GREENHOUSE GAS EMISSIONS INVENTORY FOR THE UNIVERSITY OF WYOMING: Fiscal Year 2012

by
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For

The Campus Sustainability Committee of the University of Wyoming

And

The American College and University Presidents Climate Commitment

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Abstract

UW conducts a Greenhouse Gas (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.

This document is a narrative report based on the GHG Emissions Inventory of the University of Wyoming (UW) for the Fiscal Year (FY) 2012. The inventory data is included in Appendix A and includes all fiscal years up to the current year.

Version 6.8 of the Campus Carbon Calculator developed by Clean Air Cool Planet was used for this year's calculations.

UW emitted a net total of 140,766 metric tons of eCO_2 during FY 2012, a 3.5% decrease from FY 2011 (145,827 metric tons). The relatively low emissions for this year were due to a lower scope 1 emission. In particular, less use of the on-campus stationary source contributed to the reduced eCO_2 released for FY 2012.

Unlike previous reports, solid waste data and personal mileage reimbursement data was added to the Excel file in this year's report (updated for the earlier FYs too). This inclusion has caused the results for the previous FYs to be different – and in fact higher than what was earlier reported.

Acknowledgements

Apart from my efforts, the success of this project depends largely on the encouragement and guidelines of many others. I take this opportunity to express my gratitude to the people who have been instrumental for the completion of this project. In particular, my greatest appreciation goes to the supervisor Mr. Jim Scott and the Deputy Director of the Physical Plant Mr. Forrest 'Frosty' Selmer. I thank you for your tremendous support.

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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 to commit to neutralizing their (GHG) emissions.

In September 2007, UW President Tom Buchanan signed onto this organization, joining 152 other presidents and chancellors that represented higher education institutions across the United States. 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 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, 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 – in this case the University of Wyoming. 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 eCO_2. An eCO_2 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_2 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_2 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_4) is 25, so 1 molecule of CH_4 warms the planet to a similar extent as 25 molecules of CO_2 meaning that emitting 1 kg of CH_4 is equivalent to emitting 25 kg of CO_2. 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 eCO_2.[1]

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).

Physical and Temporal Boundaries

The physical boundaries of this inventory were 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, 2011 through June 30, 2012).

Methodology for Collection of Data

The FY 2012 GHG emissions inventory for UW was conducted by UW student Rizan Fazily, with direction and oversight from the University's Campus Sustainability Committee. Data was collected from the main campus and off campus properties and then entered into version 6.8 of the Clean-Air Cool-Planet Campus Carbon Calculator (CCC). In FY 2012, all prior year data was reentered into this version of the CCC and recalculated to ensure a consistent historical comparison.

When collecting data, the intern 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 C 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.

- Scope 2 emissions are indirect emissions that are generated in the production of electricity, steam and chilled water.

- 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.

Emissions data and institutional data obtained for UW is explained below. Also, data requiring more in depth analysis is explained.

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.

Other On-Campus Stationary Sources

We do not co-generate here at UW. Hence this data falls under the Other On-Campus Stationary sources category. The fuel sources used for FY 2012 were coal, natural gas and propane. When calculating and converting total emissions in Metric Tons (MT) of eCO_2 from original units, the CA-CP calculator automatically combines the components of on-campus stationary into one total figure of MT eCO_2.

Transportation

The University of Wyoming buys and distributes gasoline and diesel for its own fleet.

Refrigeration

The refrigerants used over here for FY 2012 were HFC-134a and HFC-404a.

Electricity

UW purchases most of its electricity from Rocky Mountain Power and some from Carbon Power & Light. The college does not purchase any steam or chilled water.

Commercial Air Travel

Commercial air travel mileage data has been recorded from FY98 to the present (in the form of money paid) by Accounts Payable at the University of Wyoming. This information was tracked through departmental receipts kept on record. In order to estimate the total airline miles, Accounts Payable receipts under $100 that had information designating them as a travel reimbursement for something other than airline travel were disregarded.

From the fiscal year 1998 to the fiscal year 2008 the following method was applied. 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. This yielded the estimated total amount of commercial airline miles flown.

For the fiscal 2009 to the fiscal year 2012 the following method was applied. A graph containing the real cost per mile versus the year for commercial airline travel was obtained. The total cost for each FY was found out (extrapolation was used for some of the years) and then using the graph the miles travelled was found out. This method was chosen as it did not ignore any data.

Private Air Travel

The University of Wyoming owns two private planes – the N2UW and the N200UW. The miles travelled for FY 2012 was obtained for both aircrafts.

Solid Waste

The solid waste generated is put in a landfill where there is no CH_4 recovery.

Results & Discussion

In FY 2012 the University of Wyoming emitted a gross total of 140,793 metric tons of eCO_2. 27 metric tons of eCO_2 was subtracted as offsets leaving a net total of 140,793 metric tons of eCO_2. This is a decrease in emissions from FY 2011's net total of 145,827 metric tons of eCO_2. The net difference of 5034 metric tons is a decease equivalent to 3.5 %.

The diagram shows the overall trend in UW's net emissions, by source, from 2001-2012.

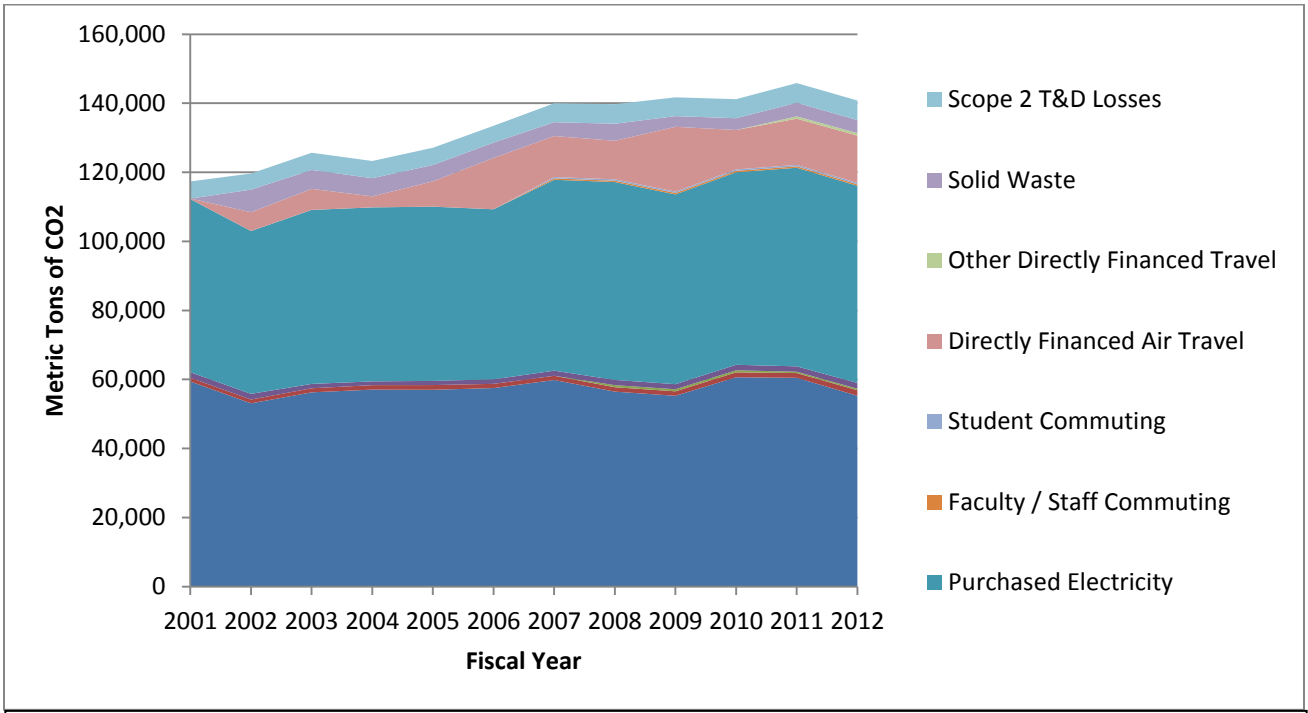

Figure 1: UW greenhouse gas emissions by source, 2001 – 2012, reported as metric tons of eCO_2.

As the above figure shows, the major sources of eCO_2 emission for UW are, purchased electricity, other on-campus stationary sources and directly financed air travel.
Here is a look at how much the emissions from sources compared to the last fiscal year:

- Purchased electricity decreased 0.73%
- Other on-campus stationary sources decreased by 8.63%
- Directly financed air travel increased 2.18%
- Solid Waste decreased by 4.20%
- Agriculture increased by 7.66%
- Direct transportation increased by 19.5%

The ones highlighted in red are the major sources of emission. Generally, it seems that they have decreased in comparison to the last year which is why there is a decrease in the overall emissions. As far as UW was concerned, the other sources did not have a major impact. As one can see, even though the emissions for direct transportation and agriculture have increased it did bring the overall emission of eCO_2 up. All the other sources emitted less than 1000 metric tons of eCO_2; hence their effect would be negligible. This includes refrigerants, faculty commuting and student commuting.

Scope 2 T&D losses deal with the transmission and distribution losses associated with purchased utilities such as electricity, chilled water, steam etc. Since UW only purchases the former, the emissions from this come only from the purchased electricity. Hence it is fairly low. If UW does decide to purchase other utilities then obviously it would be much higher. But then, the emissions from scope 1 would go down. This will be discussed later.

The pie-chart below gives a visual on the contributions by each source for the emission of metric tons of eCO_2 for the fiscal year of 2012. The highest contributor for the year was the other on-campus stationary with an overall contribution of 39.25%, followed by the purchased electricity (40.56%) and directly financed air travel (9.72%). This means the other sources contributed to less than 15% of the emissions for 2012.

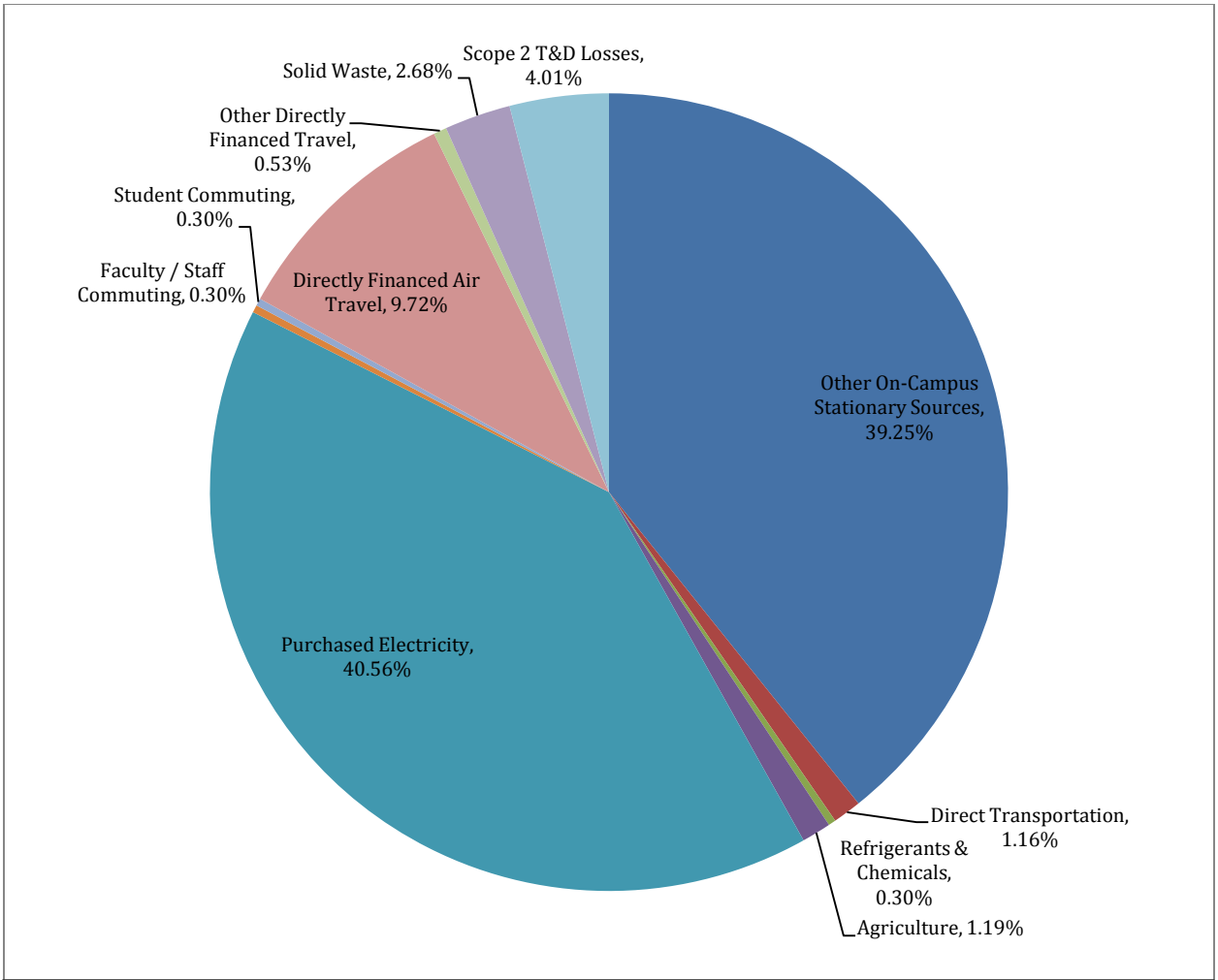

Figure 2: FY 2012 percentage contributions to UW's total GHG emissions by source

Some of the data that was input into the calculator do not affect the results of this report. This includes the budget, population, research space and building space. The reason why they are present is for comparison purposes. For example, if the building space increased drastically during a fiscal year then it would make sense that emissions increased as more electricity and other utilities would be used. Hence it can be used for individual research purposes to see if there are any trends between them and increased emissions.

The emissions of eCO_2 for every single source in the last twenty year period is given in Appendix B in MT.

Recommendations

UW signed the ACUPCC to reduce its GHG emissions so as to play a role in preserving the environment. The Campus Sustainability Committee continually assesses ways to reach that goal. Here are a couple of recommendations that the university should consider to reduce its emissions:

- Hydroelectric power appears to be the most environmentally sustainable power source followed by nuclear, coal, oil and gas.[2] RMP has a higher composition of hydro (4.3%) when compared to CP&L (4.30%). Also, the latter has a coal content of 67.8% while for RMP it is 30.43%. Economically, RMP is cheaper as it charges 8.5c per hour[3] and CP&L has a charge of 10c per hour[4]. To the extent possible, it would better to utilize RMP in the regions where RMP and CP&L are available.
- A question raised earlier was whether it would be better for UW to purchase its steam and chilled water or to continue making its own. A calculation was setup for the steam coal with the assumption that it is only used to produce steam and has an efficiency of 80% (for FY 2011). It produced 545,074.2 MMBTU of steam. When this was entered as a scope 2 emission, the overall emission for FY 2011 fell to 132,354 MT eCO_2. So environmentally, at least in the case of steam, it seems like purchasing it may be considered.
- Out of all the refrigerants used, R404a has the highest emissions factor per pound. Unfortunately, its use has increased over the last couple of years. Refrigerants such as RS-50 have been developed to replace R404a because of its high global warming potential and it is an option to be considered.[5]
- A system where methane recovery is present in the landfilled waste would reduce GHG emissions instead of the current system where it is buried underground.[6] Recovery of methane would mean it will not be in the land and later exerted into the air. In addition, the methane obtained could be used for energy purposes on campus. This is an option that could be discussed with the City of Laramie who owns and operate the landfill.

Financially there may be reasons why the University of Wyoming is using some of these sources. In such cases, any change would be a balance between being ecofriendly and financially viable. A very important sheet in the calculator is the one titled EF_eCO_2. This gives a summary of the emission factor for every source and is very helpful if one wants to consider replacing a particular source or increase the use of another.

References

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Appendix A: GGEI 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.

1. Institutional Data

Fiscal Year	Budget		
	Operating Budget	Research Dollars	Energy Budget
	$	$	$
1990	$ 208,973,119.60	$ 33,022,071.60	
1991	$ 217,516,856.84	$ 32,661,922.80	
1992	$ 221,826,669.61	$ 36,819,266.41	
1993	$ 226,048,398.16	$ 37,141,138.11	
1994	$ 222,061,833.91	$ 37,592,041.92	
1995	$ 238,043,475.34	$ 39,193,534.46	
1996	$ 241,125,554.86	$ 41,691,894.15	
1997	$ 251,121,159.84	$ 44,005,861.50	
1998	$ 243,262,153.52	$ 44,917,073.08	
1999	$ 255,011,589.19	$ 45,355,906.91	
2000	$ 246,901,889.87	$ 45,515,521.17	
2001	$ 258,261,695.02	$ 49,189,616.92	$ 831,624.39
2002	$ 259,603,997.22	$ 50,818,310.09	$ 778,673.90
2003	$ 280,791,523.00	$ 54,005,147.00	$ 3,051,924.50
2004	$ 280,524,727.43	$ 60,224,918.00	$ 3,308,729.28
2005	$ 302,707,265.99	$ 63,369,136.61	$ 3,817,988.13
2006	$ 299,264,785.09	$ 67,237,328.37	$ 4,018,446.31
2007	$ 331,344,309.67	$ 68,000,000.00	$ 4,448,758.32
2008	$ 346,333,564.94	$ 70,869,254.11	$ 5,247,420.44
2009	$ 423,038,040.00	$ 81,012,837.00	$ 6,397,539.00
2010	$ 431,853,687.00	$ 101,613,246.00	$ 5,830,712.97
2011	$ 427,311,565.00	$ 85,465,585.00	$ 7,804,176.57
2012	$ 439,665,995.00	$ 85,961,392.00	$ 7,499,342.54

Fiscal Year	Population					Physical Size	
	Full Time Students	Part-Time Students	Summer School Students	Faculty	Staff	Total Building Space	Total Research Building Space
	#	#	#	#	#	Square feet	Square feet
1990	8797	4723	3474	612	1920	6,000,000	700,000
1991	8682	4921	3877	613	1920	6,000,000	700,000
1992	8698	4761	3761	635	1920	6,000,000	700,000
1993	8584	4474	3466	600	1920	6,000,000	700,000
1994	8551	4076	3241	591	2073	6,000,000	700,000
1995	8564	3953	3106	635	2073	6,000,000	700,000
1996	8412	3477	2700	626	2035	6,000,000	700,000
1997	8354	3524	2622	620	2035	6,000,000	700,000
1998	8139	3336	2579	615	2024	6,000,000	700,000

1999	8230	3315	2536	612	2024	6,000,000	700,000
2000	8111	3223	2488	606	1926	6,000,000	700,000
2001	8147	3628	2831	596	1926	6,000,000	700,000
2002	8435	4037	3098	604	1907	6,264,779	750,000
2003	8580	4208	3171	612	1907	6,290,052	750,000
2004	8610	4384	3204	624	2122	6,290,052	750,000
2005	8744	4287	3369	643	2122	6,309,464	750,000
2006	8620	4306	3106	651	2182	6,339,525	750,000
2007	8659	3606	3080	1115	1750	6,412,003	750,000
2008	8798	4,172	2,811	1,044	1,736	6,414,196	797,032
2009	9,251	2,816	4,746	1,130	1,876	6,648,814	807,648
2010	9,610	2,817	5,201	1,151	1,846	6,734,641	780,948
2011	9,944	2,967	5,500	1,179	1,816	6,669,353	780,948
2012	9,948	2,977	5,137	1,195	1,841	6,776,343	780,948

2. Scope 1 Data

Fiscal Year	Other On-Campus Stationary Sources				
	Residual Oil (#5-6)	Distillate Oil (#1-4)	Natural Gas	LPG (Propane)	Coal (Steam Coal)
	Gallons	Gallons	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			113,269	8,867	24510
2009			113,076	6,416	23,749
2010			120,815	5,418	27,137
2011			102,949	6,565	27,529
2012			89,637	6,712	25,269

	Direct Transportation Sources	
Fiscal Year	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
2011	100,091	44,879
2012	110,754	61,550

Fiscal Year	Refrigerants & Chemicals		
	HFC-134a	HFC-404a	HCFC-22
	Pounds	Pounds	Pounds
1990			
1991			
1992			
1993			
1994			
1995			
1996			
1997			
1998			
1999			
2000			
2001			
2002			
2003			
2004			
2005			

2006			
2007			
2008	33	190	390
2009	33	190	390
2010	33	190	390
2011	5	219	90
2012	34	271	-

Fiscal Year	Fertilizer Application				Animal Husbandry					
	Synthetic	% Nitrogen	Organic	% Nitrogen	Dairy Cows	Beef Cows	Swine	Goats	Sheep	Horses
	Pounds	%	Pounds	%	#	#	#	#	#	#
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	30,746	**21%**			0	705	137	0	1,103	4
2008	33,456	21%			0	728	92	0	1,118	3
2009	48,594	14.50%			0	693	112	0	1,140	2
2010	46,114	14.50%			-	763	116	-	1,190	2
2011	46,114	14.50%			-	741	156	-	1,096	2
2012	46,114	14.50%			-	792	190	-	1,169	9

3. Scope 2 Data

Fiscal Year	Electricity
	CLICK TO SET eGRID SUBREGION
	kWh
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
2011	69,113,643
2012	68,607,169

4. Scope 3 Data

Fiscal Year	Faculty / Staff Commuting		Student Commuting	
	Automobile	Bus	Automobile	Bus
	Miles	Miles	Miles	Miles
1990	-	-	-	-
1991	-	-	-	-
1992	-	-	-	-
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	-	-
1996	-	-	-	-
1997	-	-	-	-
1998	-	-	-	-
1999	-	-	-	-
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	972,468	21,476	747,978	332,366
2008	943,616	20,839	778,148	345,772
2009	1,020,327	22,533	762,062	338,624
2010	1,017,273	22,465	787,764	350,045
2011	1,016,594	22,450	817,006	363,039
2012	1,030,510	22,758	817,649	363,325

Fiscal Year	Air Travel		Other

	Faculty / Staff	Students	Personal Mileage Reimbursement
	Miles	Miles	Miles
1990			
1991			
1992			
1993			
1994			
1995			
1996			
1997			
1998	8,050	8,050	
1999	33,120	33,120	
2000	36,000	36,000	
2001	109,990	109,990	
2002	3,756,538	3,756,538	
2003	4,343,440	4,343,440	
2004	2,333,536	2,333,536	
2005	5,650,178	5,650,178	
2006	11,781,689	11,781,689	
2007	9,727,963	9,727,963	
2008	9,484,961	9,484,961	
2009	15,949,140	15,949,140	
2010	9,698,658	9,698,658	
2011	11,375,139	11,375,139	1,804,343
2012	11,623,010	11,623,010	1,997,791

	Solid Waste
Fiscal Year	Landfilled Waste
	No CH4 Recovery
	Short Tons
1990	
1991	
1992	
1993	
1994	
1995	
1996	
1997	
1998	
1999	
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
2011	1,272
2012	1,219

Fiscal Year	Non-Additional Renewable Energy Certificates (RECs) Green Power Certificates
	kWh
1990	
1991	
1992	
1993	
1994	
1995	
1996	
1997	
1998	
1999	
2000	
2001	
2002	
2003	
2004	
2005	
2006	
2007	
2008	15600
2009	15600
2010	15,600
2011	15,600
2012	32,400

Appendix B: GGEI Data in MT eCO_2

1. Scope 1 Emissions

Fiscal Year	Other On-Campus Stationary	Direct Transportation	Refrigerants & Chemicals	Agriculture
	MT eCO_2	MT eCO_2	MT eCO_2	MT eCO_2
1990	-	-	-	-
1991	-	-	-	-
1992	-	-	-	-
1993	-	-	-	-
1994	-	-	-	2,764.0
1995	44,681.2	-	-	2,471.8
1996	42,592.3	-	-	2,496.7
1997	51,496.2	-	-	2,181.9
1998	52,916.3	-	-	1,667.4
1999	57,107.7	-	-	1,865.4
2000	57,358.5	864.7	-	1,940.2
2001	59,399.9	1,074.9	-	1,617.0
2002	53,085.4	1,088.9	-	1,652.8
2003	56,258.1	1,178.9	-	1,267.8
2004	57,054.7	1,298.5	-	1,089.2
2005	57,003.2	1,360.4	-	1,216.3
2006	57,503.9	1,221.3	-	1,311.9
2007	59,832.9	1,218.0	-	1,488.8
2008	56,463.1	1,278.0	603.1	1,514.6
2009	55,257.9	1,299.0	603.1	1,468.8
2010	60,633.0	1,412.4	603.1	1,596.9
2011	60,478.6	1,360.6	396.5	1,553.4
2012	55,260.2	1,627.3	422.8	1,672.1

2. Scope 2 Emissions

Fiscal Year	Purchased Electricity
	MT eCO_2
1990	-
1991	-
1992	44,334.8
1993	44,745.8
1994	43,288.1
1995	46,592.9
1996	38,964.8
1997	50,052.4
1998	48,189.4
1999	48,771.0

2000	48,614.4
2001	50,133.8
2002	47,165.9
2003	50,401.8
2004	50,392.2
2005	50,469.1
2006	49,250.8
2007	55,295.6
2008	57,311.7
2009	54,958.8
2010	55,763.3
2011	57,530.2
2012	57,108.6

3. Scope 3 Emissions

Fiscal Year	Faculty / Staff Commuting	Student Commuting	Directly Financed Air Travel	Other Directly Financed Travel	Solid Waste	Scope 2 T&D Losses
	MT eCO_2	MT eCO_2	MT eCO_2	MT eCO_2	MT eCO_2	MT eCO_2
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	-	-	-	-	-	4,384.8
1993	-	-	-	-	-	4,425.4
1994	-	-	-	-	-	4,281.2
1995	-	-	-	-	-	4,608.1
1996	-	-	-	-	-	3,853.7
1997	-	-	-	-	-	4,950.2
1998	-	-	13.3	-	-	4,766.0
1999	-	-	53.9	-	-	4,823.5
2000	-	-	56.1	-	-	4,808.0
2001	-	-	170.0	-	-	4,958.3
2002	-	-	5,444.4	-	6,543.5	4,664.8
2003	-	-	6,097.6	-	5,473.1	4,984.8
2004	-	-	3,195.5	-	5,258.4	4,983.8
2005	-	-	7,334.1	-	4,736.9	4,991.5
2006	-	-	14,865.5	-	4,443.2	4,871.0
2007	403.7	387.7	11,877.4	-	4,013.7	5,468.8
2008	389.8	398.2	11,166.9	-	4,938.3	5,668.2
2009	421.5	392.4	18,777.3	-	3,095.4	5,435.5
2010	420.2	405.7	11,418.5	-	3,406.3	5,515.0
2011	401.8	420.7	13,392.2	672.1	3,944.5	5,689.8
2012	425.7	421.0	13,684.1	744.1	3,779.5	5,648.1

4. Offsets

Fiscal Year	Non-Additional
	MT eCO_2
1990	-
1991	-
1992	-
1993	-
1994	-
1995	-
1996	-
1997	-
1998	-
1999	-
2000	-
2001	-
2002	-
2003	-
2004	-
2005	-
2006	-
2007	-
2008	(13.6)
2009	(13.0)
2010	(13.0)
2011	(13.0)
2012	(27.0)

5. Overall Emissions

Fiscal Year	Total Scope 1	Total Scope 2	Total Scope 3	Total Emissions	Net Emissions
	MT eCO_2	MT eCO_2	MT eCO_2	MT eCO_2	MT eCO_2
1990	-	-	-	-	-
1991	-	-	-	-	-
1992	-	44,334.8	4,384.8	48,719.6	48,719.6
1993	-	44,745.8	4,425.4	49,171.3	49,171.3
1994	2,764.0	43,288.1	4,281.2	50,333.4	50,333.4
1995	47,152.9	46,592.9	4,608.1	98,353.9	98,353.9
1996	45,089.0	38,964.8	3,853.7	87,907.4	87,907.4
1997	53,678.1	50,052.4	4,950.2	108,680.7	108,680.7
1998	54,583.7	48,189.4	4,779.3	107,552.5	107,552.5
1999	58,973.1	48,771.0	4,877.4	112,621.5	112,621.5
2000	60,163.4	48,614.4	4,864.2	113,641.9	113,641.9
2001	62,091.8	50,133.8	5,128.3	117,353.9	117,353.9
2002	55,827.1	47,165.9	16,652.6	119,645.6	119,645.6
2003	58,704.8	50,401.8	16,555.4	125,662.0	125,662.0
2004	59,442.3	50,392.2	13,437.7	123,272.2	123,272.2
2005	59,580.0	50,469.1	17,062.5	127,111.5	127,111.5
2006	60,037.0	49,250.8	24,179.6	133,467.4	133,467.4
2007	62,539.7	55,295.6	22,151.4	139,986.8	139,986.8
2008	59,858.8	57,311.7	22,561.4	139,731.9	139,718.4
2009	58,628.8	54,958.8	28,122.0	141,709.5	141,696.5
2010	64,245.4	55,763.3	21,165.6	141,174.3	141,161.4
2011	63,789.1	57,530.2	24,521.1	145,840.4	145,827.4
2012	58,982.3	57,108.6	24,702.5	140,793.4	140,766.4

Appendix C: Contact List

Input	University of Wyoming Source
Operating Budget	Budget Office
Research Budget	Office of Research and Economic Development
Energy Budget	Physical Plant
Population	Office of Institutional Analysis
Physical Size	Real Estate Operations & University Facilities Planning
Purchased electricity	Physical Plant
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	Physical Plant