Greenhouse Gas Emissions Inventory FY ’2009

Summary

The goal of this study was to complete a comprehensive and detailed inventory of the greenhouse gases (GHG) emitted by Hobart and William Smith Colleges (HWS) during the 2009 fiscal year from June 2008 to May 2009. The data used was compiled from the most recent data of this time frame. The inventory attempts to account for all direct and indirect sources of greenhouse gases emitted by HWS’ daily functions throughout the year and emissions produced by the students, faculty, and staff. The results from this inventory will help HWS to determine a plan of action so that HWS can achieve its goal of being emission neutral by 2025. Future inventories will help HWS to determine the effectiveness of its emission reducing projects and determine a level of priority concerning the scale and nature of future projects.

In 2009, 13,638 metric tons of carbon dioxide equivalents (MTCDE) were emitted by Hobart and William Smith Colleges. The data represents a 14% decline in GHG emissions generated by HWS from the 2007 fiscal year. The format and methodology used to complete the GHG inventory was similar to those used in 2007. Both inventories utilized an emission calculator provided by Clean Air- Cool Planet, Inc and can be located and downloaded at http://www.cleanair-coolplanet.org . The emission calculator used in this inventory was an updated version of the calculator used to complete the 2007 emissions inventory. The calculator incorporated data from a wide range of emission producing activities in its analysis of HWS’ total GHG emissions. One new source of emissions was the inclusion of greenhouse gas credits and reductions. There are still a number of emission sources that are unaccounted for in our survey that we suggest future inventories should include. Data that was compiled reflected the emissions produced by heating, electricity consumption, student transportation, faculty and staff transportation, faculty and staff air travel, student air travel to study abroad programs, athletic team travel, fertilizer use, refrigerant and chemical leakages, solid waste disposal, wastewater, and activity of our university fleet vehicles. In order to calculate the level of student, faculty, and staff transportation a campus wide survey was distributed. The survey can be seen in figures 10a and 11a.

The primary sources of GHG emissions are, in order of emission quantities, heating from natural gas, purchased electricity, faculty and staff commuting, and directly financed outsourced travel. Directly financed outsourced travel includes athletic team travel, reimbursed automobile travel, and school program transportation. The GHG emissions from each source can be found in Table 2 of this inventory. The sources used to calculate the GHG emission produced by HWS are also a good, however somewhat incomplete, representation of the indirect emission sources of Hobart and William Smith Colleges. In addition, the range of emission sources used to calculate HWS’ total emission meets the requirements of the President’s Climate Commitment for direct sources. This study tried to represent the full extent of emissions that HWS concretely believed it was responsible for. There are some sources that have been identified as possible future sources to be included in subsequent surveys. These sources were not included in this inventory because HWS’ emission responsibilities are not yet clearly defined and new sources are being considered and debated with each discussion of the topic. The
arguments for and against some of these possible new emission sources are discussed in the suggestions section of this study.

Introduction

President Mark D. Gearan of Hobart and William Smith Colleges signed the American College and University Presidents Climate Commitment (ACUPCC) in September of 2007. Hobart and William Smith Colleges is now one of 685 institutions throughout the United States and Canada to have joined this important commitment to environmental awareness and change. One of the fundamental goals of the ACUPCC is to make progressive and meaningful steps towards reducing GHG emissions and climate neutrality. A requirement of the ACUPCC is that each institution completes a comprehensive and complete GHG emissions inventory. This inventory’s aim is to identify the main sources of GHG emissions and to recommend steps towards a standardization of the inventory process to help produce consistent and meaningful results for use by HWS and others.

Methods

As mentioned above, an emissions calculator, provided by Clean Air- Cool Planet, Inc (CA-CP), was utilized in the process of calculating the GHG emissions produced by Hobart and William Smith Colleges. The CA-CP Campus Carbon Calculator V6.4 uses methodology that is consistent with standards suggested by Green House Gas Protocol of the World Business Council for Sustainable Development.

The CA-CP uses three broad scopes of emissions to identify macro groupings of GHG emitting sources.

Scope One: This scope includes heat generation from natural gas usage, electricity use by electrically powered vehicles, emissions from refrigerant chemical leakages, fertilizer application, and emissions produced by the campus fleet. We defined the campus fleet in scope one as being vehicles that are utilized by Buildings and Grounds, the Cleaning Services, and Campus Safety.

Scope Two: This scope is the total emissions generated from the institution’s electricity consumption.

Scope Three: Scope three includes emissions generated from faculty and staff commuting and student commuting. In addition, emissions generated from “Directly Financed Air Travel”, air travel to study abroad programs, “Other Directly Financed Travel”, solid waste disposal, and wastewater.

Data Collection

All of the data used was collected from James Landi, HWS Sustainability Coordinator and members of HWS Facilities and Buildings and Grounds that had access to the data with the exception of transportation data. Data was collected from HWS Facilities and Buildings and Grounds for information from the 2009 fiscal year concerning natural gas use, electricity
consumption, the university fleet’s fuel consumption, total solid waste production, wastewater production, refrigerant chemical leaks and replacements, fertilizer application, and renewable energy credits. Itineraries of the routes used by study abroad programs to reach the programs were supplied by Sharon Walsh of the Center for Global Education.

Transportation data of faculty, staff, and student commuting was compiled from the responses to a survey that was distributed throughout the campus. 369 students responded to the Student Transportation Survey, an 18% response rate, and 204 faculty and staff responded to the Faculty and Staff Transportation Survey, a 32% response rate. To calculate athletic team travel, the Hobart and William Smith athletic team coaches were asked to indicate on their sport’s schedule if away games that were at a venue other than the athletic facilities found on the host team’s campuses. Coaches were asked about the mode of transportation that was used to transport the team to the athletic event. In addition, coaches were asked to report any team travel that was not formally listed on the schedule, e.g. spring break team trips. Once the coaches had responded the distances travelled by the teams were calculated using MapQuest, listing Hobart and William Smith Colleges as the start point and the final destination was the campus of the opponent, unless indicated otherwise by the coach. Distances travelled by air were calculated using the itineraries provided by Center for Global Education, coaches, and faculty responses from the transportation survey that they completed. The distances were calculated using [http://www.airrouting.com](http://www.airrouting.com). The website calculated the distance travelled by airplanes on each leg of the trip.

Two surveys were distributed anonymously online to all faculty, staff, and students during the semester. One survey was student specific and was sent out only to the students of HWS. The second survey was distributed to only faculty and staff. The survey was formatted and created using the help of surveys used previously by Mark Clayton, Hobart ’08, and Michael Thompson, Hobart ’08. Their surveys were refined, adjusted, and updated before being sampled by a number of students and faculty/staff for comments and suggestions. These surveys are provided in Figure 10A and Figure 11A. The survey was hosted electronically using a survey generating database. HWS IT (Information Technologies) helped to create the survey and then download the responses to an electronic file that can be on the surveyor database. The 2008-2009 surveys can be found in the Surveyor Program under the subject heading “environmental studies”.

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<th>CO₂ Equivalent</th>
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<tr>
<td>Methane (CH₄)</td>
<td>23</td>
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<tr>
<td>Nitrogen Oxides (NOₓ)</td>
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</tr>
<tr>
<td>Hydroflourocarbons (HFC’s)</td>
<td>Up to 12,000</td>
</tr>
</tbody>
</table>

**Table 1**

Global Warming Potentials (100 years)
The following are the various direct and indirect sources of greenhouse gasses used by the CA-CP calculator.

**Scope 1**

**Figure 1**
On-Campus Stationary (Scope 1)
- HWS only uses natural gas to heat properties.
- The data provided was given in therms. Therms were then converted to MMBTU by multiplying by .1. CA-CP calculator required on-campus stationary to be in MMBTU.
- Data was provided by James Landi, Sustainability Coordinator.
  - Data can be accessed from file “energy-building sqft.pdf”.
- Natural Gas use was from June/2008–May/2009.

**Figure 2**
University Fleet (Scope 1)
- All university fleet vehicles run on either gasoline or diesel fuel.
- Data provided by HWS Buildings and Grounds.
- Data filed under “Activity Summary Report by Account for Product”.
- Data range was from January/2009–December/2009.

**Figure 3**
Electric Fleet
- HWS owns and operates one electric truck and three electric utility carts.
- Electricity consumption from the electric vehicles is not currently distinguishable from the campus’ total electricity consumption.

**Figure 4**
Refrigerants and Chemicals
- Data provided by Chad Bouffiou, Mechanical Trades Manager.
- Chemical identified as “-410-a” was not recognized by the CA-CP calculator and was categorized as “other”.
- Data recorded within file: “GHG Inventory email correspondences.docx”.
- Data range of refrigerants and chemicals was from June/2008–May/2009.

**Figure 5**
Agriculture
- Data consisted of fertilizer application to HWS grounds and athletic facilities.
- 50% of fertilizer used contained 20% nitrogen; the remaining 50% contained 15% nitrogen.
- The nitrogen content of the fertilizer was calculated by taking the weighted average of the nitrogen contents from the two different types of fertilizer used. The nitrogen content recorded in the CA-CP calculator was 17.5% nitrogen in the synthetic fertilizer applied.
- Data provided by David Iannicello, HWS Grounds Manager.
- Data range was from June/2008–May/2009.
• Data recorded within file: “GHG Inventory email correspondences.docx”.

Scope 2
Figure 6
Purchased Electricity
• Data was reported in kWh.
• Data was provided by James Landi, HWS Sustainability Coordinator.
• Data range was from June 2008 – May 2009.

Scope 3
Figure 7
Study Abroad Air Travel
• Only travel to and from the study abroad programs was recorded. Any emissions produced from air travel done by students in abroad programs were not claimed as the responsibility of HWS.
• The distances flown to study abroad programs were calculated using the website http://www.airrouting.com.
• Itineraries were provided by Susan Walsh, Center for Global Education.
• Data included Summer 08, Fall 08, and Spring 09 programs.
• Data is located within the file “2008-2009 study abroad air travel.xlsx”.

Figure 8
Athletic Air Travel
• Data was collected from all athletic coaches of their respective sports.
• Distances were calculated using http://www.airrouting.com.
• A number of teams did not provide team travel trips that were not on the schedule.
• Data included the Fall 2008, Winter 2008/09, and Spring 2009 Athletic Seasons.
• Data is located under “Hobart Athletics.xlsx” and “William Smith Athletics.xlsx”.

Figure 9
Faculty and Staff Air Travel
• Air travel data for faculty and staff was collected from the Faculty and Staff Transportation Survey.
• Only air travel that was reported in the survey was recorded and used in the total mileage flown by faculty and staff during the 2009 fiscal year. We made this decision because we were unsure of the actual proportion of faculty and staff that were reimbursed for air travel. The 2007 GHG inventory calculated an average distance flown per faculty or staff member from the responses given in the survey. That number was then multiplied by the number of faculty and staff members at HWS. The 2009 Faculty and Staff Air Travel data reflects a desire to not drastically over estimate the amount of flying done by HWS.
• Data can be located within the file “Survey Data”.

Figure 10
Student Commuting
• Data was collected from the responses provided by the student transportation survey participants.
• The data collected focused on the frequency of trips taken around campus.
• The student transportation survey also asked students to estimate how far they lived from school when they are not at HWS.
• The survey inquired about any travel to school activities (non-athletic).
• The data collected was from the responses provided by the student transportation survey participants.
• The student transportation survey also asked students to estimate how far they lived from school when they are not at HWS.
• The survey inquired about any travel to school activities (non-athletic).
• Student commuting data is compiled in the file “Students.xlsx”.

**Figure 10a**

**Student Survey**

• 369 students responded to the Student Transportation Survey. The Survey was distributed immediately following Spring Break and was then closed two weeks later.
• Messages and reminders about the survey were sent out twice during the period. The majority of surveys taken were within a 24 hour period after the reminder was sent out.
  o 1.) Approximately how far do you live (in miles) from campus? 2.) What is your normal mode of transportation to school when returning from break or other trips? A.) car B.) Airplane C.) Bus D.) Train 3.) If you drive to campus from breaks and trips, what type of vehicle do you drive in? Please indicate to the nearest mpg and type. (selection of cars with mpg’s listed below) 4.) Do you normally carpool with other students? Yes/No 5.) How many other students do you normally carpool with to school? 6.) Do you keep a vehicle on campus? 7.) What type of car do you drive at school? (approximate to closest mpg and type) 8.) How many car trips on campus do you make per week? (E.g. dorm to Scalding Center or Athletic facilities.) 9.) Do you live off campus? 10.) How many days a week do you drive to campus? 11.) When you drive to campus, how many trips on average do you make per day? (1 trip = round trip) 12.) What is your round trip distance to campus? *please estimate in miles 13.) Do you travel to school programs in non-school owned vehicles? 14.) How many miles per week do you travel for school programs in non-school owned vehicles? 15.) What type of vehicle do you travel in?
  o Fuel Efficiency indicated with each type of vehicle:
    ▪ SUV-16 mpg.
    ▪ Small SUV-22mpg.
    ▪ Minivan-17mpg.
    ▪ Hybrid-45mpg.
    ▪ Large Car-20 mpg.
    ▪ Midsize Car-24 mpg.
    ▪ Compact Car-26 mpg.
    ▪ Sub-Compact Car-28 mpg.
    ▪ Truck-15 mpg.
    ▪ Stationwagon-20 mpg.
• Survey was created using the Surveyor Program and is a web based survey database.
• The survey was created with the help of HWS IT (Information Technology) Services.
• Student Transportation Survey is stored under the “environmental studies” subject heading.
• Compiled survey responses can be found in the file “Students.xlsx”.

Figure 11
Faculty and Staff Commuting
• Faculty and Staff commuting data was compiled from results provided by participants of the Faculty and Staff Transportation Survey.
• Faculty and Staff Transportation Survey collected response from faculty and staff respondents about their daily commute to work, and other school related driving.
• The survey asked about travel during the 2009 fiscal year that was reimbursed by Hobart and William Smith Colleges.
• Data of the survey’s response can be found in the file “Faculty.xlsx”.

Figure 11.a
Faculty Survey
• 204 faculty and staff responded to the HWS Faculty and Staff Transportation Survey.
• Two messages and reminders were sent out reminding faculty and staff to complete the transportation survey.
  o 1.) How many days per YEAR do you walk or bicycle to campus? 2.) Do you drive to campus? (indicate yes even if sometimes) 3.) Do you regularly carpool to campus with other faculty or staff? 4.) On average how many other faculty and/or staff do you carpool with to campus? 5.) What type of car do you drive to campus? (please approximate to nearest mpg) 6.) What is the round trip distance to campus? (please estimate in miles) 7.) When you drive to campus, how many trips on average do you make per day to and from home? (one trip = round trip) 8.) On average how many miles per week do you travel for school programs in vehicles that are not owned by the colleges? (e.g. rental cars, personal cars, etc...) 9.) What type of vehicle do you travel in to the aforementioned programs? 10.) While on campus, approximately how many miles per week do you travel in your car when going to meetings, athletic facilities, lunch, etc...? 11.) What type of vehicle do you travel in? 12.) In the past 12 months, have you used any air travel sponsored by HWS? (e.g. to conferences and/or events) Yes/No 13.) For any air travel in the past 12 months that was sponsored by HWS, please list the starting point and destination of the airports you used. If the flight plant was not the same on the return, please list those details as well. 14.) How many miles of automobile travel per year do you make to HWS events in vehicles that are not owned by HWS? (Conferences, recruiting, etc...) (No athletic team travel was included)
  o Fuel Efficiency indicated with each type of vehicle:
    ▪ SUV-16 mpg.
    ▪ Small SUV-22mpg.
    ▪ Minivan-17mpg.
    ▪ Hybrid-45mpg.
- Large Car-20 mpg.
- Midsize Car-24 mpg.
- Compact Car-26 mpg.
- Sub-Compact Car-26 mpg.
- Truck-15 mpg.
- Stationwagon-20 mpg.

**Figure 12**

Athletic Team Travel

- The total distance of athletic team travel to away events was calculated by finding the sum of all the distances to each away event during the Fall 2008, Winter 2008/2009, and Spring 2009 seasons.
- The distance of any one event was calculated using MapQuest. Hobart and William Smith Colleges was used as the starting location and the final location corresponded to the campus of the host college unless otherwise noted by the coach. This distance was then multiplied by two to assume the same route travelled back, unless noted by a coach. There were a number of trips that schools did not return back to school right away and would travel to another school/contest before returning home.
- All athletic team coaches also indicated the mode of transportation. The four modes of transportation used by HWS athletic teams were: Coach Bus (5 mpg), K-Venture Bus (10 mpg diesel), 12 passenger van (16 mpg gasoline), and rental car.
- Any teams that traveled to away athletic contests using 12 passenger vans were not included in the mileage calculated for the total athletic team travel. The mileage of all of the 12 passenger vans was recorded for the 2009 fiscal year by HWS Buildings and Grounds. The mileages of these vans included travel to school activities, general use by HWS, and in addition travel to athletic events.
- Data is located within the files “Hobart Athletics.xlsx” and “William Smith Athletics.xlsx”.

**Figure 13**

Solid Waste

- Solid Waste is sent to Ontario County Landfill.
- Ontario County Landfill utilizes methane recovery and electricity generation at its facilities.
- Solid waste data was provided by Scott Woodworth, Assistant Director of Facilities.
- Data range was from June 2008- May 2009.

**Figure 14**

Emission Reductions

- Sources of possible emission reductions include composting weight, forest preservation, “Green Power Certificates”, and High/Low End Retail Offsets.
- Composting data was provided by James Landi, HWS Sustainability Coordinator.
- Green Power Certificates data was provided by Erica Cooney-Connor and James Landi.
- Green Power Certificate data can be found in the file “SKMBT_60009062909280[1].pdf”.
Results
From June 2008 to May 2009, HWS produced 13,684 MTCDE. This is a decrease of 2,110 MTCDE since the 2007 GHG inventory. However, this report will explain that the differences are mainly due to procedural changes in the collection of data for Scope 3. On-Campus Stationary and purchased electricity accounted for 71% of greenhouse gas emissions produced by HWS.

Scope 1
Figure 1R
On-Campus Stationary
- On-campus stationary was generated from natural gas usage. Calculator measure natural gas usage in MMBTUs.
- GHG emissions generated by natural gas usage totaled 5990 MTCDE. This was an increase of 125 MTCDE and a 2.2% increase in emissions relative to the 2007 HWS GHG Emissions Inventory.
- HWS consumed 113,214 MMBTUs from June 2008 to May 2009. This was an increase of 7,328 MMBTUs that resulted from the opening of the new addition to Scandling Center. The addition increased HWS’ total building space by 51,849 square feet.

Figure 2R
University Fleet
- Data was recorded in the calculator in gallons of gasoline and gallons of diesel.
- HWS’ university fleet consumed 19,084 gallons of gasoline, and 1,946 gallons of diesel.
- This fuel consumption generated 189.9 MTCDE from June 2008 to May 2009.
- The fuel consumption of the University Fleet is the fuel consumed by the vehicles used on and around campus by Buildings and Grounds, Campus Safety, and other departments.

Figure 4R
Refrigerants and Chemicals
- 30 lbs of HCFC-22 were purchased by HWS during the 2009 fiscal year. Additionally 30 lbs of -410-a were purchased.
- The chemical leakages and refrigerant use resulted in 23.1 MTCDE.
- No refrigerants and chemical emissions were reported in the 2007 GHG inventory.

Figure 5R
Agriculture
- 7,000 lbs of synthetic fertilizer was applied during the focus of this study.
- This resulted in 5.1 MTCDE. In 2007, 6 MTCDE were emitted by HWS from fertilizer application.

Scope 2
Figure 6R
Purchased Electricity
• HWS purchases electricity that is provided on the NYUP power grid. The emissions factor of NYUP was .32695 in both 2008 and 2009. The emissions factor used in the 2007 emissions inventory was .381.
• GHG emissions from purchased electricity were 3,878.2 MTCDE in 2009. The 2007 emission level from purchased electricity was 3,994 MTCDE.
• HWS purchased 11,815,642 kWh from June 2008- May 2009. HWS purchased 10,338,433 kWh from June 2006- May 2007. This resulted in a decrease of 1.4 million kWh and a reduction in emissions of 116 MTCDE.
• The emissions from purchased electricity declined by 3% from 2007 to 2009.
• Additional electricity purchased was the result of the opening of a new addition to the Scandling Center at HWS. The new building addition increased HWS’ building square footage by 51,849 square feet.

Figure 7R
Study Abroad Air Travel
• HWS students travelled 385,237 miles by plane to and from their respective abroad programs. In 2007, HWS students flew 362,234 miles to and from abroad programs; a 6% increase in travel by HWS students to their respective abroad programs.
• This resulted in 299.1 MTCDE being produced in the 2009 fiscal year.

Figure 8R
Athletic Team Air Travel
• Athletic teams only flew 16,454 miles in 2008/2009. This resulted in only 12.7 MTCDE.

Figure 9R
Faculty and Staff Air Travel
• Faculty and Staff reported a total of 392,858 air miles in the Faculty and Staff Transportation Survey.
• This resulted in 303.9 MTCDE to be emitted.

Figure 10R
Student Commuting
• HWS students average 5.27 round trips per week. Each trip was considered to have an average distance of 1.2 miles. This distance was calculated by the average one-way distances between parking lots on campus and nearby popular locations. The distance was calculated using GoogleMaps.
• Students are on campus for 32 weeks out of the year at HWS.
• The responses from the Student Transportation Survey showed that 55% of students at HWS own cars on campus, but 88% of respondents say that they have carpooled. The frequency of carpooling is unknown at this time.
• Student commuting consumed 18,439 gallons of gasoline and drove 407,500 miles during the 2009 academic school year.
• Student commuting in 2009 generated 168.8 MTCDE. In 2007, student commuting accounted for 1,045 MTCDE. The average distance driven by an HWS student, according
to the data reported in 2007, was 9 miles each day throughout the school year. The
daily average of an HWS student in 2009 is closer to one mile.

**Figure 11R**

Faculty and Staff Commuting

- HWS faculty and staff commute 26 miles each day to and from work. The additional
work related driving that occurs the average distance driven per day by an HWS faculty
or staff member increases the daily distance travelled to 31.8 miles. In 2007, using the
data reported, HWS faculty and staff drove 49.5 miles each day.
- HWS faculty and staff drove 5,174,799 miles during the 2009 fiscal year.
- HWS Faculty and Staff commuting generated 2,089 MTCDE during the 2009 fiscal year.
- The differences in the daily distances between these two studies account for the decline
in emissions produced by HWS faculty and staff commuting in 2009. 1,264 fewer
MTCDE were emitted in 2009 by HWS faculty and staff.

**Figure 12R**

Athletic Team Travel

- Hobart and William Smith College athletic teams travelled 43,802 miles by coach bus for
away events during the fall, winter, and spring seasons.
- An additional 9,670 miles were driven in rental cars for athletic events.
- Athletic team travel generated 14.8 MTCDE.

**Figure 13R**

Solid Waste

- In 2009, HWS produced 674 tons of solid waste that was disposed of in the Ontario
County Landfill. This landfill captures methane produced and uses it to generate
electricity.
- HWS produced 28 fewer tons of solid waste in 2009 than in 2007. Some of this decline
in solid waste production can be accounted for by the introduction of a food waste
composting program. HWS composted 39 tons of food waste in 2009.
- Solid waste disposal at Ontario County Landfill produced 108.3 MTCDE in 2009.

**Figure 14R**

Emission Reductions

- The 2007 GHG inventory had no emission reductions to report. In 2009, HWS purchased
530,000 kWh of “Green Power Certificates” and composted 39 tons.
- These actions were responsible for an emissions reduction of 200.8 MTCDE. 173.7
MTCDE was from the Green Power Certificates and the remaining 27.1 was from the
composting program that was introduced in during the time frame of this study.
Table 2

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<th>Resulting GHG Emissions (MTCDE)</th>
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<td>Natural Gas Use</td>
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<td>Purchased Electricity</td>
<td>11,815,642 kWh</td>
<td>5990.0</td>
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<td>University Fleet</td>
<td>19,084 gallons of gasoline</td>
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<td>1,946 gallons of diesel</td>
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<td>Student Air Travel</td>
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<td>Emission Reductions</td>
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<td>39 tons composted</td>
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Table 3

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<td>7,169 metric tons of CO₂</td>
<td>15,794 MTCDE</td>
<td>13,684 MTCDE</td>
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Previous yearly data was obtained from the 2007 HWS GHG Inventory.

Figure 15

Per Capita Emissions
- **6.51 tons per student**

Graph 1

Total Campus Emissions by Scope

This graph illustrates the breakdown of HWS’ greenhouse gases by scope.
Graph 2

Heating and Electricity Emissions

This graph shows a comparison of the emissions generated by heating and electricity consumption. These two sources account for 70% of HWS’ GHG emissions in 2009.

Graph 3

Transportation and Campus Waste (3,752 MTCDE)
Discussion
The 2009 GHG Emissions Inventory showed that HWS emitted 13,637 MTCDE. There were a number of procedural changes in the two surveys that may help to account for the drop in the emissions produced by Hobart and William Smith Colleges. The 2007 GHG Emissions Inventory calculated that HWS emitted 15,794 MTCDE. The major discrepancy in procedure occurs in the transportation data that was collected from each survey. In 2007, emissions from Scope 3 were calculated to be 5,785 MTCDE. In 2009, Scope 3 emissions were 3,752 MTCDE, a decline of 2,033 MTCDE between the two emission inventories.
1. One discrepancy is the procedure used in the previous survey to calculate the number of miles flown by faculty and staff of HWS that were paid for by the colleges. In the previous survey an average distance flown per faculty or staff member was calculated and then multiplied by the total number of faculty and staff in 2007. We believe that the number produced by this method is misrepresentative of the actual distance of air travel flown. In this survey we only claimed the emissions of flights taken that were reported in the survey sent out to all faculty and staff. The 2007 report estimated that HWS faculty and staff flew 1,288,097 miles. The total air travel reported by faculty and staff during the 2009 fiscal year was 392,858 miles. These distances translated to 1001 MTCDE in 2007 and 317.8 MTCDE in 2009. One suggestion to be made would be to begin tracking through reimbursements how many flights are booked each year and to record the flight itineraries from these trips.

2. Another discrepancy is the results of the students, faculty and staff survey. The results of the faculty and staff commuting data are significantly lower than the data from 2007. In 2007, Faculty and Staff consumed 374,076 gallons of gas and diesel. In 2009, HWS faculty and staff consumed only 234,154 gallons of gas and diesel. In 2007, the average distance travelled per day was 49.5 miles. In 2009, the average distance traveled was 31.8 miles per day. The calculation using the data for faculty and staff commuting include the number of round trips to and from home, the number of times these trips are taken, any other trips taken during the day that are work related, and the frequency of these trips. The 2007 GHG Inventory reported that faculty and staff commuting accounted for 3,353 MTCDE, and in 2009 this study reported 2,089 MTCDE were emitted, a difference of 1,264 MTCDE and a decline of 38%.

3. To calculate the amount of student driving on and near the HWS campus the survey asked students about the number of trips driven on an average week. A trip was given a standard length of .6 miles. This was done for the purpose of simplifying the survey and eliciting more accurate answers from the participants. The length of .6 miles is an average of the distances between the most common parking locations on campus and popular locations visited in the city of Geneva, NY. (supermarkets, retail stores, restaurants) With this information, we determined that students drove 407,500 miles throughout the school year. The CA-CP calculator calculated the distance travelled by multiplying the average number of one way trips per week, the distance of these trips, the number of weeks students were on campus, and the number of students that registered vehicles with HWS. The average number of one way trips in 2009-2010 was 10.54 trips. The survey indicated that 55% of HWS students registered a car with HWS, and the majority of students were on the HWS for 32 weeks. 168.8 metric tons of carbon dioxide equivalents were produced by HWS students in 2009/2010. In 2007, HWS students produced 1,045 MTCDE.
In 2007, HWS did not report any renewable energy credits or other forms of GHG emission offsets. In 2009, HWS was able to claim nearly 200 tons of emission offsets. These came from composting the food waste HWS produces (39 tons) and purchasing clean energy offsets. During the 2009 fiscal year, HWS purchased nearly 530,000 kWh of renewable energy credits for a savings of 173.7 MTCDE.

Although there remain large differences between the 2007 and 2009 Scope three emission quantities, the data from scopes one and two are consistent and lend to a better understanding of some of the steps that HWS has taken to reduce energy consumption and thereby try to lower its GHG emission totals. In 2007, the sum of scopes one and two was 10,077 MTCDE and in 2009 the total emissions of these two scopes was only 10,086. This represents an increase of less than one percent. Amazingly the consumption of our energy sources actually increased disproportionately to the total increase in emissions. The main explanation for this is the decreased emission factor of the New York Upstate power grid. The previous study used an emissions factor for the Upstate New York power grid of .381 kg of CO₂/ kWh. The 2007 survey used an emissions factor for NYUP that was different than the one provided by the CA-CP calculator, .686 kg of CO₂/ kWh. In 2008, the entire grid improved its emissions factor by nearly 15% to .32695. HWS consumed 1.4 million more kilowatt hours than in 2007; the improved emissions factor actually resulted in a reduction of 116 MTCDE in 2009. This is a 3% total reduction in the emissions produced by the electricity that we purchase. The additional electricity consumption was the result of the addition to the Scandling Center being completed. In addition, HWS produced 125 additional MTCDE in 2009 resulting from the use of natural gas for heating. HWS consumed 7,328 MMBTU more from natural gas in 2009 than in 2007.

Suggestions

- To be able to record the amount of electricity consumed by the three utility electric carts and the electric truck it would be useful to find a way of separately metering the electricity drawn from the grid by those vehicles. Currently there is no system in place to measure the vehicle’s electricity consumption.

- Better documentation of the refrigerant chemicals used throughout the fiscal year. Data provided was an inventory of the chemicals purchased for the 2009 fiscal year. Data provider informed us that there were still some chemicals unused from the previous order.

Contact Campus Safety to obtain the number of permits issued throughout the year in question and then compares the car ownership ratio to the ratio derived from the transportation survey. There is a need for better documentation of travel that is reimbursed by HWS. The transportation survey only asks about travel that has occurred in the past 12 months; however the intended data range of the GHG inventory was from the year before the range in question. Air travel to study abroad programs only included itineraries of the program once the group had rendezvoused at the initial starting point. It would be helpful to find out where the students were traveling from to arrive at the rendezvous point. This is along the same lines as
claiming the emissions of students travelling to and from campus at the beginning and end of breaks.

- One possible indirect source of GHG emissions that has been omitted from the 2009 survey are the emissions produced by students that are travelling to and from home at the beginning or end of academic breaks. This indirect source was not included in 2009 because the boundaries of HWS’ emission responsibilities had not clearly defined the ownership of these emissions. Other indirect sources of GHG emissions that should be discussed are the emission credits that HWS claims from composting and the emissions produced by the solid waste disposal vehicles. All of these indirect sources of GHG emissions are still undefined in regards to ownership of the emissions.

- The student survey asked participants the distance between HWS and their home. During the survey, however, as in 2007 there was some confusion from the participants concerning the definition of “home”. Some participants mistakenly thought “home” was referring to their housing location on or near campus during the school year. The majority of the respondents did answer correctly and gave an interesting look into the average distance students travel to or from school at the beginning and end of academic breaks, i.e. winter and summer break. After excluding responses that were less than five miles, the average distance of an HWS student’s home is 404 miles. This average was taken from 197 correct student responses in the survey. If it is assumed that there are eight trips per year (thanksgiving, winter, spring, and summer breaks) that a student is either leaving from or travelling to campus then the total distance of HWS students would be 6,783,968 miles. When this total is added to the input of student transportation the total GHG emissions increases by nearly 2,800 MTCDE.

- Future inventories should discuss matters of establishing clear ownership rights of any emerging indirect sources of GHG emissions. These matters should be discussed with the Climate Task Force, Sustainability Coordinator, and others.