

**GREENHOUSE GAS EMISSIONS INVENTORY FOR  
THE UNIVERSITY OF WYOMING:  
Update, Fiscal Year 2010**

by

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## **Abstract**

This document is a narrative report based on the Greenhouse Gas (GHG) Emissions Inventory of the University of Wyoming (UW) for the Fiscal Year (FY) 2010. The inventory data is included in Appendix A and includes all fiscal years up to the current year. UW emitted a net total of 121,707 metric tons of CO<sub>2e</sub> during FY 2010, a 1% increase from FY 2009. Most of the calculated emissions haven't changed drastically from the previous year except for building space. The minimal increase/decrease in emissions for other sources throughout this period have resulted from changes in the university's population, new construction projects, and fluctuations in weather/temperature, which have led to fluctuations in energy used for heating and additions to data categories in the inventory.

Version 6.4 of the Campus Carbon Calculator developed by Clean Air Cool Planet was used for this year's calculations.

UW conducts a GHG Inventory as part of its commitments as a signatory to the *American College and University Presidents Climate Commitment (ACUPCC)*, which the UW President Tom Buchanan signed in the fall of 2007.

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## Introduction

### American College and University Presidents Climate Commitment (ACUPCC)

The ACUPCC was organized in the fall of 2006 and is supported by the Association for the Advancement of Sustainability in Higher Education (AASHE), ecoAmerica and Second Nature. The purpose of this organization is to address global climate change by engaging institutions of higher education not only to commit to neutralizing their Greenhouse Gas (GHG) emissions, but to realize their unique ability and responsibility in advancing research and education to their students and communities that will provide society with the tools it needs to address all dimensions of global climate change. Signatories to the commitment are pledging to complete a series of steps to eliminate their campuses' greenhouse gas emissions and increase sustainability over time. These steps are to:

- Complete an annual GHG Emissions Inventory
- Choose from a designated list of immediate or short-term actions to reduce GHG emissions
- Complete a Climate Action Plan within two years of signing to achieve carbon neutrality
- Integrate sustainability into the curriculum
- Make the Climate Action Plan, GHG Emissions Inventory and progress reports publicly available

### Greenhouse Gas Emissions Inventories

A GHG Emissions Inventory is an accounting of the amount of GHGs emitted to or removed from the atmosphere over a specific period of time from a spatially and conceptually defined entity (e.g., UW). Conducting a GHG Emissions Inventory provides a measurement by which an institution can monitor the effects of its efforts on GHG emissions.

There are numerous emissions inventory calculators in use by governments, businesses, schools and others around the globe. However, the goal to provide a numerical value for an entity's role in contributing to global climate change is still the same. Almost all GHG emissions calculators convert emissions and energy use data into Carbon Dioxide equivalent units, or CO<sub>2e</sub>. A CO<sub>2e</sub> is calculated based on its Global Warming Potential (GWP), which is the ratio of warming that would result from 1 kg of any GHG to x kg of CO<sub>2</sub> in a fixed period of time. The GWP ratio is the Radiative Forcing (RF) of a given substance being emitted in relation to the RF of CO<sub>2</sub> which, based on wavelength and lifetime, determines the degree to which the gas traps the sun's energy. For instance, the GWP of Methane (CH<sub>4</sub>) is 25, so 1 molecule of CH<sub>4</sub> warms the planet to a similar extent as 25 molecules of CO<sub>2</sub> meaning that emitting 1 kg of CH<sub>4</sub> is equivalent to emitting 25 kg of CO<sub>2</sub>. This methodology allows for a standardized unit of comparison between various gases and facilitates meaningful comparisons both within and among measuring entities (IPCC 2007).

The calculator recommended for and used by the vast majority of the ACUPCC signatories, including UW, is the Campus Carbon Calculator (CCC), which also uses CO<sub>2e</sub>. The

CCC was developed by Clean-Air Cool Planet (CA-CP) through a project completed by the University of New Hampshire based on workbooks of the International Panel on Climate Change (IPCC). It is a Microsoft Excel-based spreadsheet tool customized to account for the main emission sources on college and university campuses, including on-campus energy production, purchased electricity, transportation, waste, agriculture, and refrigerants (CA-CP 2008).

### **Global Climate Change**

The ACUPCC and its required GHG Emissions Inventory is a mechanism to address global climate change through awareness of an institution's emissions. The amount of anthropogenically released GHGs, primarily CO<sub>2</sub>, has dramatically increased since pre-industrial times. Current levels of 380 ppm of CO<sub>2</sub> in the atmosphere exceeds historical variations of 180-300 ppm, as does the rate of global temperature rise. GHGs trap solar radiation in the atmosphere, keeping the planet at a hospitable global average temperature. However, when the concentration of GHGs gets too high and too much solar radiation is trapped, the temperature can increase, resulting in changes to global climate patterns (Allali et al. 2007). Human activities have greatly increased the concentration of GHGs in the atmosphere by emitting GHGs through activities such as the burning of fossil fuels for electricity production and transportation. Mitigation actions by colleges and universities to decrease anthropogenic GHG emissions into the atmosphere can set an example for other public and private entities.

## **Greenhouse Gas Emissions Inventory**

### **Methodology**

The FY 2010 GHG emissions inventory for UW was conducted by UW students, Jeff Wenke and Chris Michael, with direction and oversight from the University's Campus Sustainability Committee. Data was collected from the main campus and off campus properties then entered into version 6.4 of the Clean-Air Cool-Planet Campus Carbon Calculator (CCC). In FY09, all prior year data was reentered into this version of the CCC and recalculated to ensure a consistent historical comparison. Several new emissions sources are included beginning with version 6.4, including transportation and distribution losses for steam, water and electricity.

When collecting data, interns verified with campus sources whether or not the data included or excluded properties outside of the main campus to avoid missing information or double counting. In the event the data provided did not include UW property outside of the main campus, satellite properties were contacted for the remaining data, which was then aggregated, with the main campus data before being entered into the CCC spreadsheet for calculation. The resulting data sets include on campus and off campus sources. Appendix D shows each emissions data category and the source from which each was obtained.

The ACUPCC identifies three scopes of emissions that the data categories of the CCC inventory calculator fall into:

- Scope 1 emissions are direct GHG emissions from sources either owned or controlled by the institution. These sources include on-campus stationary fossil fuel combustion, fossil fuel combustion by institution-owned or controlled vehicles, and fugitive emissions. Fugitive emissions are either intentional or unintentional GHG emissions, including Hydrofluorocarbons from refrigeration and air conditioning equipment and CH<sub>4</sub> from institution owned livestock.

- Scope 2 emissions are indirect emissions that are generated in the production of electricity, which is consumed by the university.
- Scope 3 refers to all other indirect emissions that occur as a consequence of activities of the university from sources not owned or controlled by the university.

ACUPCC signatories must report on Scope 1 and 2 emissions, as well as some Scope 3 emissions, including commuting and air travel paid for by or through the university. Emissions data requiring more in depth explanation is detailed below.

### Budget

For this inventory, data concerning the University budget is divided into three categories: operational budget, research dollars and energy budget. It is important to note that the data for these three categories were collected separately from different entities on campus, but the operational budget does include the entire energy budget, as well as some of the funds used for research.

The energy budget must be subtracted from the operational budget to ensure that it is not counted twice, and this fact must be noted when interpreting data outcomes. Furthermore, the CA-CP calculator instructs users to include the combined costs of purchased electricity, chilled and steamed water and any other purchases for the production of On-Campus Stationary sources of energy (i.e. heating, cooling, etc.). Therefore, UW's current energy budget includes purchased electricity, coal, propane and natural gas. Water is not included because the water used and purchased by the university does not go towards energy production.

Research dollars are not included in the operational budget. Research funds are separate monetary awards or grants to the University for specific research projects. The research money included in the operational budget is a much lower amount that primarily covers personnel costs which the additional research money does not cover, so there is no double-counting.

All three budget categories include data from UW's satellite locations and properties. Future interns should ensure this is still the case when collecting data on UW's budget.

### Building Space

Data regarding total building space was taken from the campus master building list. Square footage for total building research space was obtained from UW Real Estate Operations and excludes satellite building space with utilities not paid for by the University.

The demolition of old buildings and addition of new buildings each year effectively alters the building space numbers. Research space was included in total building space. This is not considered double counting because the two numbers are graphed separately and this inclusion follows the CA-CP calculator guide.

### On-Campus Stationary

When calculating and converting total emissions in Metric Tons (MT) of CO<sub>2e</sub> from original units, the CA-CP calculator automatically combines the components of on-campus stationary sources (currently including coal, natural gas and propane) into one total figure of MT CO<sub>2e</sub>. In order to calculate and convert the individual components of on-campus stationary

sources into MT of CO<sub>2e</sub>, a separate spreadsheet was used. The emissions factors are approximations showing the amount of MT of CO<sub>2e</sub> per given unit of an individual emission source (e.g., MT of CO<sub>2e</sub> per Short Ton of coal). These emissions factors from the calculator were multiplied by the amount of each on-campus stationary source in its own unit of measure to determine their individual contributions to UW's GHG emissions. The separate calculations, which are included in Appendix C, will provide valuable information to UW in evaluating progress toward energy reduction goals included in the University's Climate Action Plan.

### Commercial Air Travel

Commercial airline miles were first calculated by finding the total number of flights paid for by the University. This information was either tracked through departmental receipts kept on record by Accounts Payable or on receipts from UW employee debit cards, called the Procurement Card, or P-Card. A new account code for flight purchases was implemented at the beginning of FY 2010 (July 1, 2009) by Accounts Payable, which began separating flight receipts from travel reimbursements. Although the new coding system has reduced some of the inaccuracies from previous year's inventories, results are thought to be still slightly equivocal.

In order to estimate the total airline miles, Accounts Payable and P-Card receipts under \$100 that had information designating them as a travel reimbursement for something other than airline travel were disregarded. To estimate total airline miles traveled, a random sample of 40 flight receipts were used. The average miles flown per ticket for the 40 flights was calculated and multiplied by the total number of flights found through Accounts Payable and the P-Card. This yielded the estimated total amount of commercial airline miles flown for FY 2010. This method is consistent with the method used for calculating commercial air travel for previous fiscal years for the purposes of this inventory.

Due to the P-Card dataset not containing destinations within the information, the sample was only taken from the Accounts Payable flight receipts because the P-Card data does not include destinations so flight mileage could not be determined. Until flight records are tracked by mileage from both Accounts Payable and the P-Card, commercial air travel will remain a derived estimate.

### **Physical and Temporal Boundaries**

The physical boundaries of this emissions inventory extended beyond the main campus to include off campus property owned by UW within the state of Wyoming. The ACUPCC requires participating institutions to calculate and report emissions in periods of one year, either calendar, fiscal, or academic. This inventory calculates and reports data according to the fiscal year (July 1 through June 30).

### **UW Inventory**

The American College and University Presidents Climate Commitment (ACUPCC) recommends that colleges and universities utilize the CCC to conduct their emissions inventory, although this recommendation is not a requirement since some signatories have already completed emissions inventories utilizing different calculators. Additionally, some institutions

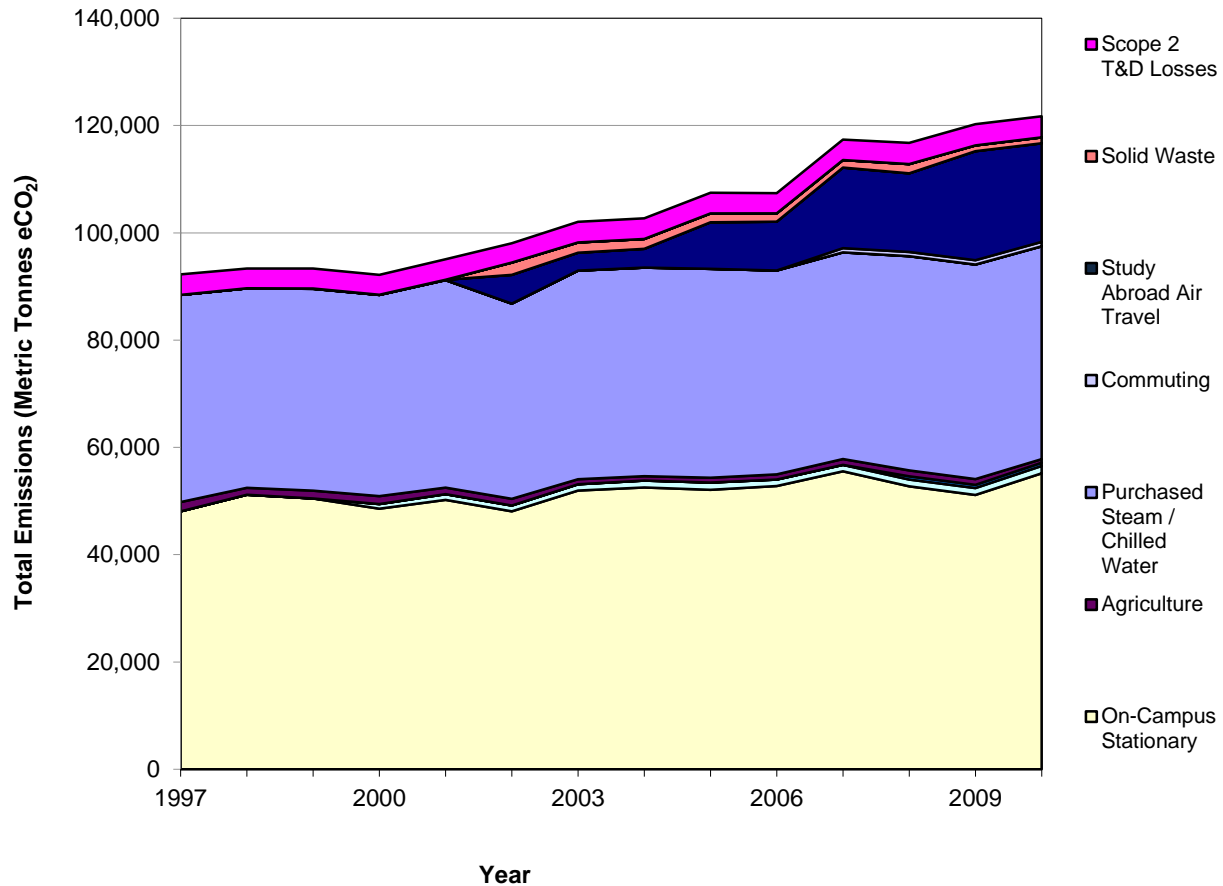


are enrolled in programs such as the Chicago Climate Exchange or the California Climate Action Registry, that require emissions be calculated in a specific manner. In light of this, signatories are allowed to use any emissions inventory calculator that is “consistent with the standards of the Greenhouse Gas Protocol” (Dautremont-Smith 2007). The CCC is designed specifically for colleges and universities. It is the most common inventory tool for colleges and universities, facilitating comparability and consistency. For these reasons, the CCC v6.4 is the calculator used for the UW GHG emissions inventory.

The main input fields and data sources are listed in Appendix A. Some of the categories are entered solely for reporting and comparison purposes. For instance, the budget data includes input fields for the operating budget, research dollars, and energy budget. This information does not impact the emissions calculations, but is used to generate reports and graphs comparing the budget data to emissions. Likewise, population and physical size are not themselves used in the calculator to determine emissions. Rather, the information is used to generate reports such as per capita emissions.

## Findings

During FY 2010, the University of Wyoming emitted a gross total of 121,716 metric tons of CO<sub>2e</sub>. Subtracting 9 metric tons CO<sub>2e</sub> of offsets gives a net total of 121,707 metric tons of CO<sub>2e</sub>. This is an increase in emissions from FY 2009’s net total of 120,238 metric tons of CO<sub>2e</sub>. The net difference of 1469 metric tons is an increase equivalent to 1%. More detail addressing differences in the distribution of the sources of these emissions will be explained later in this section. **Figure 1** shows the overall trend in UW’s net emissions, by source, from 1997-2010.



**Figure 2.** UW greenhouse gas emissions by source, 1997 – 2010, reported as metric tons of CO<sub>2e</sub>.

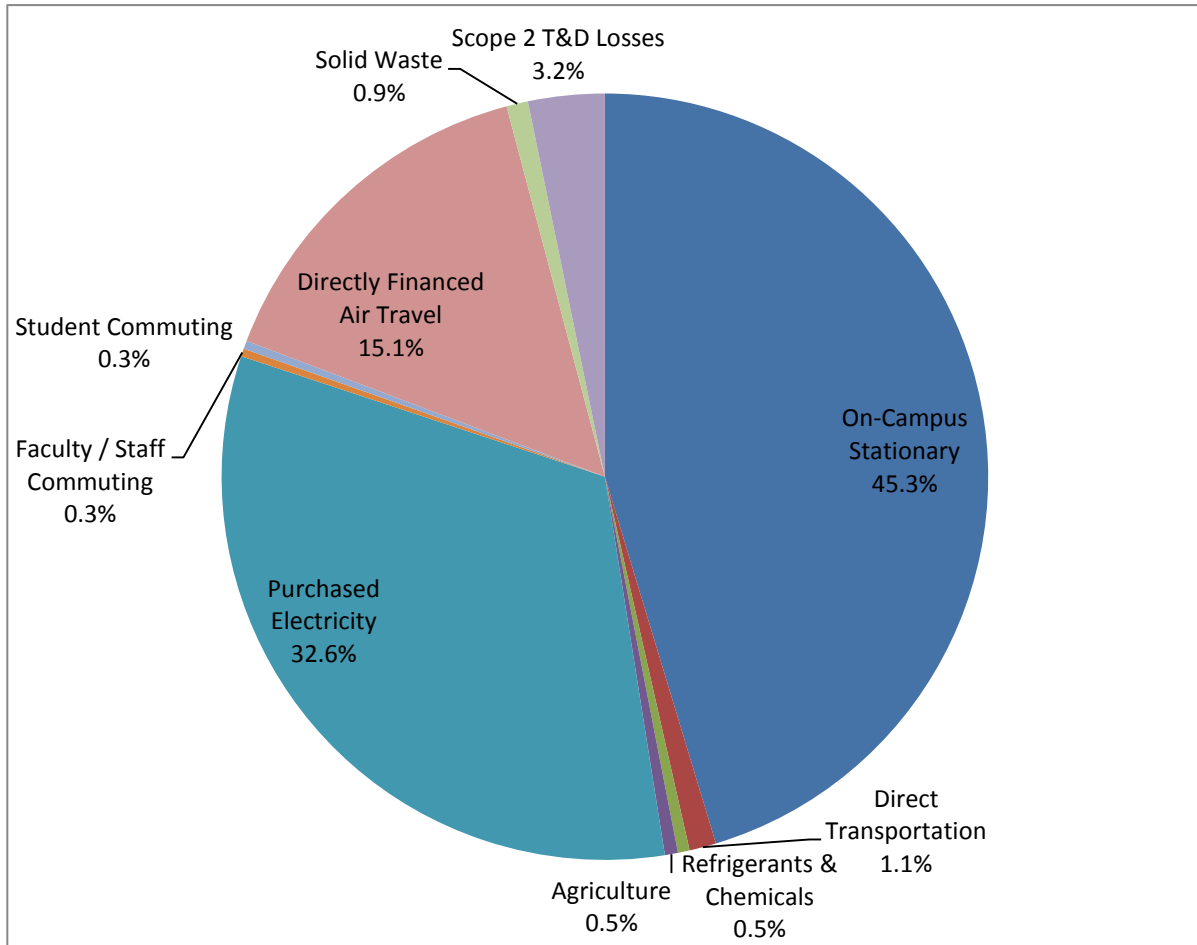
The amount of purchased electricity decreased 0.8% from FY 2009 to FY 2010. On-campus stationary emissions increased approximately 7.9% from FY 2009 to FY 2010. The CA-CP calculator defines on-campus stationary sources as energy sources that generate emissions on campus for the production of heat, cooling, cooking and other campus uses. UW’s current on-campus stationary sources include coal, natural gas and propane, with coal being the largest emitter and propane being the smallest. Please see Appendix A for the individual unit amounts before they were converted to CO<sub>2e</sub> and combined into the total on-campus stationary value. The amount of on-campus stationary is up quite a bit from last year but this could be due to abnormally warm winter last year compared to the past few years.

Transportation decreased 8% from last year although student population is up from last year. Emissions of flights have decreased 10.5% from FY 2009 to FY 2010 This is likely due to better airline flight record keeping.

Agriculture has dropped substantially from last year, but this is due to smaller amount of livestock currently at the University. Solid waste is steady from last year. Both of these sources are rather insignificant relative to UW’s total emissions. The same value for refrigerants was used from the previous year because of a lack of tracking information.

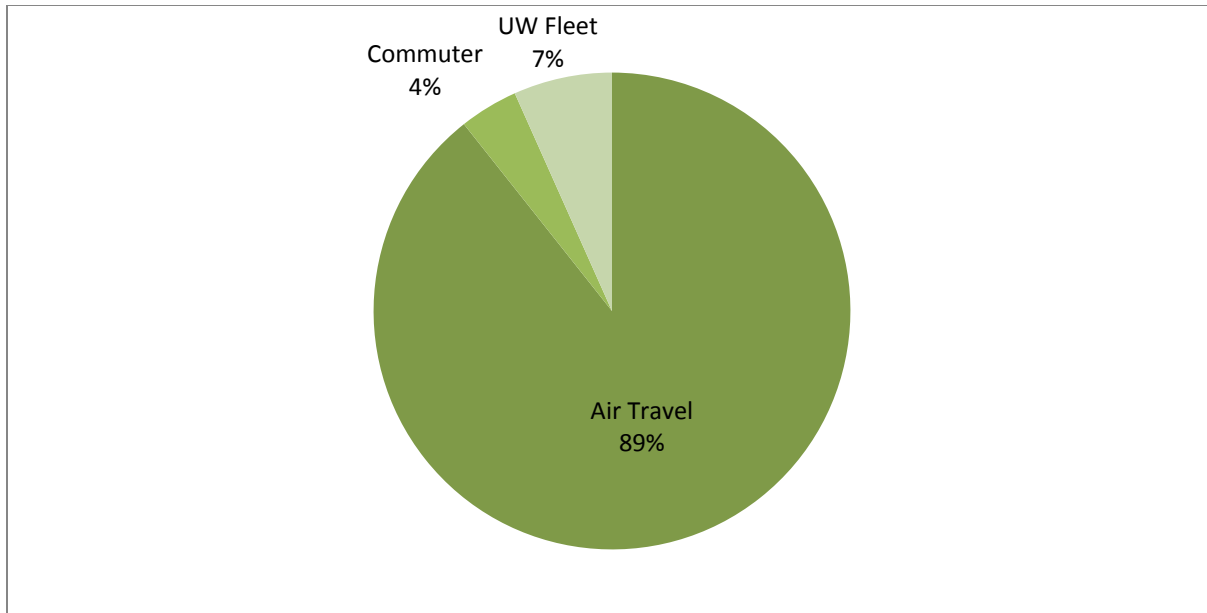
The percentage of emissions from each CA-CP category source is shown in **Figure 2** to provide a visual breakdown of UW’s contributions to GHGs. The CA-CP combines components for some categories of UW’s emissions sources. Both transportation and on-campus stationary

emissions consist of multiple components, as described previously for **Figure 1**. Electricity (33%), stationary (45%), and air travel (15%), are the major contributors to CO<sub>2e</sub> GHG emissions at UW. This distribution is consistent with other colleges and universities that have completed an emissions inventory.



**Figure 2.** FY2010 percentage contributions to UW’s total GHG emissions by source.

**Figure 3** shows a percentage breakdown of the components for transportation emissions. As shown, air travel contributes 89% of the total transportation emissions.



**Figure 3.** FY 2010 percentage contributions to UW's transportation emissions.

### Recommendations

Upon completing the UW GHG inventory for FY 2010, the following recommendations suggest how the inventory may be expanded and/or improved in the future. These recommendations are aimed at improving accuracy of information and comprehensiveness of the report.

- Devising a methodology for including paper purchasing and wastewater treatment should be investigated to improve the accuracy for the net emissions total.
- Customization to conditions at UW should continue to be investigated so that the Custom Fuel Mix feature of the CCC can be used. It is recommended that the heat content value of coal specific to UW's Central Energy Plant be utilized.
- A commuter survey, designed to gather data required for the GHG inventory, should be conducted in FY12. Due to the current and ongoing expansion of the University shuttle system, as well as the fact that a commuter survey has not been conducted since 2007, we recommend another survey be conducted to update data and trends. The GHG Protocol tool CO<sub>2</sub> Emissions from Employee Commuting v. 2.0 (WRI 2006) contains an MS Excel-based survey. This employee survey could be modified for students, faculty, and staff at UW and dispersed electronically to the UW community.
- To produce a more accurate total airline mileage, it is suggested that the P-Card receipts also list departing location and destination. Including whether the flight was one-way or round-trip will also help to reduce inaccuracies within the survey.

### References

Allali A, Bojariu R, Diaz S, Elgizouli I, Griggs D, Hawkins D, Hohmeyer O, Jallow BP, Kajfez-Bogata L, Leary N, Lee H, Wratt D, editors . 2007. Climate change 2007: synthesis report. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. 52p.

Clean Air-Cool Planet (CA-AP). 2008. Campuses for climate action program. [cited in 2008 March 5]. Available from <http://www.cleanair-coolplanet.org>.

## Appendix A: GHG Emissions Inventory CA-CP Calculator Data Sheets

(Note: FY 2007 was the first year UW conducted a GHG inventory and historical data was collected to provide a ten year analysis period. In some cases data was accessible for FYs prior to 1997, the earliest being 1990. Data is shown from the earliest year collected and recorded to provide for as much trend analysis as possible. Blanks indicate missing/unknown data, as opposed to 0, which indicates no (known) quantity exists for UW.

| Fiscal Year | Institutional Data                                |                  |                 |
|-------------|---|------------------|-----------------|
|             | <a href="#">Budget - Click here to enter data</a> |                  |                 |
|             | Operating Budget                                  | Research Budget  | Energy Budget   |
|             | \$ (2005)   | \$ (2005)        | \$ (2005)       |
| 1990        | \$ 289,436,453.73                                 | \$ 45,736,941.27 | \$ -            |
| 1991        | \$ 291,085,909.64                                 | \$ 43,708,913.63 | \$ -            |
| 1992        | \$ 290,181,923.52                                 | \$ 48,165,018.06 | \$ -            |
| 1993        | \$ 289,027,487.74                                 | \$ 47,488,988.77 | \$ -            |
| 1994        | \$ 278,022,127.79                                 | \$ 47,065,356.97 | \$ -            |
| 1995        | \$ 292,056,382.77                                 | \$ 48,086,686.20 | \$ -            |
| 1996        | \$ 290,334,318.50                                 | \$ 50,200,351.77 | \$ -            |
| 1997        | \$ 297,420,629.18                                 | \$ 52,119,267.94 | \$ -            |
| 1998        | \$ 284,950,396.53                                 | \$ 52,614,587.19 | \$ -            |
| 1999        | \$ 294,453,656.47                                 | \$ 52,371,002.73 | \$ -            |
| 2000        | \$ 279,010,407.58                                 | \$ 51,434,616.88 | \$ -            |
| 2001        | \$ 285,009,871.45                                 | \$ 54,284,187.96 | \$ 917,755.77   |
| 2002        | \$ 281,575,319.39                                 | \$ 55,119,266.45 | \$ 844,576.18   |
| 2003        | \$ 298,209,967.18                                 | \$ 57,355,268.22 | \$ 3,241,245.66 |
| 2004        | \$ 289,699,510.95                                 | \$ 62,194,621.67 | \$ 3,416,943.89 |
| 2005        | \$ 302,707,265.99                                 | \$ 63,369,136.61 | \$ 3,817,988.13 |
| 2006        | \$ 290,117,383.97                                 | \$ 65,182,135.63 | \$ 3,895,617.49 |
| 2007        | \$ 312,922,558.64                                 | \$ 64,219,403.70 | \$ 4,201,420.68 |
| 2008        | \$ 320,367,758.14                                 | \$ 65,555,944.79 | \$ 4,854,003.46 |
| 2009        | \$ 384,380,857.19                                 | \$ 73,609,890.33 | \$ 5,812,932.39 |
| 2010        | \$ 385,057,632.88                                 | \$ 90,602,343.23 | \$ 6,321,280    |

| Fiscal Year | Institutional Data |                    |                        |             |             |
|-------------|--------------------|--------------------|------------------------|-------------|-------------|
|             | Population         |                    |                        |             |             |
|             | Full Time Students | Part-Time Students | Summer School Students | Faculty     | Staff       |
|             | #                  | #                  | #                      | #           | #           |
| 1990        | 8797               | 4723               | 3474                   | 612         | 1920        |
| 1991        | 8682               | 4921               | 3877                   | 613         | 1920        |
| 1992        | 8698               | 4761               | 3761                   | 635         | 1920        |
| 1993        | 8584               | 4474               | 3466                   | 600         | 1920        |
| 1994        | 8551               | 4076               | 3241                   | 591         | 2073        |
| 1995        | 8564               | 3953               | 3106                   | 635         | 2073        |
| 1996        | 8412               | 3477               | 2700                   | 626         | 2035        |
| 1997        | 8354               | 3524               | 2622                   | 620         | 2035        |
| 1998        | 8139               | 3336               | 2579                   | 615         | 2024        |
| 1999        | 8230               | 3315               | 2536                   | 612         | 2024        |
| 2000        | 8111               | 3223               | 2488                   | 606         | 1926        |
| 2001        | 8147               | 3628               | 2831                   | 596         | 1926        |
| 2002        | 8435               | 4037               | 3098                   | 604         | 1907        |
| 2003        | 8580               | 4208               | 3171                   | 612         | 1907        |
| 2004        | 8610               | 4384               | 3204                   | 624         | 2122        |
| 2005        | 8744               | 4287               | 3369                   | 643         | 2122        |
| 2006        | 8620               | 4306               | 3106                   | 651         | 2182        |
| 2007        | 8659               | 3606               | 3080                   | <b>1115</b> | <b>1750</b> |
| 2008        | 8798               | 4,172              | 2,811                  | 1,044       | 1,736       |
| 2009        | 8,960              | 4,144              | 4,028                  | 1,090       | 1,803       |
| 2010        | 9,407              | 4,060              | 4,326                  | 1,151       | 1,735       |

| Fiscal Year | Institutional Data   |                               |
|-------------|----------------------|-------------------------------|
|             | Physical Size        |                               |
|             | Total Building Space | Total Research Building Space |
|             | Square feet          | Square feet                   |
| 1990        | 6,366,700            | 1,147,299                     |
| 1991        | 6366700              | 1,147,299                     |
| 1992        | 6366700              | 1,147,299                     |
| 1993        | 6511900              | 1,148,091                     |
| 1994        | 6544146              | 1,149,529                     |
| 1995        | 6653146              | 1,149,529                     |
| 1996        | 6718146              | 1,171,187                     |
| 1997        | 6718146              | 1,171,187                     |
| 1998        | 6718652              | 1,171,693                     |
| 1999        | 6718652              | 1,171,693                     |
| 2000        | 6718652              | 1,171,693                     |
| 2001        | 6796102              | 1,172,597                     |
| 2002        | 6799145              | 1,172,597                     |
| 2003        | 6802745              | 1,172,597                     |
| 2004        | 6813324              | 1,172,597                     |
| 2005        | 6925267              | 1,224,617                     |
| 2006        | 6913471              | 1,224,617                     |
| 2007        | 7068817              | 1,218,098                     |
| 2008        | 7208817              | 797,032                       |
| 2009        | 7249000              | 807,648                       |
| 2010        | 7450000              | 810,000                       |

| Fiscal Year | On-Campus Stationary               |               |                   |
|-------------|------------------------------------|---------------|-------------------|
|             | Other On-Campus Stationary Sources |               |                   |
|             | Natural Gas                        | LPG (Propane) | Coal (Steam Coal) |
|             | MMBtu                              | Gallons       | Short Tons        |
| 1990        |                                    |               |                   |
| 1991        |                                    |               |                   |
| 1992        |                                    |               |                   |
| 1993        |                                    |               |                   |
| 1994        |                                    |               |                   |
| 1995        |                                    |               | 20233             |
| 1996        |                                    |               | 19443             |
| 1997        | 58,807                             |               | 22717             |
| 1998        | 104,822                            |               | 22995             |
| 1999        | 98,058                             |               | 22892             |
| 2000        | 96,486                             |               | 21963             |
| 2001        | 103,020                            |               | 22787             |
| 2002        | 102,155                            |               | 21864             |
| 2003        | 104,706                            |               | 23958             |
| 2004        | 115,315                            |               | 24097             |
| 2005        | 108,453                            |               | 24059             |
| 2006        | 113,063                            |               | 24297             |
| 2007        | 107,146                            | 6,841         | 25864             |
| 2008        | 103,403                            | 8,867         | 24510             |
| 2009        | 100,913                            | 6,416         | 23,749            |
| 2010        | 118,180                            | 5,418         | 27,137            |



| Fiscal Year | Direct Transportation Sources |              |
|-------------|-------------------------------|--------------|
|             | University Fleet              |              |
|             | Gasoline Fleet                | Diesel Fleet |
|             | Gallons                       | Gallons      |
| 1990        |                               |              |
| 1991        |                               |              |
| 1992        |                               |              |
| 1993        |                               |              |
| 1994        |                               |              |
| 1995        |                               |              |
| 1996        |                               |              |
| 1997        |                               |              |
| 1998        |                               |              |
| 1999        |                               |              |
| 2000        | 81,930                        | 12,987       |
| 2001        | 101,363                       | 16,520       |
| 2002        | 99,005                        | 19,805       |
| 2003        | 97,870                        | 29,686       |
| 2004        | 103,370                       | 36,341       |
| 2005        | 104,362                       | 41,560       |
| 2006        | 96,069                        | 34,851       |
| 2007        | 94,888                        | 35,091       |
| 2008        | 98,304                        | 38,386       |
| 2009        | 96,729                        | 41,822       |
| 2010        | 99,441                        | 50,511       |

| Fiscal Year | Refrigerants & Chemicals |          |         |
|-------------|--------------------------|----------|---------|
|             | Refrigerants & Chemicals |          |         |
|             | HFC-134a                 | HFC-404a | HCFC-22 |
|             | Pounds                   | Pounds   | Pounds  |
| 2008        | 33                       | 190      | 390     |
| 2009        | 33                       | 190      | 390     |
| 2010        | 33                       | 190      | 390     |

| Fiscal Year | Agriculture Sources    |            |
|-------------|------------------------|------------|
|             | Fertilizer Application |            |
|             | Synthetic              | % Nitrogen |
|             | Pounds                 | %          |
| 2007        | 30,746                 | 21%        |
| 2008        | 33,456                 | 21%        |
| 2009        | 48,594                 | 14.50%     |
| 2010        | 46,114                 | 14.50%     |

| Fiscal Year | Agricultural Resources |           |       |       |       |        |
|-------------|------------------------|-----------|-------|-------|-------|--------|
|             | Animal Husbandry       |           |       |       |       |        |
|             | Dairy Cows             | Beef Cows | Swine | Goats | Sheep | Horses |
|             | #                      | #         | #     | #     | #     | #      |
| 1990        |                        |           |       |       |       |        |
| 1991        |                        |           |       |       |       |        |
| 1992        |                        |           |       |       |       |        |
| 1993        |                        |           |       |       |       |        |
| 1994        | 152                    | 1,168     | 346   | 0     | 1,559 | 11     |
| 1995        | 156                    | 926       | 159   | 0     | 1,524 | 11     |
| 1996        | 163                    | 858       | 199   | 0     | 1,855 | 11     |
| 1997        | 146                    | 788       | 116   | 1     | 1,422 | 7      |
| 1998        | 0                      | 909       | 99    | 1     | 1,189 | 6      |
| 1999        | 0                      | 1,016     | 207   | 1     | 1,184 | 6      |
| 2000        | 0                      | 1,023     | 268   | 1     | 1,142 | 6      |
| 2001        | 0                      | 853       | 180   | 1     | 976   | 5      |
| 2002        | 0                      | 880       | 238   | 1     | 850   | 4      |
| 2003        | 0                      | 652       | 97    | 1     | 851   | 4      |
| 2004        | 0                      | 537       | 143   | 1     | 788   | 4      |
| 2005        | 0                      | 629       | 159   | 1     | 681   | 4      |
| 2006        | 0                      | 646       | 128   | 0     | 964   | 4      |
| 2007        | 0                      | 705       | 137   | 0     | 1,103 | 4      |
| 2008        | 0                      | 728       | 92    | 0     | 1,118 | 3      |
| 2009        | 0                      | 693       | 112   | 0     | 1,140 | 2      |
| 2010        | 0                      | 763       | 116   | 0     | 1,190 | 2      |

| Fiscal Year | --- Scope 2 Emissions Sources ---               |                                       |                                       |
|-------------|---|---------------------------------------|---------------------------------------|
|             | Purchased Electricity, Steam, and Chilled Water |                                       |                                       |
|             | Electricity                                     | Steam                                 | Chilled Water                         |
|             | <a href="#">CLICK TO SET eGRID SUBREGION</a>    | <a href="#">CLICK TO SET FUEL MIX</a> | <a href="#">CLICK TO SET FUEL MIX</a> |
|             | kWh   | MMBtu                                 | MMBtu                                 |
| 1990        |   |                                       |                                       |
| 1991        |   |                                       |                                       |
| 1992        | 53,445,897                                      | -                                     | -                                     |
| 1993        | 53,941,369                                      | -                                     | -                                     |
| 1994        | 52,184,047                                      | -                                     | -                                     |
| 1995        | 56,167,979                                      | -                                     | -                                     |
| 1996        | 46,972,247                                      | -                                     | -                                     |
| 1997        | 60,338,399                                      | -                                     | -                                     |
| 1998        | 58,092,656                                      | -                                     | -                                     |
| 1999        | 58,793,723                                      | -                                     | -                                     |
| 2000        | 58,604,939                                      | -                                     | -                                     |
| 2001        | 60,436,600                                      | -                                     | -                                     |
| 2002        | 56,858,767                                      | -                                     | -                                     |
| 2003        | 60,759,668                                      | -                                     | -                                     |
| 2004        | 60,748,033                                      | -                                     | -                                     |
| 2005        | 60,840,819                                      | -                                     | -                                     |
| 2006        | 59,372,098                                      | -                                     | -                                     |
| 2007        | 63,602,733                                      | -                                     | -                                     |
| 2008        | 65,921,694                                      | -                                     | -                                     |
| 2009        | 66,024,455                                      | -                                     | -                                     |
| 2010        | 66,990,963                                      | -                                     | -                                     |

| Fiscal Year | --- Scope 3 Emissions Sources ---                    |        |            |                  |                      |         |            |                  |
|-------------|--|--------|------------|------------------|----------------------|---------|------------|------------------|
|             | <a href="#">Commuting - click here to enter data</a> |        |            |                  |                      |         |            |                  |
|             | Faculty / Staff<br>Commuting                         |        |            |                  | Student<br>Commuting |         |            |                  |
|             | Automobile   | Bus    | Light Rail | Commuter<br>Rail | Automobile           | Bus     | Light Rail | Commuter<br>Rail |
|             | Miles  | Miles  | Miles      | Miles            | Miles                | Miles   | Miles      | Miles            |
| 2007        | 972,468  | 21,476 | -          | -                | 747,978              | 332,366 | -          | -                |
| 2008        | 943,616  | 20,839 | -          | -                | 778,148              | 345,772 | -          | -                |
| 2009        | 981,972  | 21,686 | -          | -                | 788,730              | 350,474 | -          | -                |
| 2010        | 951,739  | 21,018 | -          | -                | 751,100              | 333,753 | -          | -                |

| Fiscal Year | Directly Financed Outsourced Travel |          |
|-------------|-------------------------------------|----------|
|             | Air Travel                          |          |
|             | Faculty / Staff                     | Students |
|             | Miles                               | Miles    |
| 1990        |                                     |          |
| 1991        |                                     |          |
| 1992        |                                     |          |
| 1993        |                                     |          |
| 1994        |                                     |          |
| 1995        |                                     |          |
| 1996        |                                     |          |
| 1997        |                                     |          |
| 1998        | 16,100                              |          |
| 1999        | 66,240                              |          |
| 2000        | 36,000                              |          |
| 2001        | 78,433                              |          |
| 2002        | 6,903,773                           |          |
| 2003        | 4,291,792                           |          |
| 2004        | 4,506,532                           |          |
| 2005        | 11,167,532                          |          |
| 2006        | 11,722,533                          |          |
| 2007        | 19,351,563                          |          |
| 2008        | 18,877,452                          |          |
| 2009        | 26,170,530                          |          |
| 2010        | 24,612,175                          |          |

| Fiscal Year | Solid Waste      |
|-------------|------------------|
|             | Landfilled Waste |
|             | No CH4 Recovery  |
|             | Short Tons       |
| 2000        |                  |
| 2001        |                  |
| 2002        | 2,111            |
| 2003        | 1,766            |
| 2004        | 1,696            |
| 2005        | 1,528            |
| 2006        | 1,433            |
| 2007        | 1,295            |
| 2008        | 1,593            |
| 2009        | 999              |
| 2010        | 1,099            |

| Fiscal Year | Non-Additional Renewable Energy Certificates (RECs) |
|-------------|---|
|             | Green Power Certificates                            |
|             | kWh   |
| 2006        |   |
| 2007        |   |
| 2008        | 16,200  |
| 2009        | 15,600  |
| 2010        | 14,800  |

## Appendix B: GHG Emissions Inventory Data After Conversion to Metric Tons of CO2e

(Note: All amounts are in Metric Tons of CO2e)

| Fiscal Year | Scope 1             |                     |                            |                       |                     |                          |                     |
|-------------|---------------------|---------------------|----------------------------|-----------------------|---------------------|--------------------------|---------------------|
|             | Co-gen Electricity  | Co-gen Steam        | Other On-Campus Stationary | Direct Transportation | Electric Fleet      | Refrigerants & Chemicals | Agriculture         |
|             | MT eCO <sub>2</sub> | MT eCO <sub>2</sub> | MT eCO <sub>2</sub>        | MT eCO <sub>2</sub>   | MT eCO <sub>2</sub> | MT eCO <sub>2</sub>      | MT eCO <sub>2</sub> |
| 1990        | -                   | -                   | -                          | -                     | -                   | -                        | -                   |
| 1991        | -                   | -                   | -                          | -                     | -                   | -                        | -                   |
| 1992        | -                   | -                   | -                          | -                     | -                   | -                        | -                   |
| 1993        | -                   | -                   | -                          | -                     | -                   | -                        | -                   |
| 1994        | -                   | -                   | -                          | -                     | -                   | -                        | 2,279.0             |
| 1995        | -                   | -                   | 40,391.4                   | -                     | -                   | -                        | 1,970.0             |
| 1996        | -                   | -                   | 38,649.0                   | -                     | -                   | -                        | 1,968.1             |
| 1997        | -                   | -                   | 48,078.5                   | -                     | -                   | -                        | 1,731.5             |
| 1998        | -                   | -                   | 51,173.5                   | -                     | -                   | -                        | 1,291.6             |
| 1999        | -                   | -                   | 50,475.5                   | -                     | -                   | -                        | 1,456.7             |
| 2000        | -                   | -                   | 48,575.0                   | 861.7                 | -                   | -                        | 1,476.7             |
| 2001        | -                   | -                   | 50,211.8                   | 1,070.6               | -                   | -                        | 1,219.9             |
| 2002        | -                   | -                   | 48,082.2                   | 1,082.8               | -                   | -                        | 1,246.1             |
| 2003        | -                   | -                   | 51,954.9                   | 1,171.1               | -                   | -                        | 938.5               |
| 2004        | -                   | -                   | 52,530.5                   | 1,288.7               | -                   | -                        | 813.0               |
| 2005        | -                   | -                   | 52,094.1                   | 1,350.1               | -                   | -                        | 901.7               |
| 2006        | -                   | -                   | 52,796.9                   | 1,208.5               | -                   | -                        | 964.7               |
| 2007        | -                   | -                   | 55,540.3                   | 1,200.4               | -                   | -                        | 1,088.5             |
| 2008        | -                   | -                   | 52,744.4                   | 1,264.1               | -                   | 601.1                    | 1,103.0             |
| 2009        | -                   | -                   | 51,133.1                   | 1,284.6               | -                   | 601.1                    | 1,074.5             |
| 2010        | -                   | -                   | 55,163.2                   | 1,375.5               | -                   | 601.1                    | 669.4               |

| Fiscal Year | Scope 2               |                                 |
|-------------|-----------------------|---------------------------------|
|             | Purchased Electricity | Purchased Steam / Chilled Water |
|             | MT eCO <sub>2</sub>   | MT eCO <sub>2</sub>             |
| 1990        | -                     | -                               |
| 1991        | -                     | -                               |
| 1992        | 34,208.4              | -                               |
| 1993        | 34,525.5              | -                               |
| 1994        | 33,400.7              | -                               |
| 1995        | 35,950.6              | -                               |
| 1996        | 30,064.9              | -                               |
| 1997        | 38,619.9              | -                               |
| 1998        | 37,182.5              | -                               |
| 1999        | 37,631.3              | -                               |
| 2000        | 37,510.4              | -                               |
| 2001        | 38,682.8              | -                               |
| 2002        | 36,392.8              | -                               |
| 2003        | 38,889.6              | -                               |
| 2004        | 38,882.1              | -                               |
| 2005        | 38,941.5              | -                               |
| 2006        | 38,001.5              | -                               |
| 2007        | 38,522.6              | -                               |
| 2008        | 39,927.1              | -                               |
| 2009        | 39,989.4              | -                               |
| 2010        | 39,676.9              | -                               |

| Scope 3     |                           |                     |                              |                                |                         |                     |            |                  |                     |
|-------------|---------------------------|---------------------|------------------------------|--------------------------------|-------------------------|---------------------|------------|------------------|---------------------|
| Fiscal Year | Faculty / Staff Commuting | Student Commuting   | Directly Financed Air Travel | Other Directly Financed Travel | Study Abroad Air Travel | Solid Waste         | Wastewater | Paper Purchasing | Scope 2 T&D Losses  |
|             | MT eCO <sub>2</sub>       | MT eCO <sub>2</sub> | MT eCO <sub>2</sub>          | MT eCO <sub>2</sub>            | MT eCO <sub>2</sub>     | MT eCO <sub>2</sub> |            |                  | MT eCO <sub>2</sub> |
| 1990        | -                         | -                   | -                            | -                              | -                       | -                   | -          | -                | -                   |
| 1991        | -                         | -                   | -                            | -                              | -                       | -                   | -          | -                | -                   |
| 1992        | -                         | -                   | -                            | -                              | -                       | -                   | -          | -                | 3,383.2             |
| 1993        | -                         | -                   | -                            | -                              | -                       | -                   | -          | -                | 3,414.6             |
| 1994        | -                         | -                   | -                            | -                              | -                       | -                   | -          | -                | 3,303.4             |
| 1995        | -                         | -                   | -                            | -                              | -                       | -                   | -          | -                | 3,555.6             |
| 1996        | -                         | -                   | -                            | -                              | -                       | -                   | -          | -                | 2,973.4             |
| 1997        | -                         | -                   | -                            | -                              | -                       | -                   | -          | -                | 3,819.6             |
| 1998        | -                         | -                   | 13.1                         | -                              | -                       | -                   | -          | -                | 3,677.4             |
| 1999        | -                         | -                   | 52.9                         | -                              | -                       | -                   | -          | -                | 3,721.8             |
| 2000        | -                         | -                   | 28.0                         | -                              | -                       | -                   | -          | -                | 3,709.8             |
| 2001        | -                         | -                   | 60.9                         | -                              | -                       | -                   | -          | -                | 3,825.8             |
| 2002        | -                         | -                   | 5,359.7                      | -                              | -                       | 2,288.7             | -          | -                | 3,599.3             |
| 2003        | -                         | -                   | 3,331.9                      | -                              | -                       | 1,914.3             | -          | -                | 3,846.2             |
| 2004        | -                         | -                   | 3,498.6                      | -                              | -                       | 1,839.2             | -          | -                | 3,845.5             |
| 2005        | -                         | -                   | 8,669.8                      | -                              | -                       | 1,656.8             | -          | -                | 3,851.4             |
| 2006        | -                         | -                   | 9,100.6                      | -                              | -                       | 1,554.1             | -          | -                | 3,758.4             |
| 2007        | 398.1                     | 386.5               | 15,023.3                     | -                              | -                       | 1,403.9             | -          | -                | 3,809.9             |
| 2008        | 386.3                     | 402.0               | 14,655.3                     | -                              | -                       | 1,727.3             | -          | -                | 3,948.8             |
| 2009        | 402.0                     | 407.5               | 20,317.1                     | -                              | -                       | 1,082.7             | -          | -                | 3,955.0             |
| 2010        | 399.4                     | 419.7               | 18,381.4                     | -                              | -                       | 1,105.5             | -          | -                | 3,924.1             |



| Offsets     |                     |                     |
|-------------|---------------------|---------------------|
| Fiscal Year | Additional          | Non-Additional      |
|             | MT eCO <sub>2</sub> | MT eCO <sub>2</sub> |
| 1990        | -                   | -                   |
| 1991        | -                   | -                   |
| 1992        | -                   | -                   |
| 1993        | -                   | -                   |
| 1994        | -                   | -                   |
| 1995        | -                   | -                   |
| 1996        | -                   | -                   |
| 1997        | -                   | -                   |
| 1998        | -                   | -                   |
| 1999        | -                   | -                   |
| 2000        | -                   | -                   |
| 2001        | -                   | -                   |
| 2002        | -                   | -                   |
| 2003        | -                   | -                   |
| 2004        | -                   | -                   |
| 2005        | -                   | -                   |
| 2006        | -                   | -                   |
| 2007        | -                   | -                   |
| 2008        | -                   | (9.8)               |
| 2009        | -                   | (9.4)               |
| 2010        | -                   | (9.1)               |

| Fiscal Year | Total Scope 1       | Total Scope 2       | Total Scope 3       | Biogenic            | Total Offsets       | Total Emissions     | Net Emissions       |
|-------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|             | MT eCO <sub>2</sub> | MT eCO <sub>2</sub> | MT eCO <sub>2</sub> | MT eCO <sub>2</sub> | MT eCO <sub>2</sub> | MT eCO <sub>2</sub> | MT eCO <sub>2</sub> |
| 1990        | -                   | -                   | -                   | -                   | -                   | -                   | -                   |
| 1991        | -                   | -                   | -                   | -                   | -                   | -                   | -                   |
| 1992        | -                   | 34,208.4            | 3,383.2             | -                   | -                   | 37,591.6            | 37,591.6            |
| 1993        | -                   | 34,525.5            | 3,414.6             | -                   | -                   | 37,940.1            | 37,940.1            |
| 1994        | 2,279.0             | 33,400.7            | 3,303.4             | -                   | -                   | 38,983.1            | 38,983.1            |
| 1995        | 42,361.4            | 35,950.6            | 3,555.6             | -                   | -                   | 81,867.6            | 81,867.6            |
| 1996        | 40,617.1            | 30,064.9            | 2,973.4             | -                   | -                   | 73,655.4            | 73,655.4            |
| 1997        | 49,810.0            | 38,619.9            | 3,819.6             | -                   | -                   | 92,249.5            | 92,249.5            |
| 1998        | 52,465.1            | 37,182.5            | 3,690.5             | -                   | -                   | 93,338.1            | 93,338.1            |
| 1999        | 51,932.3            | 37,631.3            | 3,774.6             | -                   | -                   | 93,338.1            | 93,338.1            |
| 2000        | 50,913.4            | 37,510.4            | 3,737.8             | -                   | -                   | 92,161.7            | 92,161.7            |
| 2001        | 52,502.4            | 38,682.8            | 3,886.7             | -                   | -                   | 95,071.8            | 95,071.8            |
| 2002        | 50,411.1            | 36,392.8            | 11,247.6            | -                   | -                   | 98,051.5            | 98,051.5            |
| 2003        | 54,064.5            | 38,889.6            | 9,092.4             | -                   | -                   | 102,046.5           | 102,046.5           |
| 2004        | 54,632.2            | 38,882.1            | 9,183.3             | -                   | -                   | 102,697.7           | 102,697.7           |
| 2005        | 54,345.9            | 38,941.5            | 14,177.9            | -                   | -                   | 107,465.4           | 107,465.4           |
| 2006        | 54,970.1            | 38,001.5            | 14,413.1            | -                   | -                   | 107,384.6           | 107,384.6           |
| 2007        | 57,829.2            | 38,522.6            | 21,021.7            | -                   | -                   | 117,373.5           | 117,373.5           |
| 2008        | 55,712.6            | 39,927.1            | 21,119.7            | -                   | (9.8)               | 116,759.5           | 116,749.7           |
| 2009        | 54,093.3            | 39,989.4            | 26,164.3            | -                   | (9.4)               | 120,247.0           | 120,237.6           |
| 2010        | 57,809.3            | 39,676.9            | 24,230.1            | -                   | (9.1)               | 121,716.4           | 121,707.3           |

## **Appendix C: Emissions Factors for On-Campus Stationary**

| Natural Gas |                            |                            |                             |
|-------------|----------------------------|----------------------------|-----------------------------|
| Fiscal Year | kg CO <sub>2</sub> / MMBtu | kg CH <sub>4</sub> / MMBtu | kg N <sub>2</sub> O / MMBtu |
| 1990        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1991        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1992        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1993        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1994        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1995        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1996        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1997        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1998        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 1999        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2000        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2001        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2002        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2003        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2004        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2005        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2006        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2007        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2008        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2009        | 52.75574094                | 0.005275                   | 0.0001055                   |
| 2010        | 52.75574094                | 0.005275                   | 0.0001055                   |

| Propane     |                             |                             |                              |
|-------------|-----------------------------|-----------------------------|------------------------------|
| Fiscal Year | kg CO <sub>2</sub> / gallon | kg CH <sub>4</sub> / gallon | kg N <sub>2</sub> O / gallon |
| 1990        | 5.415527764                 | 0.000910565                 | 5.46339E-05                  |
| 1991        | 5.399094438                 | 0.000907802                 | 5.44681E-05                  |
| 1992        | 5.414033825                 | 0.000910314                 | 5.46189E-05                  |
| 1993        | 5.390273168                 | 0.000905793                 | 5.43476E-05                  |
| 1994        | 5.433622564                 | 0.000913077                 | 5.47846E-05                  |
| 1995        | 5.409394889                 | 0.000910063                 | 5.46038E-05                  |
| 1996        | 5.394464183                 | 0.000907551                 | 5.44531E-05                  |
| 1997        | 5.392665554                 | 0.000908305                 | 5.44983E-05                  |
| 1998        | 5.405368807                 | 0.000907802                 | 5.44681E-05                  |
| 1999        | 5.414637998                 | 0.000908305                 | 5.44983E-05                  |
| 2000        | 5.385505759                 | 0.000906044                 | 5.43626E-05                  |
| 2001        | 5.399094438                 | 0.000907802                 | 5.44681E-05                  |
| 2002        | 5.394464183                 | 0.000907551                 | 5.44531E-05                  |
| 2003        | 5.421503518                 | 0.00091157                  | 5.46942E-05                  |
| 2004        | 5.404915677                 | 0.00090931                  | 5.45586E-05                  |
| 2005        | 5.401773284                 | 0.00090931                  | 5.45586E-05                  |
| 2006        | 5.401773284                 | 0.00090931                  | 5.45586E-05                  |
| 2007        | 5.401773284                 | 0.00090931                  | 5.45586E-05                  |
| 2008        | 5.401773284                 | 0.00090931                  | 5.45586E-05                  |
| 2009        | 5.401773284                 | 0.00090931                  | 5.45586E-05                  |
| 2010        | 5.401773284                 | 0.00090931                  | 5.45586E-05                  |

Coal

| Fiscal Year | kg CO <sub>2</sub> / Short Ton | kg CH <sub>4</sub> / Short Ton | kg N <sub>2</sub> O / Short Ton |
|-------------|--------------------------------|--------------------------------|---------------------------------|
| 1990        | 1993.070709                    | 0.22362835                     | 0.033554851                     |
| 1991        | 2014.94396                     | 0.222816                       | 0.03343296                      |
| 1992        | 2019.153949                    | 0.2222674                      | 0.033350644                     |
| 1993        | 1996.065832                    | 0.2216555                      | 0.03325883                      |
| 1994        | 1983.055917                    | 0.22080095                     | 0.033130607                     |
| 1995        | 1981.442818                    | 0.220284                       | 0.03305304                      |
| 1996        | 1972.923156                    | 0.2201785                      | 0.03303721                      |
| 1997        | 1964.608088                    | 0.2197565                      | 0.03297389                      |
| 1998        | 1969.418218                    | 0.22029455                     | 0.033054623                     |
| 1999        | 1963.476292                    | 0.2196299                      | 0.032954894                     |
| 2000        | 1964.419455                    | 0.2197354                      | 0.032970724                     |
| 2001        | 1949.611799                    | 0.21807905                     | 0.032722193                     |
| 2002        | 1937.350683                    | 0.21670755                     | 0.032516403                     |
| 2003        | 1922.825976                    | 0.21508285                     | 0.032272621                     |
| 2004        | 1912.356869                    | 0.2139118                      | 0.032096908                     |
| 2005        | 1912.356869                    | 0.2139118                      | 0.032096908                     |
| 2006        | 1912.356869                    | 0.2139118                      | 0.032096908                     |
| 2007        | 1912.356869                    | 0.2139118                      | 0.032096908                     |
| 2008        | 1912.356869                    | 0.2139118                      | 0.032096908                     |
| 2009        | 1912.356869                    | 0.2139118                      | 0.032096908                     |
| 2010        | 1912.356869                    | 0.2139118                      | 0.032096908                     |

| Fiscal Year | eCO <sub>2</sub>            |                              |                                 |
|-------------|-----------------------------|------------------------------|---------------------------------|
|             | Natural Gas                 | LPG (Propane)                | Coal (Steam Coal)               |
|             | MT eCO <sub>2</sub> / MMBtu | MT eCO <sub>2</sub> / gallon | MT eCO <sub>2</sub> / Short ton |
| 1990        | 0.0529083                   | 0.0054526                    | 2.008146397                     |
| 1991        | 0.0529083                   | 0.0054361                    | 2.029964884                     |
| 1992        | 0.0529083                   | 0.0054511                    | 2.03413789                      |
| 1993        | 0.0529083                   | 0.0054272                    | 2.011008522                     |
| 1994        | 0.0529083                   | 0.0054708                    | 1.997940998                     |
| 1995        | 0.0529083                   | 0.0054465                    | 1.99629305                      |
| 1996        | 0.0529083                   | 0.0054315                    | 1.987766276                     |
| 1997        | 0.0529083                   | 0.0054297                    | 1.979422759                     |
| 1998        | 0.0529083                   | 0.0054424                    | 1.984269161                     |
| 1999        | 0.0529083                   | 0.0054517                    | 1.978282429                     |
| 2000        | 0.0529083                   | 0.0054224                    | 1.979232704                     |
| 2001        | 0.0529083                   | 0.0054361                    | 1.964313387                     |
| 2002        | 0.0529083                   | 0.0054315                    | 1.951959812                     |
| 2003        | 0.0529083                   | 0.0054587                    | 1.937325578                     |
| 2004        | 0.0529083                   | 0.005442                     | 1.926777525                     |
| 2005        | 0.0529083                   | 0.0054388                    | 1.926777525                     |
| 2006        | 0.0529083                   | 0.0054388                    | 1.926777525                     |
| 2007        | 0.0529083                   | 0.0054388                    | 1.926777525                     |
| 2008        | 0.0529083                   | 0.0054388                    | 1.926777525                     |
| 2009        | 0.0529083                   | 0.0054388                    | 1.926777525                     |
| 2010        | 0.052908294                 | 0.005438837                  | 1.926777525                     |

## Appendix D: List of Contacts

| <b>Input</b>                              | <b>University of Wyoming Source</b>                     |
|---|---|
| Institutional data                        |   |
| Budget                                    |   |
| Operating                                 | Budget Office   |
| Research                                  | Office of Research and Economic Development             |
| Energy                                    | Physical Plant  |
| Population                                | Office of Institutional Analysis                        |
| Physical Size                             | Real Estate Operations & University Facilities Planning |
| Purchased electricity                     | Physical Plant  |
| Purchased steam/chilled water             | N/A   |
| On-campus cogeneration plant              | N/A   |
| Stationary sources of emissions on campus | Physical Plant  |
| University fleet                          | Fleet Services  |
| Air travel                                | Accounts Payable  |
| Commuting                                 | Stantec Consulting survey                               |
| Agriculture                               | Various   |
| Solid waste                               | Physical Plant  |
| Refrigeration and other chemicals         | Physical Plant  |
| Offsets                                   | Real Estate Operations and Physical Plant               |