969	**28,672**
Recycling CTR	322	456	469	662	1,347	1,400	1,735	1,407	699	673	441	466	**10,077**
Red Garden Shed	156	116	111	64	31	26	41	31	141	179	243	502	**1,641**
Sage Building	1,716	3,075	3,167	3,175	3,032	2,430	3,315	2,973	3,143	2,369	1,081	1,346	**30,822**
Schafer A	4,859	5,647	6,054	5,897	6,026	5,398	5,847	5,202	5,056	4,222	3,110	2,211	**59,529**
Schafer B	3,162	4,514	4,289	4,399	4,871	4,748	4,939	4,778	5,045	3,900	3,297	3,128	**51,070**
Schafer C	2,618	4,035	4,252	5,186	5,487	4,991	5,438	5,221	5,539	4,424	2,955	2,307	**52,453**
Sheppard Building	844	1,248	1,165	1,088	1,226	1,200	1,522	1,535	1,414	1,106	590	788	**13,726**
South Enterance Sign	75	86	99	86	98	100	90	63	46	37	36	41	**857**
Spidel Building	2,260	2,670	2,170	1,950	2,070	1,460	2,270	2,180	2,190	1,590	1,650	1,610	**24,070**
St Clair BLDG	1,582	1,451	1,678	1,402	1,751	1,727	1,682	1,688	1,913	1,848	1,550	1,716	**19,988**
Stephenson	1,501	2,039	2,083	1,974	2,175	1,836	2,476	2,256	2,462	1,934	1,221	1,754	**23,711**
Sunderland	42,400	41,120	36,480	24,640	21,920	20,960	21,760	19,840	20,960	23,200	27,680	37,920	**338,880**
Sutton	1,956	3,177	3,606	3,830	4,160	3,853	3,728	3,516	3,671	2,709	1,655	1,865	**37,726**
The Boiler #610	1,020	1,080	1,440	2,460	4,860	5,460	5,340	4,500	2,160	1,440	960	1,080	**31,800**
The Farm Office	782	714	716	644	984	927	1,231	822	843	569	494	484	**9,210**
Tractor Shed 8-04				144	508	479	746	575	80		1		**2,533**
Vining A	2,680	3,920	3,960	4,320	4,480	4,240	4,720	4,480	4,880	3,800	1,600	1,920	**45,000**
Vining B	3,840	5,280	5,600	5,920	7,520	6,480	7,280	6,560	6,000	4,640	3,200	2,960	**65,280**
White Barn	19	5	36	31	115	71	8	5	4	40	1	10	**345**
Date Meter Read	8/25/04	9/23/04	10/25/04	11/22/04	12/23/04	1/24/05	2/22/05	3/24/05	4/25/05	5/24/05	6/22/05	7/25/05	
Totals (kWh)	**356,191**	**375,495**	**366,300**	**331,635**	**379,635**	**376,978**	**402,243**	**385,162**	**368,798**	**323,108**	**288,293**	**383,894**	

Natural Gas Inventory Methods and Data:

Methods:

The natural gas data was gathered from the PSNC website, which lists all 38 on-campus natural gas meters.

The PSNC website is located at www.scana.com. In order to access the natural gas data follow the link to customer login, and then enter the appropriate username and password (available from the accounting office). After the username and passwords are entered the website displays a number of Warren Wilson College accounts. The two accounts of primary interest are those that end with 3825 and 9378. Once in either of these two accounts monthly data can be accessed through the account history link and consequently the consumption history tab. Due to the constant changes in the design and layout of the PSNC website, as well the natural gas accounts summarized on the website, the exact methods of accessing the College's natural gas consumption data will vary from inventory to inventory. The inventory's data was taken from PSNC's website, rearranged, and consolidated to summarize natural gas use by use location The natural gas consumption data was then used to calculate the resulting greenhouse gas emissions from the combustion of that natural gas.

The following table lists the energy consumption in therms by meter by month, percentage of total use, as well as month total.

Natural Gas Summary: 04/ 05 Therm Totals summarized by meter/building

Average Cost per Therm
$0.362

3825 Account

Meter #	Building	August	Sep	Oct	Nov	Dec	Jan	Feb	Mar
239820	St. Clair	30.93	72.24	218.36	301.19	632.00	572.76	536.12	546.40
101827	Shepard	35.05	39.22	138.02	343.62	589.73	565.54	515.50	495.98
110836	Dorland	263.94	262.13	614.91	1,101.24	1,571.24	1,298.26	1,453.71	1,269.79
128140	Sunderland	205.17	288.96	281.19	646.88	1,374.32	1,444.80	1,388.76	1,367.54
127977	Kittredge 1	0.00	9.29	51.50	155.25	437.14	271.42	274.25	217.12
80675	Stephenson	37.12	50.57	192.61	521.64	837.17	729.62	656.75	680.17
69237	Sage	30.93	41.28	246.17	878.72	1,027.91	1,067.09	937.18	864.36
229541	Vining B	209.29	276.58	717.91	1,121.94	1,929.00	1,903.01	1,802.19	1,876.90
193444	Devries	85.57	89.78	84.46	197.69	403.12	585.14	347.45	214.03
217223	Dorland Laundry	18.56	34.06	22.66	30.02	13.40	13.42	19.59	17.49
202458	Vining A	15.47	39.22	273.98	494.73	888.72	991.75	800.06	1,003.28
509681	Holden	7.22	15.48	51.50	169.74	482.51	484.01	445.39	407.48
253595	Pool	1,328.96	893.71	1,119.61	1,823.67	3,287.86	3,341.62	3,246.62	2,391.40
401934	Kittredge 2	0.00	1.03	14.42	1,787.45	3,409.52	3,402.50	3,009.49	3,476.99
253419	Chapel	0.00	3.10	149.35	669.65	1,220.70	1,088.76	991.82	976.52
508452	Health Center	5.16	6.19	116.39	263.93	433.02	423.12	374.25	369.41
229453	ANTC	69.08	103.20	267.80	484.38	761.91	697.63	630.97	617.40
229142	Sutton	63.92	94.94	229.69	335.34	695.93	670.80	607.26	584.47
473294	Boiler Room	2,154.79	2,600.64	3,481.40	8,942.40	16,423.83	15,810.24	14,877.33	14,128.17
	AccountTotals	**4,561.14**	**4,921.61**	**8,271.93**	**20,269.44**	**36,419.04**	**35,361.48**	**32,914.68**	**31,504.89**
	Account Total Bill	**$1,168.61**	**$1,242.51**	**$1,973.58**	**$4,317.00**	**$7,231.00**	**$7,044.00**	**$6,581.00**	**$6,344.00**

9378 Account

Meter #	Building	August	Sep	Oct	Nov	Dec	Jan	Feb	Mar
283006	Fellowship Hall	0.00	0.00	89.61	332.43	687.68	484.57	596.50	537.14
44894	Ballfield A	51.60	82.56	120.51	395.21	471.17	420.65	492.26	473.34
313180	Ballfield C	55.73	78.43	147.29	329.34	451.58	392.81	373.58	399.25
474278	EcoDorm	31.99	60.89	78.28	179.08	223.73	193.83	250.78	272.69
355865	Schafer A	54.70	89.78	160.68	284.06	423.74	369.10	420.02	499.07
226313	Schafer B	44.38	91.85	139.05	294.35	477.35	392.81	387.00	406.46
296978	Schafer C	58.82	80.50	144.20	349.93	499.00	410.34	481.94	516.56
510264	Art Barn	0.00	3.10	16.48	163.64	281.46	165.99	188.86	117.31
473861	Pottery Barn	0.00	22.70	100.94	231.57	416.52	336.11	377.71	475.40
407324	Bryson	0.00	2.06	49.44	462.11	900.06	773.25	833.86	746.03
379817	Ballfield B	60.89	91.85	143.17	413.74	614.48	507.25	488.14	510.38
	Account Totals	**358.10**	**603.72**	**1,189.65**	**3,435.47**	**5,446.77**	**4,446.70**	**4,890.65**	**4,953.61**
	Account Total Bill	**$486.64**	**$731.58**	**$1,404.26**	**$3,965.65**	**$6,974.72**	**$5,759.78**	**$14,226.21**	**$5,163.38**
	Monthly Therm Totals	**5,047.78**	**5,653.19**	**9,676.19**	**24,235.09**	**43,393.76**	**41,121.26**	**47,140.89**	**36,668.27**
	Monthly Cost Totals	**$1,513.40**	**$1,900.19**	**$2,646.77**	**$5,939.23**	**$11,294.59**	**$12,992.87**	**$21,272.05**	**$11,747.38**

3825 Account

Apr	May	Jun	Jul	Totals	Percent	Meter #	Building
333.01	116.62	37.30	51.80	**3,448.72**	1.42%	239820	St. Clair
261.87	100.10	15.54	19.68	**3,119.86**	1.29%	101827	Shepard
918.62	442.73	290.08	265.22	**9,751.86**	4.02%	110836	Dorland
812.43	243.55	176.12	0.00	**8,229.72**	3.40%	128140	Sunderland
60.83	5.16	0.00	34.19	**1,516.14**	0.63%	127977	Kittredge 1
390.75	114.55	19.68	18.65	**4,249.28**	1.75%	80675	Stephenson
307.24	166.15	17.61	0.00	**5,584.63**	2.30%	69237	Sage
97.95	468.53	122.25	67.34	**10,592.87**	4.37%	229541	Vining B
1,344.42	100.10	100.49	20.72	**3,572.99**	1.47%	193444	Devries
98.98	14.45	20.72	3.11	**306.44**	0.13%	217223	Dorland Laundry
17.53	91.85	1.04	7.25	**4,624.86**	1.91%	202458	Vining A
158.77	67.08	6.22	837.09	**3,132.49**	1.29%	509681	Holden
241.25	1,442.74	699.30	1.04	**19,817.77**	8.18%	253595	Pool
1,700.12	169.25	0.00	0.00	**16,970.77**	7.00%	401934	Kittredge 2
673.24	202.27	0.00	5.18	**5,980.59**	2.47%	253419	Chapel
501.07	82.56	4.14	37.30	**2,616.53**	1.08%	508452	Health Center
228.88	156.86	48.69	36.26	**4,103.07**	1.69%	229453	ANTC
170.12	175.44	69.41	62.16	**3,759.48**	1.55%	229142	Sutton
363.94	3,415.92	2,279.20	2,372.44	**86,850.30**	35.83%	473294	Boiler Room
8,681.02	**7,575.91**	**3,907.79**	**3,839.42**	**198,228.35**			**AccountTotals**
$3,722.00	**$1,824.00**	**$1,039.00**	**$1,113.00**	**$43,599.70**			**Account Total Bill**

9378 Account

Apr	May	Jun	Jul	Totals		Meter #	Building
217.54	63.98	0.00	0.00	**3,009.45**	1.24%	283006	Fellowship Hall
224.76	92.88	37.30	24.86	**2,887.10**	1.19%	44894	Ballfield A
220.63	120.74	23.83	27.97	**2,621.20**	1.08%	313180	Ballfield C
165.99	71.21	6.22	3.11	**1,537.78**	0.63%	474278	EcoDorm
260.84	207.43	64.23	45.58	**2,879.24**	1.19%	355865	Schafer A
250.53	148.61	53.87	55.94	**2,742.20**	1.13%	226313	Schafer B
277.34	162.02	46.62	51.80	**3,079.08**	1.27%	296978	Schafer C
65.98	9.29	0.00	1.04	**1,013.14**	0.42%	510264	Art Barn
327.86	259.03	16.58	0.00	**2,564.42**	1.06%	473861	Pottery Barn
253.63	98.04	1.04	0.00	**4,119.51**	1.70%	407324	Bryson
218.57	103.20	38.33	41.44	**3,231.44**	1.33%	379817	Ballfield B
2,483.68	**1,336.44**	**288.01**	**251.75**	**29,684.55**			
$2,948.78	**$1,632.77**	**$452.33**	**$411.76**	**$44,157.86**			
11,629.80	**9,208.68**	**4,360.12**	**4,251.18**	**242,386.21**			
$9,295.35	**$5,357.40**	**$2,278.47**	**$1,452.40**	**$87,757.56**			

Yearly Therm Total	**227,912.90**
Yearly Cost Total	$87,757.56

Staff, Faculty, and Student Driving Survey Methods and Data:

Methods:

The data displayed in the following section was gathered through a number of surveys conducted on-campus. The two versions of this survey are shown in the following pages. The student survey was distributed in various ways, while the faculty surveys were delivered through the campus mail. The staff and faculty surveys were used to estimate the gas consumption of commuting staff and faculty. A survey was delivered to every box. The student surveys were administered to a sample of on-campus resident students in person, while every off-campus day student received a survey in their mailbox. The on-campus student surveys were conducted in the Cowpie and Gladfelter cafeterias.

Of the on-campus surveys, 60 surveys were conducted in the Cowpie, and 102 surveys were conducted in the Gladfelter cafeteria, both at lunchtime. The number of surveys conducted in each cafeteria was chosen so that the surveys were proportional to the number of students eating lunch at each cafeteria. The day students were excluded from the Gladfelter and Cowpie surveys to keep on-campus survey data separate from off-campus surveys. Out of the 98 off-campus student surveys sent our through the campus mail, 10 students returned the survey, leaving a return rate of only 11%. In total, 172 students were surveyed regarding their driving behavior. The student surveys were then used to estimate how much gasoline the student body uses for personal driving (and in the case of day students, commuting and personal driving combined) throughout the year.

Out of the 294 staff and faculty surveys sent out, 39% of the surveys were returned. From these surveys, it was possible to estimate the fuel use of commuting of staff and faculty.

The following tables show the summary data, as well as the raw data, for all surveys conducted. All units of ‘Fuel Use’ are in gallons of gasoline.

Student Car/ Gasoline Use Survey **X out choices and fill in blanks**

Do you own a car that is parked at school? ☐ Yes ☐ No

If yes, what type of car do you own?
☐ Car ☐ SUV ☐ Truck ☐ Hybrid ☐ Diesel _____ ☐ Bio-diesel

What is the year and model of your primary vehicle? _____

What is your approximate gas mileage? _____

In one week how often and how far do you drive your car? _____

When was the last time your car was tuned up?
☐ 3 months ☐ 6 months ☐ 1 years ☐ 2 years ☐ 3 years ☐ Longer

Staff/ Faculty Survey

Car/ Gasoline Use Survey Please **X out choices and fill in blanks**
then put finished survey in the campus mail

☐ Administration ☐ Faculty ☐ Staff

Do you commute to campus? ☐ Yes ☐ No

If yes, what type of vehicle do you own?
☐ Car ☐ SUV ☐ Truck ☐ Hybrid ☐ Diesel _____ ☐ Bio-diesel

What is the year and model of your primary vehicle? _____

How many miles is your commute? _____

What is your approximate gas mileage? _____

In one week how often do you commute to campus?

_____

When was the last time your car was tuned up?
☐ 3 months ☐ 6 months ☐ 1 years ☐ 2 years ☐ 3 years ☐ Longer

Faculty / Staff/ Administration Commuting Survey Results

Surveys Returned Out of the 294 put out.

Admin	*Staff*	*Faculty*	*Total Returned*	*Percentage Returned*
6	61	40	**107**	**36.39%**

Gas Used

	Commute %	Per Week Miles Commuted	Per Week Gallons used	Weeks Worked	Annual Gas Used	kg CO2 8.71/Gal	Sample Total CO2
Admin	66.67%	640.00	27.892	48	1338.838004	11661.27902	25708.7195
Staff	75.41%	3944.8	158.366	48	7601.544872	66209.45584	145966.864
Faculty	77.50%	3681	121.009	34	4114.296507	35835.52257	79003.80367
					13054.67938		**250,679**

Extrapolated Fuel	**Extrapolated CO2**
35869.86672	**688,782.62**

When extrapolated out to the rest of population
previous total/ percentaged returned 688782.6152
i.e. 13054/.3639= 35869.89

	Commute (miles)	MPG	Commute Frequency per week	Tune up (months)	Miles Driven per Week	Fuel Used per Week
Admin						
Average	32.00	23.25	5.00	12.00	160.00	6.97
Median	26.00	23.00	5.00	4.50	130.00	5.24
Total					640.00	27.89
Staff						
Average	21.92	26.48	4.96	6.59	97.78	3.96
Median	12.00	27.00	5.00	6.00	65.00	2.70
Total					3944.80	158.37
Faculty						
Average	30.10	28.48	4.65	8.29	118.74	3.90
Median	20.00	28.00	5.00	6.00	70.00	2.73
Total					3681.00	121.01

Faculty survey

Survey #	Commute	Vehicle	Fuel	Year - Make- Model	Commute (miles)	MPG	Commute Frequency p/wk	Tune up	Tune up (months)	Miles Driven p/wk	Fuel Used p/wk
1	y	c	g	1997 Honda Civic	30	35	2	1 y	12	60	1.71
2	y	h	g	2000 Honda insight	100	58	5	6m	6	500	8.62
3	y	c	g	2000	26	25	5	3m	3	130	5.20
4	y	c	g	1996 Subaru Outback	12	25	5	3m	3	60	2.40
5	y	c	g	1997 Saturn 512	22	26	5	1y	12	110	4.23
6	n										
7	n										
8	n										
9	n										
10	y	c	g	1984 Mercedes	2	28	10	2y	24	20	0.71
11	n										
12	y	c	g	1991 Toyota Corrola	8	28	3	6m	6	24	0.86
13	y	c	g	1992 Toyota Camry	36	25	6	3m	3	216	8.64
14	n										
15	y	c	g	1990 Toyota Camry	2	30	7	l	40	14	0.47
16	y	t	g	1991 Toyota	20	28	5	3m	3	100	3.57
17	y	t	g	2000 Nissan Frontier	1	24	2	3m	3	2	0.08
18	y	c	g	2003 Volvo S40	20	28	5	6m	6	100	3.57
19	y	c	g	1994 Toyota Camry	2	30	5	1y	12	10	0.33
20	y	t	g	1994	2	15	5	1y	12	10	0.67
21	y	c	g	2004 Chevy Classic	27	28	3	6m	6	81	2.89
22	y	c	g	1999 VW Passat	20	33	6	3m	3	120	3.64
23	y	t	g	2000 Toyota Tacoma	20	22	3	6m	6	60	2.73
24	y	s	g	1999 Toyota 4 Runner	40	20	4	3m	3	160	8.00
25	y	c	g	2002 Sedan	36	22	6	3m	3	216	9.82
26	n										
27	y	c	g	2003 VW Beetle	2	28	5	3m	3	10	0.36
28	n										
29	y	c	g	2003 VW Beetle	10	30	7	3m	3	70	2.33
30	y	c	g	2000 Honda Civic EX	34	32	5	3m	3	170	5.31
31	y	c	g	1992 Honda Civic	21	28	2	3m	3	42	1.50
32	y	c	g	1999 Saturn	100	33	5	6m	6	500	15.15
33	y	c	g	2003 Mazda Protégé	230	35	2	3m	3	460	13.14
34	y	c	g	2001 Toyota Camry	10	28	5	6m	6	50	1.79
35	y	c	g	1997 Plymouth	16	30	4	1y	12	64	2.13
36	y	t	g	2002 Toyota Tacoma	24	20	3	3m	3	72	3.60
37	y	c	g	1999 Hyundi Accent	50	35	4	l	40	200	5.71
38	y	c	g	1996 Honda	6	30	5	6m	6	30	1.00
39	y	c	g	2001 Van	4	24	5	3m	3	20	0.83
40	n										
										Total	**Total**
	9no	5 Trucks	all gas							3681	121.01
	31yes	1 Hybrid			**Average**	**Average**	**Average**		**Average**	**Average**	**Average**
		1SUV			30.10	28.48	4.65		8.29	118.74	3.90
		24 Cars			**Median**	**Median**	**Median**		**Median**	**Median**	**Median**
					20	28	5		6	70	2.73

Staff Survey

										Miles total	3944.8
										Fuel total Gallons	158.37
Survey #	*Commute*	*Vehicle*	*Fuel*	*Year - Make- Model*	*Commute (miles)*	*MPG*	*Commute Frequency p/wk*	*Tune up*	*Tune up (months)*	*Miles Driven p/wk*	*Fuel Used p/wk*
1	y	c	g	2005 Subaru	76	27	5	6m	6	380	14.07
2	y	c	g	1991 Volvo SR 70	80	27	2	3m	3	160	5.93
3	y	c	g	1985 Saab	8	27	3	3m	3	24	0.89
4	n										
5	y	c	g	2000 Cadillac DTS	9	22	5	3m	3	45	2.05
6	n										
7	n										
8	y	t	g	2003 Mazda B3000	30	20	5	3m	3	150	7.50
9	n										
10	y	t	g	1994 Ford Ranger	12	25	5	6m	6	60	2.40
11	y	c	g	1999 Toyota Avalon	5	28	5	6m	6	25	0.89
12	y	c	g	1996 Saab 9000	36	30	5	6m	6	180	6.00
13	y	s	g	2000 Chevy Blazer	14	18	5	3m	3	70	3.89
14	n										
15	y	c	g	1996 Honda Accord	70	20	5	3m	3	350	17.50
16	y	minivan	g	1987 Toyota	30	26	5	1y	12	150	5.77
17	y	minivan	g	Toyota Seanna Van	10	22	8	1y	12	80	3.64
18	n										
19	n										
20	n										
21	y	c	g	2001 Toyota Corolla	24	33	4	3m	3	96	2.91
22	y	c	g	1996 Toyota Corrola	23	30	5	1y	12	115	3.83
23	y	c	g	1999 Saturn SL1	30	30	5	6m	6	150	5.00
24	n										
25	y	s	g	1998 Honda	32	20	5	3m	3	160	8.00
26	y	c	g	1991 Honda Civic	20	33	5	1y	12	100	3.03
27	y	c	g	1994 Plex Voyager	1	26	5	6m	6	5	0.19
28	y	c	g	1989 Toyota Corolla SW	2.6	30	6	1y	12	15.6	0.52
29	y	s	g	1998 Jeep Cherokee	160	22	3	3m	3	480	21.82
30	y	c	g	1991 Ford Escort	6	27	7	6m	6	42	1.56
31	y	t	g	1994 Ford Ranger	1	18	5	1y	12	5	0.28
32	y	c	g	1991 Toyota Camry	19.2	29	5	2y	24	96	3.31
33	n										
34	y	c	g	2005 Saab	6	25	5	6m	6	30	1.20
35	y	c	g	2000 Saturn	18	36	5	6m	6	90	2.50
36	y	c	g	1994 Honda Accord	10	27	6	1y	12	60	2.22
37	y	c	g	2004 Dodge Neon	6	30	5	3m	3	30	1.00
38	y	c	g	1991	20	30	5	3m	3	100	3.33
39	y	c	g	1992 Honda Accord	2.4	30	3	3m	3	7.2	0.24
40	y	c	g	1995 Geo Prizm	22	30	5	3m	3	110	3.67
41	y	t	g	1995 Toyota Tacoma	50	26	5	2y	24	250	9.62

42	y	s	g	1997	5	20	6	6m	6	30	1.50
43	y	s	g	2003 Honda CRV	4	27	5	3m	3	20	0.74
44	n										
45	y	t	g	1998 Toyota	8	27	4	3m	3	32	1.19
46	y	c	g	2002 VW Beetle	10	28	5	6m	6	50	1.79
47	y	c	g	1998	1	26	5	1y	12	5	0.19
48	n										
49	y	St Wgn	g	200 Subaru Outback	12	20	5	3m	3	60	3.00
50	y	c	g	2000 Subaru Impz Spt	6	26	7	3m	3	42	1.62
51	y	c	g	2001 Saab	18	25	5	6m	6	90	3.60
52	n										
53	n										
54	y	St Wgn	g	1990 Volvo Wagon	27	22	5	6m	6	135	6.14
55	y	c	g	2003 Pontiac Vi be	2	34	4	3m	3	8	0.24
56	y	s	g	2003 Honda CRV	8	23	5	6m	6	40	1.74
57	y	c	g	2003 Honda Civic	30	39	5	3m	3	150	3.85
58	y	c	g	1989 VW Golf	4	32	5	3m	3	20	0.63
59	y	c	g	2000 saturn	12	30	5	1y	12	60	2.00
60	y	t	g	1987 Toyota	28	15	5	3m	3	140	9.33
61	n										
										Total	**Total**
	15 no	6 t	All Gas							3944.80	158.37
	46yes	6 SUV			**Average**	**Average**	**Average**		**Average**	**Average**	**Average**
		2 Sta WGN			21.92	26.48	4.96		6.59	97.78	3.96
		2 MiniVN			**Median**	**Median**	**Median**		**Median**	**Median**	**Median**
		30 Cars			12.00	27.00	5.00		6.00	65.00	2.70

Administration Survey

Survey #	Commute	Vehicle	Fuel	Year - Make- Model	Commute (miles)	MPG	Commute Frequency p/wk	Tune up	Tune up (months)	Miles Driven p/wk	Fuel Used p/wk
1	y	c	g	1993 Ford Tempo	40	24	5	3y	36	200	8.33
2	y	c	g	2004	72	22	5	3m	3	360	16.36
3	y	c	g	2004 Toyota Camry	12	28	5	6m	6	60	2.14
4	y	t	g	2000	4	19	5	3m	3	20	1.05
5	n										
6	n										
										Total	**Total**
										640.00	27.89
					Average	**Average**	**Average**		**Average**	**Average**	**Average**
					32.00	23.25	5.00		12.00	160.00	6.97
					Median	**Median**	**Median**		**Median**	**Median**	**Median**
					26	23	5		4.5	130	5.24

Student Fuel Use Data

Cowpie	**Number**	**Percent**
With Cars	27	45.00%
Without Cars	33	55.00%
Total	**60**	

2 Trucks
2 SUV's
1 Minivan
22 Cars

Gladfelter	**Number**	**Percent**
With Cars	32	31.37%
Without Cars	70	68.63%
Total	**102**	

3 Suv's
1 Hybrid
5 trucks
1 Minivan
1 Wagon
21 Cars

Day Students	**Number**	**Percent**
With Cars	11	100
Without Cars	0	0
Total	**11**	

3 SUV
2 Trucks
6 Cars

	Year	**MPG**	**Miles a Week**	**Last Tune up (Months)**	**Fuel Used per Week**	**Fuel used in 32 Weeks**	**kg CO2 8.71/Gal**
Gladfelter							
Average	1994.63	26.41	54.90	6.31	2.15	68.67	598.11
Median	1996.50	25.00	35.00	3.00	1.25	39.94	347.88
Total					**68.67**	**2197.41**	19139.44
Cowpie							
Average	1994.32	27.63	37.22	7.30	1.06	34.05	296.58
Median	1995	28.00	25.00	3.00	0.83	26.67	232.27
Total					**28.73**	**919.38**	8007.76
Day Students							
Average	1996.22	23.27	196.91	6.00	9.50	303.88	2646.78
Median	1994.00	23.00	140.00	3.00	5.56	177.78	1548.44
Total					**104.46**	**3342.66**	29114.57

Student Fuel Use Data

	Totals	Sampled	% Sampled	% With Cars	Extrapolated # with Cars	Fuel used in 32 wks (Sample)	Extrapolated Fuel use
Cowpie	150	60	40.00%	45.00%	68	2197.41	2,472.09
Gladfelter	552	102	18.48%	31.37%	173	919.38	1,560.80
Day Students	98	10	10.20%	100.00%	98	1930.895866	18,922.78
					339		**22,955.67**
	800						

(Sampled\ Sampled Gas Total) =
(Extrapolated # with cars/ Extrapolated Fuel Use)

Extrapolated Data

	Miles/ Week	Pop with Cars	Total Miles/Week	Total Miles 32 Week
Cowpie	37.22	68	2,531	80,991
Gladfelter	54.9	173	9,498	303,926
Day Students	196.91	98	19,297	617,510

(Fuel Used In Sample * Extrapolated # with Cars)
/ Number Sampled= Extrapolated Fuel Use.

Data From the 27 Cowpie Student 'Yes' Surveys: Out of 60

	Type	Fuel	Year	Make	Model	MPG	Miles p/wk	Tune up	Last Tune up (Months)	Fuel Used p/wk	Fuel used in 32 Wks
1	c	g	1991	Volvo	240	25	20	3m	3	0.80	25.60
2	s	g	1988	Jeep	Wagoneer	22	60	3m	3	2.73	87.27
3	c	g	2003	Honda	Civic	36	30	6m	6	0.83	26.67
4	c	g	1996	Nissan	Sentra	30	15	1y	12	0.50	16.00
5	t	g	1991	Ford	Ranger	28	30	6m	6	1.07	34.29
6	c	g	1991	Plymoth	Acclaim	26	15	1y	12	0.58	18.46
7	c	g	1997	Ford	Escort	27	40	3m	3	1.48	47.41
8	c	g	1999			31	30	3m	3	0.97	30.97
9	c	g		VW	Jetta	30		3m	3	0.00	0.00
10	t	g	1997	Mazda	B2300	22	8	3m	3	0.36	11.64
11	c	g	1995	Nissan	Maxima	33	40	l	40	1.21	38.79
12	c	g	1995	Ford	Escort	25		3m	3	0.00	0.00
13	c	g	1992	Subaru	Legacy	30	35	3m	3	1.17	37.33
14	c	g	1993			22	30	6m	6	1.36	43.64
15	c	g	1993	Mitsubishi	Diamante SW	21	25	3m	3	1.19	38.10
16	c	g	1996	Toyota	Tercel	38	200	3m	3	5.26	168.42
17	c	g	1994	Volvo	850	24		3m	3	0.00	0.00
18	c	g	1998	Toyota	Avalon	26	10	3m	3	0.38	12.31
19	s	g	1996	Jeep	Grand Cherokee	18		1y	12	0.00	0.00
20	c	g	1983	Volvo	DL Turbo Wagon	20	20	3m	3	1.00	32.00
21	c	g	1996	Honda	Accord	30	8	6m	6	0.27	8.53
22	c	g	2002	VW	Golf	33	15	3m	3	0.45	14.55
23	c	g	1986	Volvo		30	15	6m	6	0.50	16.00
24	c	g	1996	Honda	Civic DX Hatchbk	35	130	l	40	3.71	118.86
25	m	g	1994	Plymoth	Grand Voyager	27	50	3m	3	1.85	59.26
26	c	g	1996	Infinit	Infiniti G20	28	5	3m	3	0.18	5.71
27	c	g		Subaru	Outback	29	25	3m	3	0.86	27.59

		Average			**Average**	**Average**		**Average**	**Total**	**Total**
	All Gas	1994.32			27.63	37.22		7.30	28.73	919.38
2 Trucks		**Median**			**Median**	**Median**		**Median**	**Average**	**Average**
2 SUV's		1995			28	25		3	1.06	34.05
1 Minivan									**Median**	**Median**
22 Cars									0.83	26.67

Data From the 32 Student 'Yes' Gladfelter Surveys: Out of 102

	Type	Fuel	Year	Make	Model	MPG	Miles p/wk	Tune up	Last Tune-up (Months)	Fuel Used p/wk	Fuel used in 32 Wks
1	c	g	1984	Toyota		24		3m	3	0.00	0.00
2	c	g	1992	Mercury	Sable	22	35	3m	3	1.59	50.91
3	Wag	g	1993	Ford	Escort	35	10	3m	3	0.29	9.14
4	t	g	1987	Toyota		25	17	3m	3	0.68	21.76
5	c	g	1991	Chevy	Cavalier	28	80	3m	3	2.86	91.43
6	c	g	1992	Toyota	Camry	15	30	6m	6	2.00	64.00
7	t	g	2005	Toyota		24	20	3m	3	0.83	26.67
8	c	g	1999	Oldsmobile		22		1y	12	0.00	0.00
9	c	g	2004	Honda	Civic	38	50	3m	3	1.32	42.11
10	s	g	1995	Jeep	Cherokee	15	50	3m	3	3.33	106.67
11	c	g	1999			35	80	3m	3	2.29	73.14
12	c	g	1995	Chevy	Corsica	25	30	6m	6	1.20	38.40
13	c	g	2004	Honda	Civic	38	60	6m	6	1.58	50.53
14	c	g	1997	Geo	Prism	30	15	3m	3	0.50	16.00
15	c	g	1997	Crysler	Sebring	23	20	3m	3	0.87	27.83
16	c	g	1971	VW	Beetle	17	45	3m	3	2.65	84.71
17	c	g	1995	Saturn		20	70	6m	6	3.50	112.00
18	c	g	1997	Subaru	Legacy	24	10	3m	3	0.42	13.33
19	t	g	2002	Toyota	Tacoma	25	8	1y	12	0.32	10.24
20	c	g	2000	Chevy	Prism	25	60	3m	3	2.40	76.80
21	t	g	2000	Toyota	Tacoma	20	75	3m	3	3.75	120.00
22	minivan	g	1987	Ford	Aerostar Van	27	20	3m	3	0.74	23.70
23	c	g	1987	Mercury	Cougar	18	297	3m	3	16.50	528.00
24	c	g	2002	Toyota	Corrolla	40	45	3m	3	1.13	36.00
25	s	g	1998	Honda	C-RV	28	30	3y	36	1.07	34.29
26	c	g	1987	Toyota	Corolla	35	20	l	40	0.57	18.29
27	s	g	1997	Isuzu	4runner	15		3m	3	0.00	0.00
28	c	g	1996	Toyota	Tercel	30	30	6m	6	1.00	32.00
29	h	g	2003	Toyota	Prius	50	100	3m	3	2.00	64.00
30	c	g	1987	Subaru		27	35	6m	6	1.30	41.48
31	t	g	1997	Ford	Ranger	20	200	3m	3	10.00	320.00
32	c	g	1988	BMW	528e	25	50	3m	3	2.00	64.00
			Average			**Average**	**Average**		**Average**	**Total**	**Total**
	3 Suv's	32 G	1994.625			26.41	54.90		6.3125	68.67	2197.41
	1 Hybrid		**Median**			**Median**	**Median**		**Median**	**Average**	**Average**
	5 trucks		1996.5			25	35		3	2.15	68.67
	1 Minivan									**Median**	**Median**
	1 Wagon									1.25	39.94
	21 Cars										

Data From the Day Student Surveys

	Type	Fuel	Year	Make	Model	MPG	Miles p/wk	Tune up	Last Tune up (Months)	Fuel Used p/wk	Fuel used in 32 Wks
1	c	g	1994	Toyota	Camry	25	250	3m	3	10.00	320
2											
Dropped no 3											
4	s	g	1994	Jeep		17	30	6m	6	1.76	56.47
5	t	g	1990	Mitsubishi	Mighty Max	29	90	6m	6	3.10	99.31
6	s	g		Toyota		18	100	3m	3	5.56	177.78
7	c	g	2004	Subaru	Outback Sport	26	56	3m	3	2.15	68.92
8	t	g	1998	Dodge	Dakota	23	200	3m	3	8.70	278.26
9	c	g	1992	VW	Fox	28	150	3m	3	5.36	171.43
10	c	g	2003	Honda	Civic	35	140	1y	12	4.00	128.00
11	s	g	2002			15	100	3m	3	6.67	213.33
12	c	g	1989	Buick	LaSabre	23	300	1y	12	13.04	417.39
11 total											
										Total	**Total**
										60.34	1930.90
3 SUV			**Average**			**Average**	**Average**		**Average**	**Average**	**Average**
2 Trucks			1996.22			23.9	141.6		5.4	6.03	193.09
6 Cars			**Median**			**Median**	**Median**		**Median**	**Median**	**Median**
			1994			24	120		3	5.46	174.60

Campus Fleet Inventory Methods and Data:

Methods:

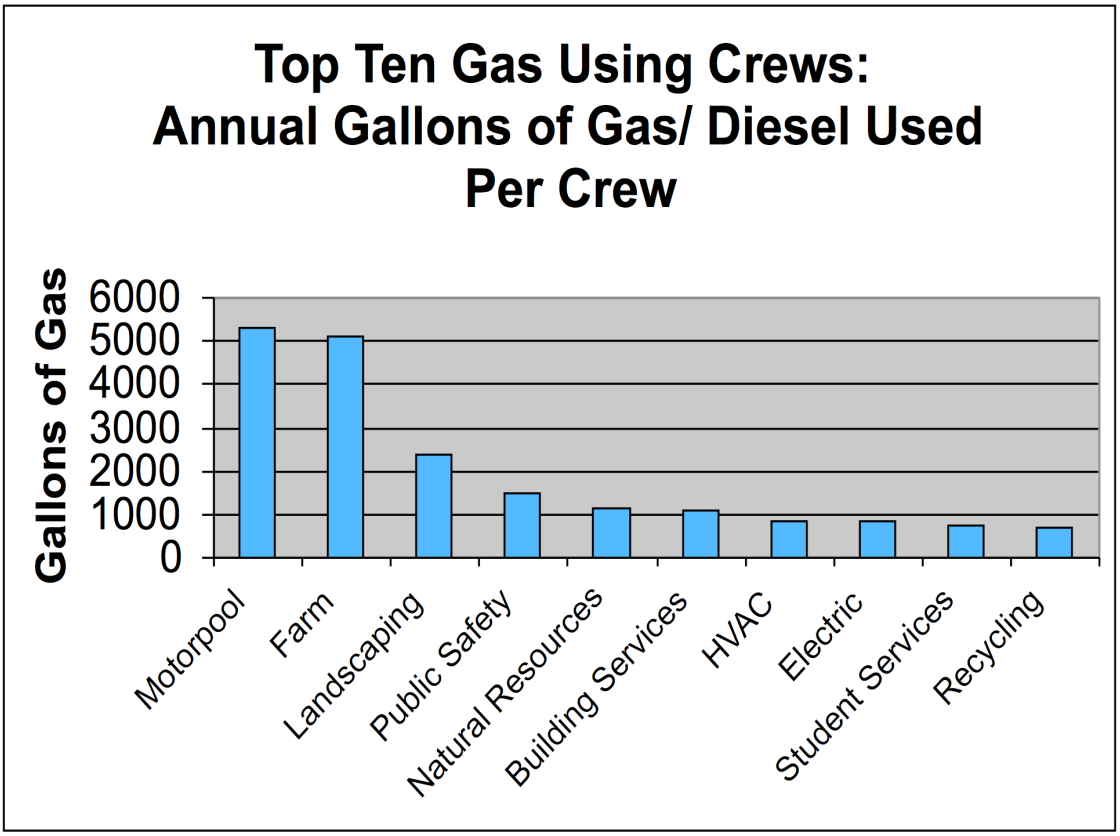
This inventory quantified the annual campus fleet gas and diesel consumption, as well as the gasoline purchased off-campus for campus fleet vehicles on athletic, academic, and service trips. The FMTS gas data sheets were used to quantify the on-campus vehicles gas and diesel consumption. These FMTS gas and diesel data sheets can be obtained from the FMTS office. These sheets list the monthly gas and diesel consumption of each crew or account. Because the data was available only on paper it was manually entered into Excel and summarized.

Other gas or diesel that was consumed by fleet vehicles, but not included in the FMTS gas reports was gas that was bought for 15 passenger campus vans from off-campus sources on service and athletic trips. This gas consumption data was also calculated. Because records are not readily available that record gas purchasing on these trips, a list was generated of all trips that were beyond the round trip 250 mile fuel range of the 15 passenger vans. For all trips that exceeded this mileage, the extra mileage and consequent gas consumption was calculated using the average fuel efficiency of 10 miles per gallon.

The following tables show how much gas was purchased off-campus as well as where the fuel is consumed on-campus.

Top Gas and Diesel Using Crews/ Accounts

Rank	Crew	Total Gallons
1	Motorpool	5,314
2	Farm	5,101
3	Landscaping	2,358
4	Public Safety	1,491
5	Natural Resources	1,133
6	Building Services	1,067
7	HVAC	822
8	Electric	818
9	Student Services	740
10	Recycling	708
11	Carpentry	554
12	Paint	522
13	Campus Support	446
14	Garden	424
15	Locksmith	380
16	Health Center	299
17	Plumbing	157



Service Learning Break Trips

Tank is 25 Gallons

Trip	Round Trip Mileage	Gallons used	Gallons Bought	Total lb. CO2
Fall 04				
4-H Swannanoa	60	6	0	0
Shady Valley, TN	230	23	0	0
Americus	720	72	47	902.51
Cumberland Island	830	83	58	1113.73
Winter 04				
Jacksonville, FL	882	88.2	63.2	1213.58
Spring 05				
Okeefenokee NWR	864	86.4	61.4	1179.02
John C. Campbell Folk Scl	228	22.8	0	0
4-H Swannanoa	60	6	0	0
Southern Dharma Retreat Cnt.	66.2	6.62		
			Total	**Total**
			229.6	**4408.84**

Athletics Travel: Gas Bought Off-Campus

College	Location	Distance	Men's Soccer	Women's Soccer	Mnt. Bk	Cross-Country	M Bask	W Bask	Swimming	Padd	Trips	Miles Round Trip	Gall. Gas Bought
# of Vans for Each Team			2 vans	2 vans	1 van	2 vans	1 van	1 van	1 van				
Emmanuel College	Franklin Springs, GA	132	2	2							4	1056	5.6
Bluefield College	Bluefield VA	198	2	2							4	1584	58.4
Guilford College	Greensboro NC	161	2								2	644	14.4
Emory & Henry College	Emory VA	130	2								2	520	2
LaGrange College	LaGrange, GA	282	2						1		3	1692	94.2
Tenn. Temple	Chattanooga, TN	235	2								2	940	44
Toccoa Falls College	Toccoa Falls GA	127	2				2	2			6	1524	2.4
Averett College	Danville VA	208	2								2	832	33.2
Brevard	Brevard NC	37.5		2		2					4	300	
Peace College	Raleigh NC	241		2							2	964	46.4
Lee University	Cleveland TN	207				2					2	828	32.8
Lees-McRae College	Banner Elk NC	65				2					2	260	
CC Nationals	Elsah IL	634				2					2	2536	203.6
Kiawah Island	Kiawah Island	269				2					2	1076	57.6
Cumberland University	Nashville TN	303			1						1	606	35.6
Georgia Tech	Gainesville GA	153			1						1	306	5.6
University of SC	Charlotte NC	120			1						1	240	
E. Tenn. St. University	Johnson City TN	71			1						1	142	
Florida State U	Tallahasse FL	475			1						1	950	70
MB Champs	7 Springs PA	515			1						1	1030	78
Centre College	Danville, Kentucky	274							1		1	548	29.8
Berea College	Berea, Ky	256							1		1	512	26.2
Sewanne	Sewanee, TN	284							1		1	568	31.8
Darton College	Albany, Georgia	387							1		1	774	52.4
Frostburg and SCAD	Savannah GA	312							1		1	624	37.4
Agnes Scott	Atlanta GA	216							1		1	432	18.2
GSO & Salem College	Winston-Salem, NC	135							1		1	270	2
Catawba Valley CC	Hickory NC	67.2					1				1	134.4	
Johnson Bible	Knoxville, TN	124					1	1			2	496	
Cumberland College	Williamsburg KY	191					1				1	382	13.2
Southern Virginia University	Buena Vista, VA	291					1				1	582	33.2
North Greenville	Tigerville,SC	52.1					1	1			2	208.4	
Piedmont Baptist	Winston-Salem, NC	135					1	1			2	540	4
Oxford College	Oxford, Georgia	209					1				1	418	16.8
Milligan College	Milligan College, TN	68.8					1				1	137.6	
Maryland CC		125					1				1	250	0
Truett- McConnell College	Cleveland GA	146						1			1	292	4.2
Wilkesboro CC	Wilkesboro, NC	89.6						1			1	179.2	
Atlanta Christian	East Point GA	222						1			1	444	19.4
Salem College	Winston-Salem, NC	135						1			1	270	2
Bennett College	Greensboro NC	161						1			1	322	7.2
												26413.6	**1081.6**

Agricultural Emissions Inventory Methods and Data:

Methods:

Agricultural emissions were also included within this survey. To estimate agricultural emissions, the number of farm animals and the poundage of synthetic fertilizer was recorded and the resulting emissions were calculated using the applicable emissions factors. These emissions factors calculated the probable GHG emissions of various types of farm animals, as well as a emissions

The emissions factors used for the farm animals were based on the annual number of different types of farm animals in residence. However, many animals are slaughtered, or move into a different emissions class (growing from a calf to a beefer) before a full year is up. To compensate for this, a residence time was generated. This residence time was measured in the percentage of a year. This percentage was applied to the total number of a given class of farm animals to generate an equivalent number of animals (eNumber). This eNumber enables the inventory to more accurately reflect the emissions from the various farm animals.

The following tables show the total poundage of GHG's emitted, as well as the GHG's emitted by various farm animals and fertilizer use.

Agricultural Emissions

Farm Animal Emissions

Cows

Bovine Type	*Number*	*Residence Time*	*eNumber*	*kg. CH4/ Head*	*kg CH4*	*lbs CH4*	*kg N2O*	*lb N2O*	*lbs eCO2*
Dairy	1	100.00%	1	46.17	46.17	101.80	0.22	0.49	2289.72
Bulls	2	100.00%	2	46.17	92.35	203.60	0.44	0.98	4579.45
Calves	53	58.00%	30.74	46.17	1419.42	3129.27	6.84	15.07	70386.11
Cows	64	100.00%	64	46.17	2955.19	6515.08	14.23	31.37	146542.33
Beefers	36	87.50%	31.5	46.17	1454.51	3206.64	7.00	15.44	72126.31
Total	**156**		**129.24**		**5,967.64**	**13,156.39**	**28.74**	**63.35**	**295,923.93**
	Total Beef Cattle	128.24							
	Total Dairy Cows	1							

Pigs

Pig Type	*Number*	*Residence Time*	*eNumber*	*kg. CH4/ Head*	*kg CH4*	*lbs CH4*	*kg N2O*	*lb N2O*	*lbs eCO2*
Boars	2	100.00%	2	15.32	30.65	67.56	0.05	0.10	1451.27
Sows	40	100.00%	40	15.32	612.92	1351.25	0.95	2.09	29025.40
Weaners	40	50.00%	20	15.32	306.46	675.63	0.47	1.05	14512.70
			0	15.32	0	0	0	0	0
Total	**82**		**62**		**950.02**	**2,094.44**	**1.47**	**3.25**	**44,989.37**

Other Farm Animals

	Number	*kg Ch4/ Head*	*Total kg CH4*	*lbs. CH4*	*kg N2O*	*lbs. N2O*	*lbs. eCO2*
Chickens	70	0.06	4.36	9.61	0.80	1.77	751.27
Goats	1	5.50	5.50	12.13	0.05	0.11	289.09
Horses	2	23.66	47.32	104.32	0.20	0.44	2327.50

Agricultural Fertilizer Emissions

	Acres	**Lbs./Acre**	**% N**	**Total Lbs.**	**Total N**	**kg N2O / lb N**	**kg N2O**	**lbs N2O**	**lbs. eCO2**	**MT eCO2 / lb N**	**MT eCO2**
Corn	22.00	100.00	30.00	2200.00	660.00	0.01	9.24	20.37	6314.92	4.2E-03	2.77
Hay	50.00	100.00	30.00	5000.00	1500.00	0.01	21.00	46.30	14352.09	4.2E-03	6.30
New Seedling	35.00	100.00	30.00	3500.00	1050.00	0.01	14.70	32.41	10046.47	4.2E-03	4.41
					3210.00		**44.94**	**99.08**	**30713.48**		**13.48**

Agricultural eCO2 emisions

Summary Data

	lbs CH4	lbs N2O	lbs eCO2
Fertilizer		99.08	30,713.48
Cattle	13,156.39	63.35	295,923.93
Pigs	2,094.44	3.25	44,989.37
Horses	104.32	0.44	2,327.50
Goats	12.13	0.11	289.09
Chickens	9.61	1.77	751.27
Total lbs.	15,376.90	168.00	
eCO2 Total lbs.	322,914.86	52,079.77	**374,994.63**

Worldwide Emissions Inventory Methods and Data:

Methods:

Worldwide flight emissions were calculated from the number of passengers and the total mileage flown. In order to estimate the mileage of the flights, a straight flight was assumed from the Asheville airport to the capital of the country of destination. While this assumption was known to be false, it was the most time-effective way to generate mileage data. The total mileage and the number of passengers on each flight were then converted into per-passenger mile emissions. These per-passenger mile emissions were then converted into the three main GHG's included in the survey. The following table shows the various worldwide courses, their mileage, number of participants, and their resulting emissions.

Worldwide Courses 2004-2005

	Course	Passengers	Miles (One Way)	Miles Round Trip	Total Passenger Miles	Total kg CO2	Total lb. CO2
1	Alaska	12	2,827.90	5,655.80	67,869.60	18,763.33	41,366.07
2	Malta	14	5,181.90	10,363.80	145,093.20	40,112.76	88,433.49
3	Greece	13	5,524.50	11,049.00	143,637.00	39,710.17	87,545.94
4	Peru	14	3,311.50	6,623.00	92,722.00	25,634.11	56,513.54
5	New Zealand	14	8,383.50	16,767.00	234,738.00	64,896.14	143,071.49
6	India	13	7,818.10	15,636.20	203,270.60	56,196.60	123,892.29
7	Germany	10	4,556.80	9,113.60	91,136.00	25,195.64	55,546.88
8	Chile	13	4,783.70	9,567.40	124,376.20	34,385.29	75,806.59
9	Mexico	8	1,505.50	3,011.00	24,088.00	6,659.42	14,681.50
	Totals	**111**	**43,893.40**	**87,786.80**	**1,126,930.60**	**311,553.46**	**686,857.80**

Other Sector's Emissions Inventory Methods and Data:

The methods and data of the remaining sectors so far un-described will be discussed in this page. These sectors are simple enough to avoid many of the backup charts and tables so common in other sectors. The various sectors' methods and data are discussed below.

Solid Waste:

An emissions factor was used for solid waste to convert short tons of solid waste into pounds of greenhouse gases. The management of landfill gas affects its impact on global warming. If landfills flare (burn) their methane emissions as they escape from the landfill, the GHG emissions are much lower. The Buncombe County landfill (where the College's waste goes) does not currently flare their methane, but a plan to flare the methane is being considered.

FMTS Boiler:

The FMTS building uses waste motor oil from the campus Autoshop to heat part of the building. The Autoshop supervisor, Ray Cockrell, estimated that the boiler consumed 4,000 gallons of used motor oil during the 2004-2005 academic year. Using another emissions factor, this fuel volume was then converted into GHG's.

Greenhouse Gas Emissions Inventory Data:

Greenhouse Gas Emissions By Gas Type and Sector

Carbon Dioxide Emmisions by Source

Global Warming Potential (GWP) 1

	Factor Units	Factor	Gallons	MMBtu	Miles	kWh	Lbs N	Short Tons	kg Totals	lbs Totals	lbs. eCO_2
Electricity	kg CO2 / kWh	0.53				4,337,732			2,277,309.30	5,020,607.60	5,020,607.60
Natural Gas	kg CO2 / MMBtu	52.79		22,791.29					1,203,152.20	2,652,496.55	2,652,496.55
Gasoline Fleet	kg CO2 / Gallon	8.71	19,621.93						170,907.01	376,785.46	376,785.46
Diesel Fleet	kg CO2 / Gallon	9.99	3,418.90						34,154.81	75,298.47	75,298.47
Gas Staff/ Faculty Commuter	kg CO2 / Gallon	8.71	35,869.87						312,426.54	688,782.62	688,782.62
Gas Day Students	kg CO2 / Gallon	8.71	18,922.78						164,817.41	363,360.19	363,360.19
Gas Resident Student	kg CO2 / Gallon	8.71	4,032.89						35,126.48	77,440.63	77,440.63
Worldwide	kg CO2 / mile	0.28			1,126,930.60				311,552.95	686,856.69	686,856.69
Service trips	kg CO2 / Gallon	8.71	229.60						1,999.82	4,408.84	4,408.84
Oil Furnace	kg CO2 / Gallon	9.90	4,000.00						39,600.00	87,303.06	87,303.06
Agricultural	kg CO2 / lbs N	0.00							0.00	0.00	0.00
Solid Waste	kg CO2 / ST	0.00						357.58	0.00	0.00	0.00
Athletics	kg CO2 / Gallon	8.71	1,081.60						9,420.74	20,769.17	20,769.17
Totals									**4,560,467.25**	**10,054,109.26**	**10,054,109.26**

Methane Emmisions by Source

Global Warming Potential (GWP) 21

	Factor Units	Factor	Gallons	MMBtu	Miles	kWh	Lbs N	Short Tons	kg Totals	lbs Totals	lbs. eCO_2
Electricity	kg CH4 / kWh	4.7565E-06				4,337,732			20.63	45.49	955.22
Natural Gas	kg CH4 / MMBtu	0.00527		22,791.29					120.11	264.80	5,560.75
Gasoline Fleet	kg CH4 / Gallon	0.0018	19,621.93						35.32	77.87	1,635.19
Diesel Fleet	kg CH4 / Gallon	0.00057	3,418.90						1.95	4.30	90.22
Gas Staff/ Faculty Commuter	kg CH4 / Gallon	0.0018	35,869.87						64.57	142.34	2,989.21
Gas Day Students	kg CH4 / Gallon	0.0018	18,922.78						34.06	75.09	1,576.92
Gas Resident Student	kg CH4 / Gallon	0.0018	4,032.89						7.26	16.00	336.08
Worldwide	kg CH4 / mile	0.0000076			1,126,930.60				8.56	18.88	396.52
Service trips	kg CH4 / Gallon	0.0018	229.60						0.41	0.91	19.13
Oil Furnace	kg CH4 / Gallon	0.00145452	4,000.00						5.82	12.83	269.36
Agricultural	kg CH4	# Animals							6,964.80	15,354.76	322,449.96
Solid Waste	kg CH4 / ST	29.68						357.58	10,613.88	23,399.61	491,391.72
Athletics	kg CH4 / Gallon	0.0018	1,081.60						1.95	4.29	90.13
Totals									**17,879.32**	**39,417.16**	**827,760.41**

N2O Emmisions by Source

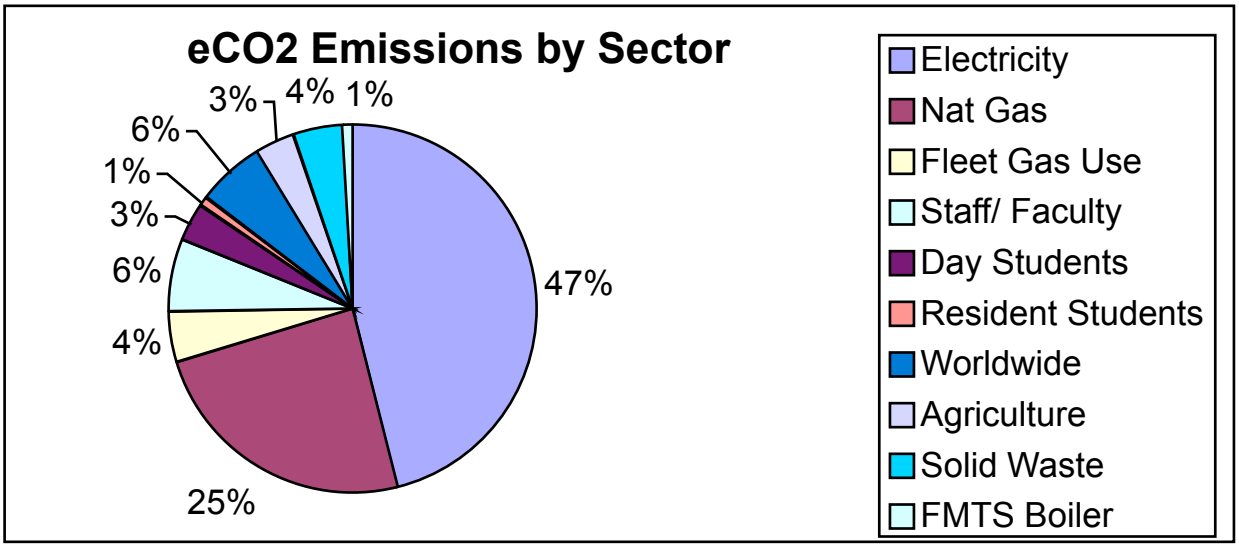
Global Warming Potential (GWP) 310

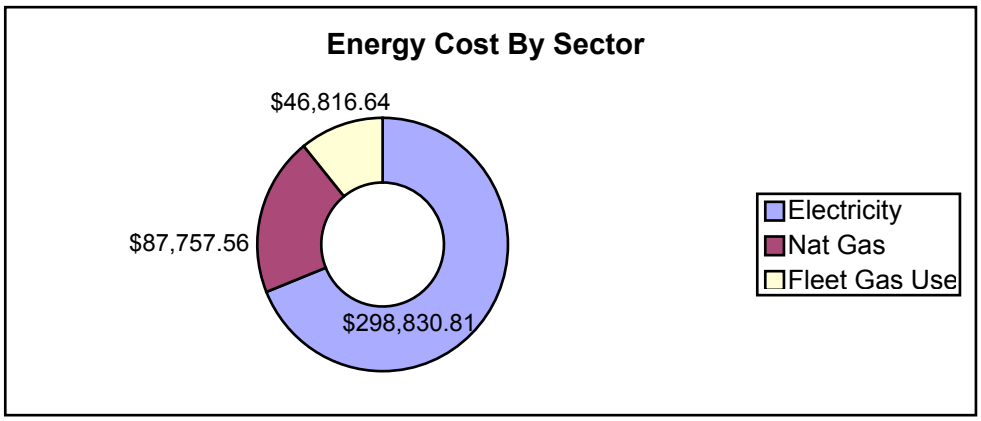
	Factor Units	Factor	Gallons	MMBtu	Miles	kWh	Lbs N	Short Tons	kg totals	lbs Totals	lbs. eCO_2
Electricity	kg CH4 / kWh	9.1959E-06				4,337,732			39.89	87.94	27,261.70
Natural Gas	kg N2O / MMBtu	0.0001054		22,791.29					2.40	5.30	1,641.74
Gasoline Fleet	kg N2O / Gallon	0.000599446	19,621.93						11.76	25.93	8,038.74
Diesel Fleet	kg N2O / Gallon	0.000257	3,418.90						0.88	1.94	600.50
Gas Staff/ Faculty Commuter	kg N2O / Gallon	0.000599446	35,869.87						21.50	47.40	14,695.21
Gas Day Students	kg N2O / Gallon	0.000599446	18,922.78						11.34	25.01	7,752.31
Gas Resident Student	kg N2O / Gallon	0.000599446	4,032.89						2.42	5.33	1,652.20
Worldwide	kg N2O / mile	8.75556E-06			1,126,930.60				9.87	21.75	6,743.37
Service trips	kg N2O / Gallon	0.000599446	229.60						0.14	0.30	94.06
Oil Furnace	kg N2O / Gallon	0.000203633	4,000.00						0.81	1.80	556.68
Fertilizer	kg N20 / lbs N	0.014					3,210.00		44.94	99.08	30,713.48
Solid Waste	kg N20 / ST							357.58	0.00	0.00	0.00
Athletics	kg N2O / Gallon	0.000599446	1,081.60						0.65	1.43	443.11
Totals									**146.60**	**323.20**	**100,193.10**

Total eCO_2	
lbs. eCO_2 from CO_2	10,054,109.26
lbs. eCO_2 from CH_4	827,760.41
lbs. eCO_2 from N_2O	100,193.10
Total lbs. eCO_2	**10,982,062.78**

Total Pounds of eCO2 Emissions by Sector in Academic Year 2004-2005

Sector	lbs. eCO2	Cost	Percent of Total
Electricity	5,048,824.51	$298,830.81	45.97%
Nat Gas	2,659,699.04	$87,757.56	24.22%
Fleet Gas Use	488,273.03	$46,816.64	4.45%
Staff/ Faculty	706,467.03		6.43%
Day Students	372,689.42		3.39%
Resident Students	79,428.91		0.72%
Worldwide	693,997.48		6.32%
Agriculture	353,163.44		3.22%
Solid Waste	491,391.72		4.47%
FMTS Boiler	88,129.09		0.80%
Total	**10,982,063.68**	**$433,405.01**	
Total Metric Tons	**4,981.38**		





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