

WHITMAN COLLEGE

Greenhouse Gas Audit

Fiscal Year 2011

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Whitman

sustainability wiki

Additional data, including the original calculations are available on Whitman Sustainability Wiki whitman.edu/sustainability.

The following data supplement this report:

2011 GHG Audit Contact Log

Campus Carbon Calculator v6.6 Guide Book

carbon_calculatorv6.6_reliable_data.xls

Files are available in the Internal Resource section of the Sustainability Wiki GHG Audit 2011 folder.

Please contact the authors or the current Whitman College Sustainability Coordinators with any questions.

SUMMARY

The Whitman College Fiscal Year 2011 Greenhouse Gas Audit (GHG Audit) was carried out in the spring semester of 2012 by a team of students led by the Campus Sustainability Coordinator. The GHG Audit team calculated the College's annual anthropogenic GHG emissions using the Clean Air-Cool Planet Campus Carbon Calculator v.6.6. The 2011 GHG Audit aimed to establish a baseline estimate of Whitman College's GHG emissions.

Data for the Audit were drawn from a number of sources. The Physical Plant and Residence Life supplied information on fuel use for the College's vehicle fleet, natural gas use in College buildings, and electricity purchased by the College. Pacific Power, the College's electric utility, provided information on the fuels used to generate purchased electricity. Data for student travel and commuting were drawn from respective surveys distributed to the student body. Data for faculty and staff daily commuting were acquired from a survey distributed to Whitman's faculty and staff. The Study Abroad Office provided information on student study-abroad travel, while department offices provided data on directly financed student, faculty and staff travel. The College's Controller provided institutional data such as the College's annual budget and number of students enrolled.

In fiscal year 2011, from July 1, 2010 to June 30, 2011, the College's activities emitted greenhouse gases equivalent to **14,445.3** metric tons of carbon dioxide equivalent (MTeCO₂). The College also offset emissions equivalent to **3,062.6** MTeCO₂. Thus, the College's net emissions (gross GHG emissions minus offsets) for the fiscal year were **11,382.6** metric tons CO₂ equivalent.

The greatest single contributor to the College's emissions was purchased electricity, which contributed **6,405.4** MTeCO₂. The next largest contributor was air travel (directly financed and study abroad), followed closely by natural gas use in campus buildings.

The College's activities emitted **7.45** MTeCO₂ per full-time student, **7.2** MTeCO₂ per member of the campus community, and **333.7** grams CO₂ equivalent per dollar of the operating budget. In terms of building area, the college emitted **13.0** kilograms CO₂ equivalent per square foot of floor space.

INTRODUCTION

A GHG Audit includes "collecting, analyzing, and presenting data on the emissions of greenhouse gases attributable to the existence and operations of an institution" (Calculator Guide, 2008). A GHG Audit considers not only an institution's direct emissions of greenhouse gases from electricity use, heating, or vehicle fuels but also emissions from behaviors the institution promotes. The Audit team considered emissions resulting from activities directly financed and encouraged by the College. Thus, study abroad travel was included because Whitman students are encouraged to study abroad. Faculty commuting was also included in the emissions.

The Audit used the Clean Air-Cool Planet Campus Carbon Calculator v6.6, which is an Excel-based program that contains formulas for converting GHG-producing inputs into their individual GHG emissions. The total emissions were measured in metric tons carbon dioxide equivalent. Carbon dioxide equivalent (eCO₂, also "metric tons equivalent" MTeCO₂) provide an internationally recognized standard for comparing various gasses (such as CO₂, methane, refrigerants, and nitrogen oxides) with different warming potentials. The calculator also considered carbon offsets such as purchasing renewable energy credits, composting, and carbon sequestration.

Input data were collected through contacts with Whitman College's staff as well as through online surveys sent via email to faculty and staff members and the student body. Specific contacts included staff members working in the Physical Plant, the Office of the Treasurer, the Faculty Development Office, and the Office of Institutional Research. The Institutional Review Board also assisted the Audit team by providing data and helping survey the faculty, staff, and student body.

Institutional data included the budget, population, and physical size of the campus. Operating Budget was defined by "all sources of funding the University has financial control of and is plainly considered as the cost to operate the institution" (Calculator Guide, 2010, p 30). Population data included the annual number of faculty, staff, and students for the 2010 school year. The physical size included both total building space and research building space in square feet.

Data were collected on the following inputs: institutional data, scope 1 (direct) emissions sources, scope 2 (purchased electricity), and scope 3 emissions sources. The institutional data were important for normalizing the emissions for comparison with other institutions, while the other data inputs were all necessary for completing the emissions inventory. All data were tracked on the basis of fiscal year. The period between July 1, 2010 and June 30, 2011 is considered fiscal year 2011 for the purposes of this audit.

Scope 1 data are divided into four groups: on campus stationary sources, direct transportation sources, refrigerants and other chemicals, and agriculture sources. On campus stationary sources are any emissions caused by on campus stationary fuel use, such as distilled oil and natural gas used for heating campus buildings. Direct transportation sources are all fuels used in College-owned vehicles, which were tracked in gallons of gasoline used and gallons of gasoline or diesel used. Refrigerants and other chemicals were the amount in pounds of Hydrofluorocarbons (HFC) and Perfluorocarbons (PFC) purchased. In this audit, agricultural sources were omitted due to the difficulty of data collection and relatively small amount of fertilizer and animals owned by Whitman College.

Scope 2 data are defined as purchased electricity and purchased steam and chilled water. Because Whitman College does not purchase any steam or chilled water, those data were omitted. Annual purchased electricity was recorded in kWh. Note that we also calculated the energy needed to transmit this purchased energy in scope 3, under scope 2 transmission and distribution losses.

Scope 3 data are any other emissions sources not included in the other previous scopes. This includes commuting, directly financed outsourced travel, study abroad air travel, solid and water wastes, and any carbon offsets on campus. Commuting was measured as the annual miles via car, bus, or plane. Directly financed outsourced travel, defined as "any travel that is paid for by the institution but uses vehicles (or aircraft) not owned by the institution" (Calculator Guide, 2010, p 35), recorded as distance traveled in miles. Student study abroad air travel was the annual air miles traveled by students studying abroad. Solid waste (as well as the disposal method) was measured in short tons taken to the landfill, while wastewater was defined as gallons of water run through

Whitman's sewage system. Offsets included on campus composting as well as Non-Additional Renewable Energy Certificates (RECs), measured in kWh.

The final category is transmission and distribution losses (Labeled Scope 2 T&D losses in the calculator results section). This category is based on assumptions made within the calculator itself which estimates the GHG emitted while transmitting purchased energy to the College from scope 2 factors. Transportation and Distribution losses from purchased energies are included in Scope 3, as it is an "other emission from the institution" (Calculator Guide, 2010, p. 9). This is the energy lost while transporting purchased electricity.

Green Power Certificates were purchased to offset electricity use.

The following table contains a list of all data inputs used in this Audit, including collection methods and assumptions:

Table 1: Descriptions of sources of GHG emissions.

Cell	Value	Description/ Methods Overview
Institutional Data	(See Calculator)	Data received via email from Whitman Controller, Walter Froese.
Scope 1		
On Campus Stationary Sources: Distilled Oil	12,500 gallons	A 12,500 gallon tank at the physical plant that acts as a backup source for one of the two boilers. <u>Source:</u> Dan Park at the Physical Plant.
On Campus Stationary Sources: Natural Gas	25688.09 MMbtu	Includes natural gas used in the physical plant main boilers, residence halls, interest houses, and other on-campus buildings. <u>Sources:</u> Gayle Worthington provided natural gas data.
Direct Transportation Sources: Gasoline Fleet	8787.8 gallons	Annual gallons of gasoline purchased by the Physical Plant and the College for the Whitman vehicle fleet and rental vehicles. Includes unleaded, mid unleaded, and premium blends. Dan Park, at the Physical Plant, provided this data.
Direct Transportation Sources: Diesel Fleet	413.16 gallons	Annual gallons of "ultra low" sulfur diesel purchased by the Physical Plant for the college fleet. Data provided by Dan Park
HCFC-22	310 lbs.	Annual pounds of refrigerant coolants (R22 and 410A) purchased by the college for campus buildings. <u>Source:</u> Dan Park and Bill Duncan
Scope 2		
Purchased Electricity	10,910,250 kWh	<u>Source:</u> Dan Park and Gayle Worthington

Scope 3		
Faculty/Staff Commuting	Car: 91,458 miles Bus: 0 miles Bike: 0 miles Foot: 0 miles	<p><u>Source:</u> Faculty and Staff survey that determines the number of miles traveled weekly by faculty and staff members via car, bus, bike, and foot.</p> <p><u>Assumptions:</u> On the survey we asked participants to specify whether they were faculty or staff members. We multiplied the average weekly mileage by the number of faculty, then by the number of work-weeks. We repeated the procedure for staff, then summed the two values. However, staff work 50 weeks a year and faculty work 32, and mileage numbers were calculated for both faculty and staff based only on 32 work weeks a year. Thus the total car mileage value seen here underestimates the true emission value. Survey collected information about fall of 2011 and spring of 2012. The data was then used for fiscal year 2011.</p>
Student Commuting	Car: 22,487 miles Bus: 0 miles	<p><u>Source:</u> Student survey from previous fiscal year that determines the number of miles traveled weekly by students via car, bus, bike, and foot to commute to campus.</p> <p><u>Assumptions:</u> We surveyed all classes. We multiplied the average weekly mileage by the number of students, then by the number of school weeks. We did not included mileage traveled by students to/from their homes during school breaks. We did not survey bike and foot miles this year, because they do not impact GHG emissions.</p>
Directly Financed Outsourced Travel: Faculty/Staff	Air: 3,965,508 miles	<p><u>Source:</u> Kathy Yeager provided a comprehensive list of school-financed air travel for the 2010-2011 fiscal year, arranged by department. Airport codes were arranged and taken to www.webflyer.com to determine air miles for each trip.</p> <p><u>Assumption:</u> There is no clear distinction in this data between who specifically the school is financing travel for. For example, it seems as if the Athletics Department has student travel listed. It seems as if all school financed air travel is covered in this document, though travel by faculty and staff appears to be predominant. However, it remains the case that the calculated number is high.</p>

Directly Financed Outsourced Travel: Student	Students: 94,079 miles Reimbursed Travels: 9,799 miles	<p><u>Source:</u> Data from ASWC-financed travel was analyzed using www.webflyer.com for air mileage and Google Maps for car mileage. Data for Varsity athletics was found based on utilizing play schedules on the Varsity athletics page and Google Maps.</p> <p><u>Assumption:</u> Due to imprecise travel records the exact mileage was impossible to calculate. This number is below the actual number. Also rented vehicles for a couple varsity sports and club sports which are partially financed by the school are not included in this number. The number of vehicles used were often not disclosed in the documents. For car travels, I assumed that they only took one vehicle, since I could not arbitrarily increase vehicle numbers. Therefore, the estimate is understated. Due to the fact that for many competitions athletes visit two schools in one weekend in the same area, I calculated this as one trip.</p>
Study Abroad Travel, Air	2,234,650 miles	<p>Annual air miles traveled by students studying abroad.</p> <p><u>Source:</u> Laura Cummings at the Study Abroad Office provided the number of students who traveled abroad and to which countries.</p> <p><u>Assumptions:</u> Every student flew in a separate plane, round trip, between the Seattle, WA airport and largest international airport located within the country of their destination (e.g. if a student traveled to Peru, air miles were calculated for a round trip flight between Seattle, WA and Lima, Peru). Given these assumptions, student trips were calculated by using a flight distance estimator online.</p>
Solid Waste: No CH4 Recovery	Higher Confidence ESTIMATE: 409.74 short tons	<p><u>Source:</u> Landfill log provided by Bob Biles for the 2010 fiscal year. This log accounted for the Whitman transported waste. Additionally, there is waste collected by the city, contact Craig Harrigan, which is unrecorded.</p> <p><u>Assumptions:</u> Because the city-collected waste amounts are unrecorded, the assumed average density of the waste is 9.25926 lbs/ft³. It is assumed that there are 3 pickups per week for the entire year. Each dumpster is assumed to be full at each pick-up to compensate for times when extra pick-ups occur (alumni weekend, admitted students day, receptions, debate tournaments, etc.). They are also considered to be full in order to compensate for the interest house, counseling center, Penrose House, and Art building's bin pick-ups.</p>

Waste Water: Septic System	782 gallons	Amount of annual waste water that travels through the Johnston Wilderness septic system. <u>Source:</u> Randy Coleman, Maintenance Supervisor of the Physical Plant <u>Assumptions:</u> The amount of waste water that goes through the septic system is equivalent to the amount of water consumed at Johnston.
Waste Water: Central Treatment System	40,506,444 gallons	Amount of annual waste water that travels through the campus sewage system. <u>Source:</u> Amy Bruner provided the water use data for ResLife, and Gayle Worthington for the remainder of campus use. <u>Assumptions:</u> The amount of waste water that passes through the sewage system is equivalent to the amount of water consumed on the Whitman College campus.
Paper: Uncoated Freesheet: 0% Recycled	1786.7 lbs	<u>Source:</u> Amber Woodsworth provided information on paper used internally and numbers of envelopes used for previous fiscal year, at which time we were informed this number does not vary year by year. <u>Limitations:</u> For this year's audit, envelopes are not included.
Paper: Uncoated Freesheet: 25% Recycled	3077 lbs	<u>Source:</u> Amber Woodsworth and Justin Rodegerdts provided information on paper used internally and numbers of envelopes used used for previous fiscal year, at which time we were informed this number does not vary year by year.
Paper: Uncoated Freesheet: 100% Recycled	50,992.2 lbs	<u>Source:</u> Amber Woodsworth provided information on paper used internally Justin Rodegerdts provided information on the total number of cases purchased for daily use on campus, including copying and printing, all of which is 100% recycled paper. This number was added together with the 100% paper figure from Amber. This method was used for previous fiscal year, at which time we were informed this number does not vary year by year. <u>Limitations:</u> For this year's audit, envelopes are not included.
Offsets		
On-Campus Composting	3.3 Short Tons	<u>Source:</u> Whitman Organic Garden Leader <u>Assumptions:</u> The organic garden composts 37.5 gallons of compost from September to November and March to May. The garden also composts 9.37 gallons of compost per week during the 15 weeks of summer. The compost weighs 1,500 pounds per cubic yard.
Non-Additional Renewable Energy Certificates (RECs): Green Power Certificates	5,214,400 kWh	Pacific Power Blue Sky Program, Renewable Choice Energy. <u>Source:</u> EPA Green Power Partnership 2011 partner report submitted by the Treasurer.

RESULTS

In fiscal year 2011, Whitman College's gross emissions of CO₂ equivalents totaled **14,445.3** MT, not including offsets (Table 2). Offsets produce a net difference of **3,062.6** MT, decreasing net total emissions to **11,382.6** MTeCO₂. With 1,528 students, each full-time student is responsible for **7.45** MT of eCO₂.

Table 2: Campus greenhouse gas emissions for fiscal year 2011

FY2011		Energy Consumption	CO₂	CH₄	N₂O	eCO₂
		MMBtu	kg	kg	kg	Metric Tonnes
Scope 1	Other On-Campus Stationary	27,413.1	1,480,031.8	153.7	3.8	1485
	Direct Transportation	1,148.1	80,638.4	15.5	5.4	82.6
	Refrigerants & Chemicals	-	-	-	-	239
Scope 2	Purchased Electricity	78,098.6	6,399,047.1	18.3	19.8	6405.4
Scope 3	Faculty / Staff Commuting	513.8	36,031.3	7.2	2.5	37
	Student Commuting	126.3	8,859.1	1.8	0.6	9.1
	Directly Financed Air Travel	15,994.8	3,140,373.3	30.9	35.5	3151.7
	Other Directly Financed Travel	206.8	14,839.7	1.4	.5	15
	Study Abroad Air Travel	9,322.3	1,830,310.6	18	20.7	1836.9
	Solid Waste	-	-	19,316.3	-	482.9
	Wastewater	-	-	0.2	66	19.7
	Paper	-	-	-	-	43.7
	Scope 2 T&D Losses	7,724.0	632,872.8	1.8	2	633.5
Offsets	Additional					(1.3)
	Non-Additional					(3061.4)
Totals	Scope 1	28,561.3	1,560,670.2	169.2	9.2	1,806.7
	Scope 2	78,098.6	6,399,047.1	18.3	19.8	6,405.4
	Scope 3	33,888.0	5,663,286.8	19,337.6	127.9	6,233.2
	All Scopes	140,547.8	13,623,004.0	19,565.2	156.9	14,445.3
	All Offsets					(3062.5)
	Net Emissions per Student	7.45			Net Emissions	11,382.6

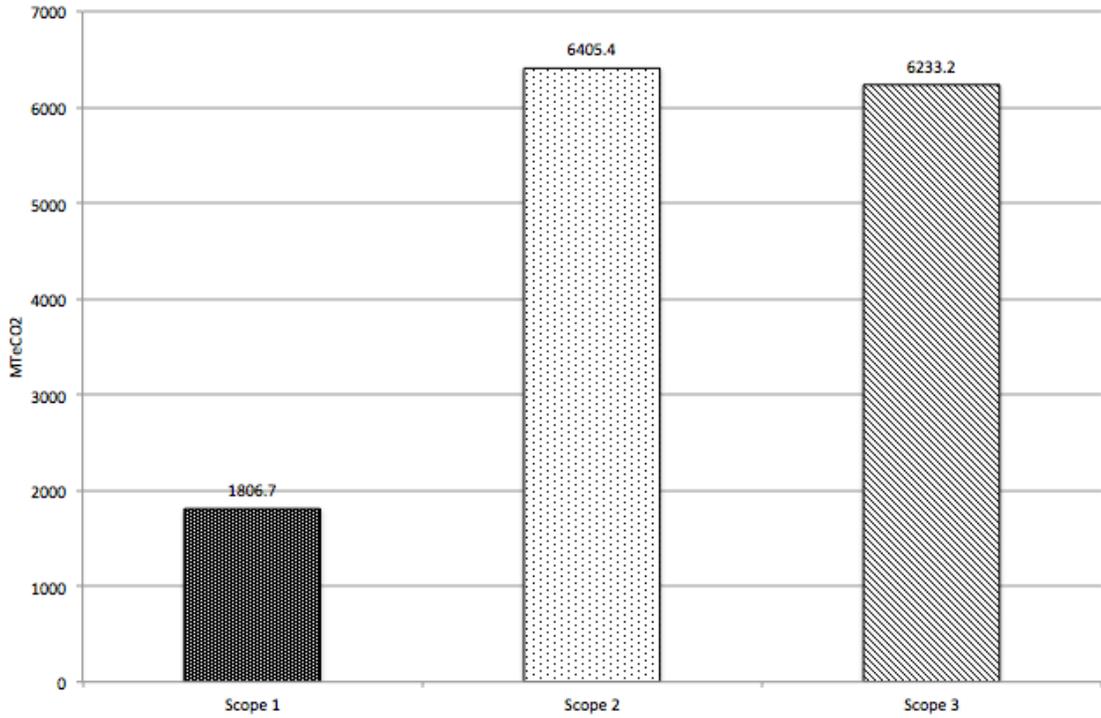


Figure 1: Fiscal year 2011 emissions by scope measured in MTeCO2.

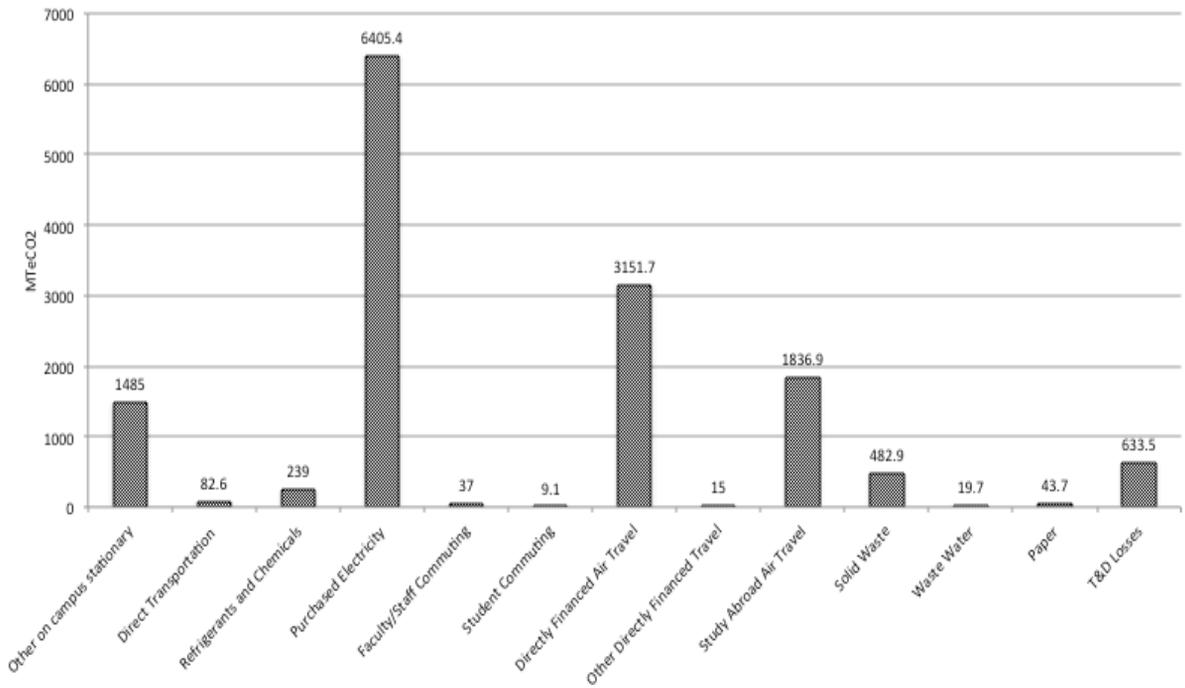


Figure 2: Total emissions in FY2011 by category.

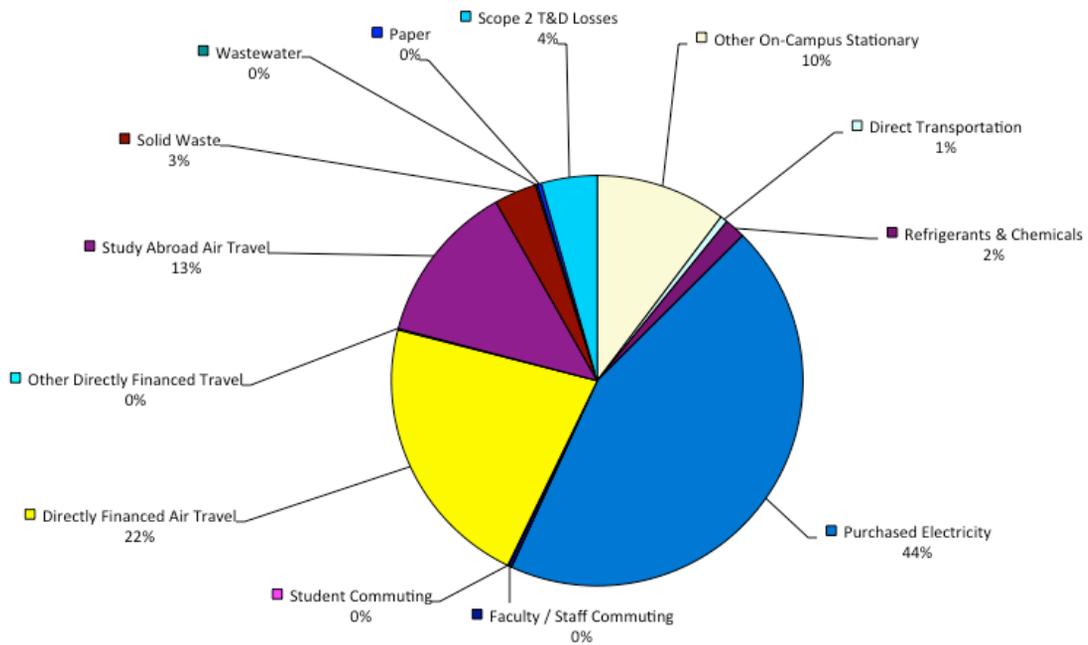


Figure 3: Total emissions (MTeCO2) in fiscal year 2011 by category, by percent.

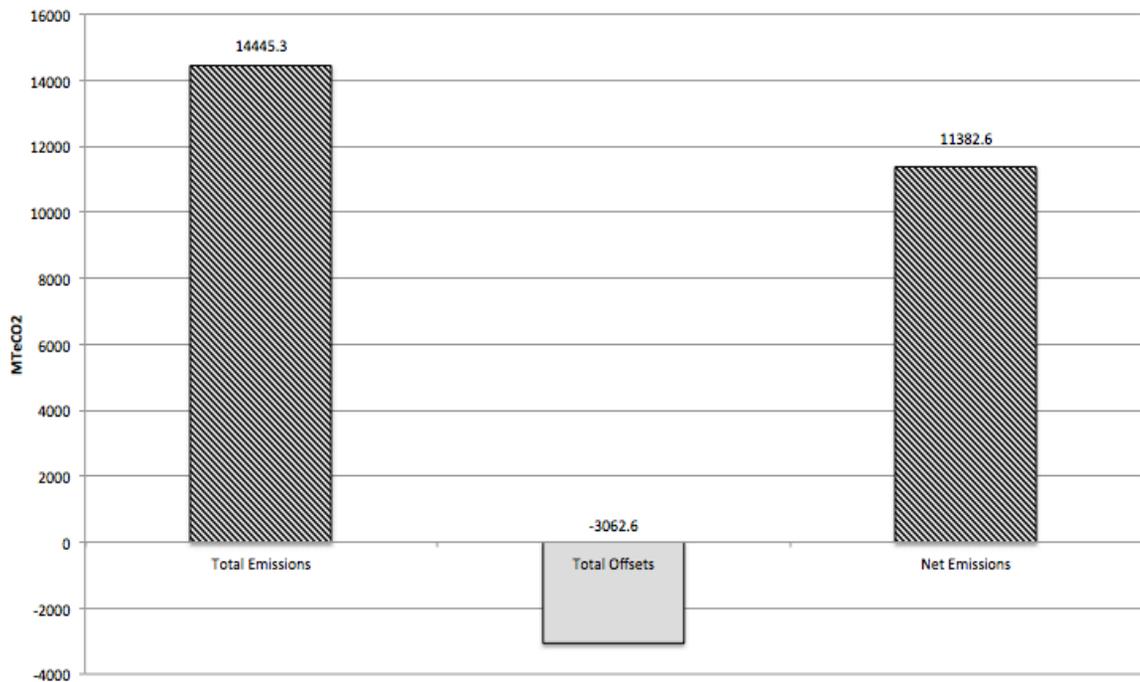


Figure 3: A portion of Whitman's total emissions are offset by solar panels on Bratton Tennis Center and Renewable Energy Credits purchased from Pacific Power's Blue Sky Program and Renewable Choice Energy, thereby reducing the total net emissions.

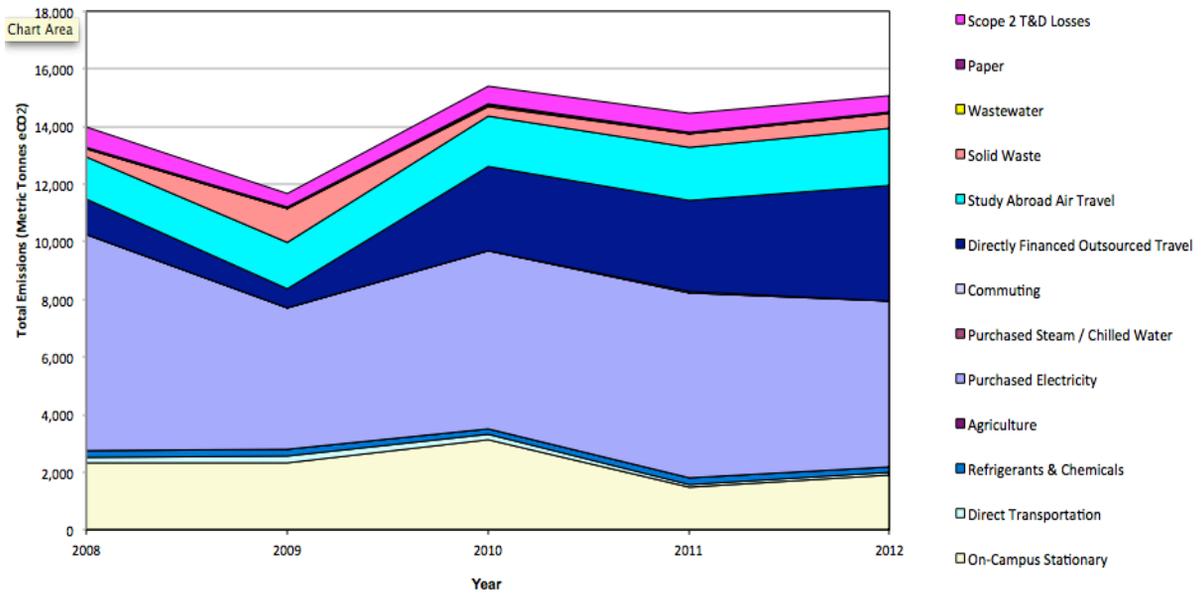


Figure 4: Total emissions by sector (MTeCO₂) from FY2008-FY2012. Data presented for FY2008-FY2011 represents calculated information from Whitman College, while the data presented for the year 2012 is a projection determined by the emissions calculator for the coming year.

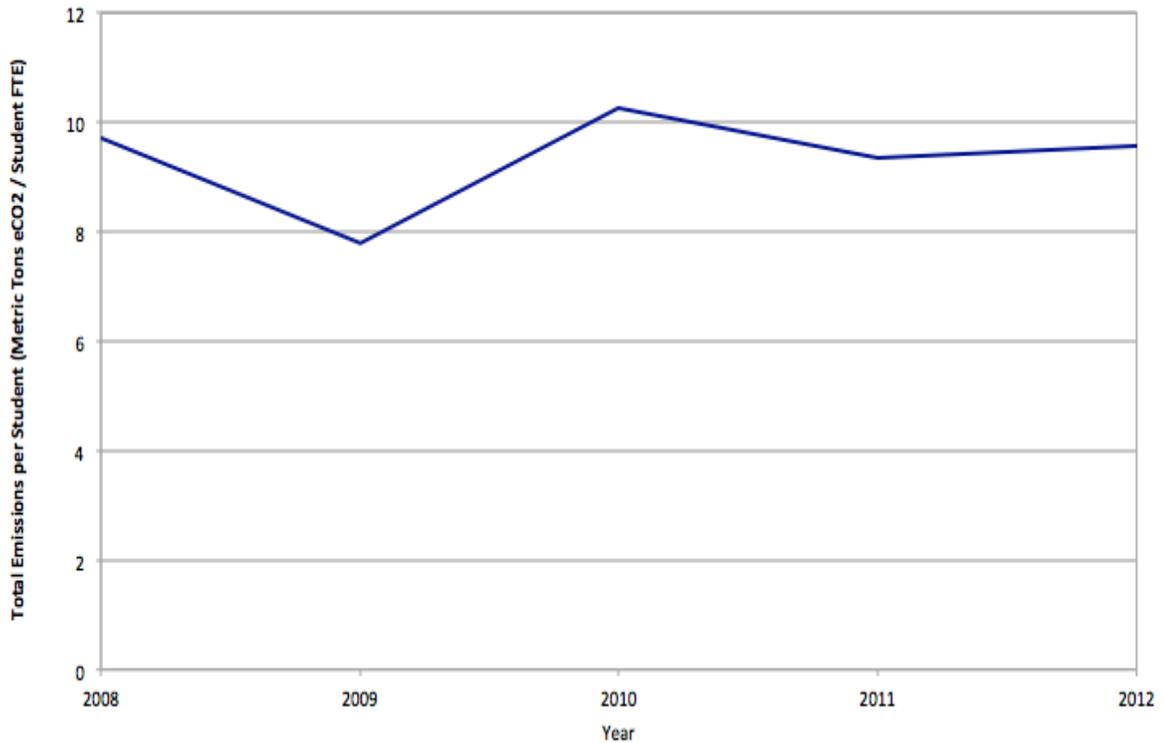


Figure 5: Total emissions per full-time student from FY 2008-FY2012. Emissions per student normalizes the total energy use estimates by the size of the student body. Data presented for FY2008-FY2011 represents calculated information from Whitman College, while the data presented for the year 2012 is a projection determined by the emissions calculator for the coming year.

The single greatest contributor to Whitman College's greenhouse gas emissions is Purchased Electricity at **6,405.4 MTeCO₂** constituting 44% of the institution's emissions. This number shows high reliability, as there is only one supplier of purchased electricity to campus: Pacific Power.

The second greatest contributor is directly financed air-travel, emitting **3,151.7 MTeCO₂**, or 22% of the College's emissions. This is reduced from the previous year's emissions of 3,991.7 MTeCO₂. It is critical to note that exact flight paths were not followed for these calculations; rather, the distance from point of origin to destination was used to determine this figure. This mechanism of accounting for air miles is thus inherently lower than actual miles traveled by air.

Study abroad air travel accounted for **1,839.6 MTeCO₂**, which is 13% of the overall CO₂ produced at Whitman for FY2011.

Whitman College produced 409.7 short tons of solid waste in the 2011 fiscal year. The solid waste was responsible for 482.9 MTeCO₂, or 3% of Whitman's total emissions.

Whitman faculty and staff traveled 91,458 miles by car to campus over the year. This equates to 37 MTeCO₂ which is less than one percent of the total MTeCO₂ produced by Whitman in the 2011 fiscal year.

The approximately 9200.96 gallons of fuel used by the College fleet (included in Direct Transportation) equates to 82.6 tons MTeCO₂. This is 1% of the GHG emissions produced by the institution.

Whitman's purchased Green Energy Certificates and solar power produced on the Brattain Tennis Center brings the College to 35.55% green power for the 2011 fiscal year.

COMPARISON TO OTHER COLLEGES

Table 3: GHG emissions from comparable liberal arts colleges.

College/University	Total Emissions (MTeCO ₂)	Emissions per student (MTeCO ₂)
Whitman College	11,362.6 (FY11)	7.45
Carleton College	22,025 (FY08)	12
Colby College	20,196 (FY08)	8.72
Colorado College	29,294 (FY08)	14.26
Evergreen State College	10,858 (FY08)	5.1
Grinnell College	23714 (F09)	10.3
Lewis & Clark College	17,123 (FY06)	4.4
Macalester College	19,845.3 (FY09)	10.4
Oregon State University	71,876 (FY11)	3
Occidental College	11,871 (FY06)	7
Pomona College	15,703 (FY11)	10.1

Through an online search of comparable liberal arts colleges, we found several greenhouse gas audits all conducted in the last 6 years with various versions of the Clean Air-Cool Planet Campus Carbon Calculator. The results are summarized in Table 3 above. The emissions per student data for most colleges were derived from their respective total emissions data divided by their present full-time student body population. This assumes each of the schools has not had wildly fluctuating student population sizes in the years the total emissions were calculated. However, with the emissions per student data directly available, **Whitman College, at 7.45 MTeCO₂** is over double the fewest emissions per student at Oregon State University which produces 3 MTeCO₂ per student.

LIMITATIONS

The limitations in precision and breadth of data collection for the Audit are described below.

SCOPE 1

The Direct Transportation figure assumes that all school-subsidized fuel purchases are accounted for by a combination of a complete set of the Physical Plant's records of fuel purchases and a figure representing the College's fuel expenses for fiscal year 2011, with the additions of data from the Health Center and Community Service Office. Fuel expenses were converted to gallons based on the average Washington fuel price for regular unleaded gasoline during this time period. Funding for fuel expenditures for faculty travel in personal vehicles for research or small-scale excursions and projects was not included because faculty can use money from grants, their department funds, endowments, professional development accounts, etc.

Previous years, the distillate oil amount was reported as 10,000 gallons used from the 12,500 gallon tank. This year, Gayle Worthington reported the size of the tank, not specifically the amount of oil used.

SCOPE 2

Electricity was calculated via a spreadsheet provided by Gayle Worthington for Scope 2 electricity data for fiscal year 2011.

We elected to enter a custom fuel mix for our electricity provider. We chose not to use the calculator's standard regional portfolio because the regional portfolio is heavily skewed towards hydropower, whereas Pacific Power relies heavily on coal-fired generation. The Pacific Power net system mix is 0.77% biomass, 44.29% coal, 34.76% hydroelectric, 0.11% landfill gases, 17.46% natural gas, 1.41 % nuclear, 0.64% waste, 0.43% petroleum, and 0.13% other.

SCOPE 3

Faculty and Staff Commuting

The faculty and staff daily commuting survey would have been more accurate had it accounted for seasonal commuting patterns. In the winter months faculty and staff may drive more, whereas in the fall, spring, and summer, they might walk or bike more. The survey also should have asked whether the participant was a faculty or staff member because faculty work 32 weeks a year and staff work 50 weeks a year. Unfortunately, although this suggestion was made last fiscal year, it was not implemented this year. Similarly, seasonal variations could be helpful for developing more accurate commuting data for students. The student commuting survey is also somewhat limited by the assumption that all juniors and seniors live off campus and thus need to commute, which is not true. A more accurate survey would be sent just to students living off-campus.

Directly Financed Outsourced Travel: Faculty/Staff

The methods in determining the number of miles traveled by air has greatly improved from those of previous years with the use of a very comprehensive travel log. It was determined that between all of the school's departments, 4,005,782 person-miles were traveled by air in the 2010-2011 fiscal year. This total does include student travel such as Varsity Athletic travel, so our total is high. However, the vast majority of flights listed in this ledger seem to be for trips by faculty, staff, and the like. A more accurate total would be determined by a list of all non-student air travel. 5,403 individual air travels were purchased in this academic year, and \$635,483.18 was spent between tickets and additional charges (luggage, changes in class seating, etc.) across the departments. The individual air travels mark every single flight destination Whitman has directly financed.

Directly Financed Outsourced Travel: Students

The College directly financed 6,479,056 miles of travel. Raw data for this figure were a list of faculty-led student trips, ASWC funded events, and Varsity Athlete Travel. Information was provided by Kathy Yeager, the Data Manager from the Business Office, ASWC Finance Chair Fritz Siegert and future Finance Chair Sam Sadeghi, Varsity Athlete archives found online. Varsity Athletic Travel using vehicles outside of the physical plant are included in these numbers, but exact mileage for all Varsity

Athlete travel is not recorded. We believe this figure to be conservative because Whitman College also assists in the funding for club sport and activity transportation.

In order for Directly Financed Outsourced travel to be more accurate it is recommended that the trip miles from varsity athletics are recorded. Bus drivers already record their mileage therefore it would be the simple task of the coaches to collect the mileage from the driver after every trip and record these in a log to be reported to the GHG audit team.

Study Abroad Travel, Air

Study abroad air travel miles were approximated under two assumptions. First, every study abroad student traveled in their own separate plane. Second, every study abroad student traveled round trip from Seattle, WA to the largest international airport in the country of their destination. Seattle was chosen because most students fly out from their home cities rather than from Walla Walla. Seattle was chosen as a popular west coast international airport close to Walla Walla. Obviously there are many students flying from different parts of the U.S., and layovers are not taken into account, therefore this is not entirely accurate. Using these assumptions, distances of every study abroad travel program could be generated and implemented to calculate approximately the total distance of all study abroad trips combined for fiscal year 2010-2011. The numbers calculated for study abroad, also fail to include any travel of students done during their study abroad experience.

Transmission and Distribution Losses

The calculator includes steam or chilled water production, but is ignored because the college did not purchase any energy to this matter. The 2T&D does include CO₂, CH₄ and N₂O emissions from electricity generations, as well as electricity lost in transmission lines between Pacific Power generating stations and the college. For example, if the college purchased 100 kwh of energy, the calculator enters in 109 kwh if there is a 9% transmission and distribution loss. Transportation and Distribution losses from purchased energies are included in Scope 3, as it is an "other emission from the institution" (Calculator Guide, 2010, p. 9). This is the energy lost while transporting purchased electricity.

Solid Waste, No CH₄ Recovery

The solid waste data was limited in that waste not picked up by the Whitman dump truck. Waste collected by the Whitman dump truck that includes the residential halls, academic buildings, and athletic fields have sufficient records to calculate generated waste in the landfills from Physical Plant records. The city trucks do not calculate tonnage collected. The city knows only the frequency with which the bins are picked up, and does not indicate how full the bins are at each collection. In residential neighborhoods, such as the Interest House bins are collected approximately once per week. Yet, waste disposal does not take note of whether the bin is empty or full. The city is responsible for picking up two 2 cubic yard bins outside of Jewett Hall, two of the same size outside of Reid, and one 6 cubic yard roll-off dumpster serving of Prentiss Hall. These dumpsters are the drop-off sites for food waste on campus (an average of 4000 pounds per week), in addition to all additional food packaging and garbage from those areas.

Waste Water

The waste-water estimate is based off the assumption that the amount of wastewater run through Walla Walla's waste water system is approximately the same as the amount of water consumed on campus. In essence, the data entered for waste-water are the amounts of water consumed by every building on campus put together.

Paper

Every year Whitman College purchases the same amount of paper, but due to a discrepancy with annual data collection, the number of boxes of envelopes that the school orders each year was again not included in this audit.

Offsets

It is unclear whether the Blue Sky RECs for fiscal year 2011 overlap precisely with the July 2010 to June 2011 period considered in the Audit.

Whitman also purchases Green-e certified American Wind from Renewable Choice Energy, which includes some local investment in wind projects around Washington State.

Solar panels were included mistakenly not included in this year's audit. Their production values are reported on the Green Power Partnership Yearly Reporting Form which is submitted annually to the Environmental Protection Agency (EPA).

Suggestions For Improving Limitations

Bob Biles processes data approximately 1.5 years after the data-set is complete. However, he does keep all receipts. It requires the student to go to the Physical Plant and take their own records, request receipts from both calendar years to figure out the calculation for the fiscal year. Do not assume that the people you are approaching understand the entire concept or functions of the Greenhouse Gas Audit.

To improve the data confidence, we primarily suggest the appointment of a full-time Sustainability Staff Person to conduct the audit with student assistance, annually. Without the presence of a consistent knowledge source to carry over knowledge year after year, mistakes and discrepancies will continue to persist.

Furthermore, more detailed analysis of results will be possible with the appointment of a full-time staff person to conduct formal investigations and comparisons with other schools, as well as address how the Greenhouse Gas Audit can be of use to improving Whitman College's external "Green Ratings" with national rating systems.

REFERENCES

Intergovernmental Panel on Climate Change

- <http://www.ipcc.ch/>

Clean Air- Cool Planet Campus Program

- http://www.cleanair-coolplanet.org/for_campuses.php

Whitman Sustainability Wiki

- whitman.edu/sustainability

Links for GHG Audit data from other colleges used for comparison:

- http://departments.oxy.edu/uepi/ecooxy/oxy_emissions.pdf

- <http://www.pomona.edu/administration/sustainability/initiatives/climate/impacts-trends.aspx>

- <http://www.greenreportcard.org/report-card-2010/schools/colorado-college/surveys/campus-survey>

- <http://www.greenreportcard.org/report-card-2010/schools/carleton-college/surveys/campus-survey>

- <http://www.greenreportcard.org/report-card-2010/schools/colby-college/surveys/campus-survey>

- <http://www.greenreportcard.org/report-card-2011/schools/grinnell-college/surveys/campus-survey#climate>

- <http://www.macalester.edu/sustainability/data/20082009greenhousegasemissionsinventory.pdf>

- http://oregonstate.edu/sustainability/sites/default/files/docs/fy11_ghg_report.pdf

Pacific Power/Washington Power Content:

<http://www.pacificpower.net/ya/ys/crfr/washington/fsei.html>