

Bryn Mawr College Greenhouse Gas Inventory

Report Compiled by Sightlines, LLC

December 15, 2014

Introduction

A greenhouse gas (GHG) inventory is an accounting of major sources of GHG emissions that are associated with a particular entity. As a signatory of the American College and University Presidents' Climate Commitment (ACUPCC), Bryn Mawr College pledged to conduct a GHG inventory.

Sightlines, LLC works with more than 450 college and university campuses each year to provide an independent view of facilities performance. In addition to the facilities service, Sightlines has compiled greenhouse gas inventories at over 50 institutions. Bryn Mawr College has had a continuous partnership with Sightlines since 2002, and extended the contract in 2008 to conduct the greenhouse inventory. Bryn Mawr College contracted with Sightlines again in 2014 to conduct a single year inventory for fiscal year 2014. This report will compare the baseline year of greenhouse gases of FY2008 to the current FY2014 inventory.

Sightlines uses the Campus Carbon Calculator (CCC), which was developed by Clean Air-Cool Planet, a non-profit advocacy group, to quantify and track GHG emissions. The calculator adheres to World Resources Institute GHG Protocol which puts forth a standard categorization of emissions. The CCC converts different types of GHG emissions into a common unit of metric tons of carbon dioxide equivalents (MTCDE). The CCC is an acknowledged resource by the ACUPCC.

GHG Protocol divides emissions into three "scopes" of influence. For higher education, the ACUPCC has determined the specific types of emissions included within each scope:

- **Scope 1:** Direct emissions or those from sources owned or controlled by the institution and directly related to the operation of the campus. For colleges and universities scope 1 is primarily composed of fossil fuel combustion for heating, cooling, and other power generation.
- **Scope 2:** Indirect emissions from the generation of power or other end-use utilities imported to the institution. If a college or university purchases electricity, steam, hot water, or chilled water, the emissions that were created during its generation and distribution fall under scope 2.
- **Scope 3:** Other indirect emissions that are the result of the institution's activities. The primary sources of scope 3 emissions are commuting, directly financed air and ground travel for students and staff, paper consumption, and waste processing.

Sources of Emissions

This report will analyze the FY2008 and FY2014 GHG inventory for Bryn Mawr College. Because the ACUPCC originated in 2007, the initial data collection at Bryn Mawr was conducted in the early phases of the commitment. As shown in the list below, emission sources were added since FY2008 as the GHG inventory scope has grown as defined by the ACUPCC and the CCC. Also, Bryn Mawr College has changed activities, including starting to compost, which was collected in FY2014.

Scope 1 – Direct Emissions

- **Fossil fuel** – Natural gas and oil burned on Bryn Mawr’s campus, collected as CCF’s of natural gas and gallons of oil.
- **Vehicle fleet** – Fuel used by Bryn Mawr owned vehicles, collected as dollars and converted to gallons using the average gas price for the applicable fiscal year.

Scope 2 – Indirect Emissions from End-Use Utilities

- **Electricity** – Purchased electricity collected as kWh. Emissions are calculated in the CCC using EPA eGrid data for the Mid-Atlantic grid.

Scope 3 – Other Indirect Emissions

- **Faculty and Staff Commuting** – Calculated by collecting zip codes of faculty and staff members to find the average trip distance with assumptions that 100% drive alone, make 5 round-trips per week, staff commute 50 weeks/year and faculty commute 40 weeks/year.
- **Directly financed travel** – Travel paid by the college collected as dollars and converted to miles using the average dollars per seat mile from the Air Transport Association (ATA) and the average mileage reimbursement rate for the applicable fiscal year.
- **Solid waste** - Amount of trash going to the landfill, collected as number of pulls for the size of dumpster and converted to short tons.

Scope 3 – Additional emissions sources collected in FY2014 only

- **Student Commuting** – Undergraduate students assumed as 100% residential. Calculated graduate student commuting distance by collecting their zip codes to find the average trip distance with assumptions that 100% drive alone, make 3 round-trips per week, and commute 34 weeks/year.
- **Study abroad travel** – Collected the number of students travelling to each destination, and calculated the round trip mileage from Philadelphia (closest airport to Bryn Mawr College) to find the number of miles travelled.
- **Paper** – Collected as amount of paper purchased (number of cases and reams) by the amount of recycled content in the type of paper.
- **Scope 2 T&D losses** – The transfer and distribution losses associated with the purchase of electricity from a utility. Calculated based on the amount of kWh purchased and the EPA eGrid data for the Mid-Atlantic grid.

Offsets – Collected in FY2014 only

- **Composting** – Amount of gallons composted, counting as an offset with additionality to carbon emissions.
- **REC Purchase** – Collected as % of electricity, by month that REC was purchased. Counts as non—additional offset.

FY2008 vs. FY2014 Comparison of Gross Emissions

CAMPUS CARBON CALCULATOR CHANGES

The CCC incorporates new data as it is available to update its conversions of GHG emissions to MTCDE. Revisions and adjustments have been made since FY2008 (version 5.0 of the calculator) based on changes from the Environmental Protection Agency, the Department of Transportation, and the Intergovernmental Panel on Climate Change. When the FY2008 inputs were transferred to the most updated calculator, version 7.0, MTCDE units changed, which are quantified in the table below. The most notable changes include a decrease in the conversion of electricity and directly financed travel and an increase in the conversion of solid waste and commuting. An additional emission source was added for transfer and distribution losses associated with purchased electricity (Scope 2 T&D). This figure is calculated based on data from the EPA's eGrid and the amount of electricity purchased. The net change in emissions was +969 MTCDE, driven primarily by the addition of Scope 2 T&D losses and the change in calculation for solid waste emissions.

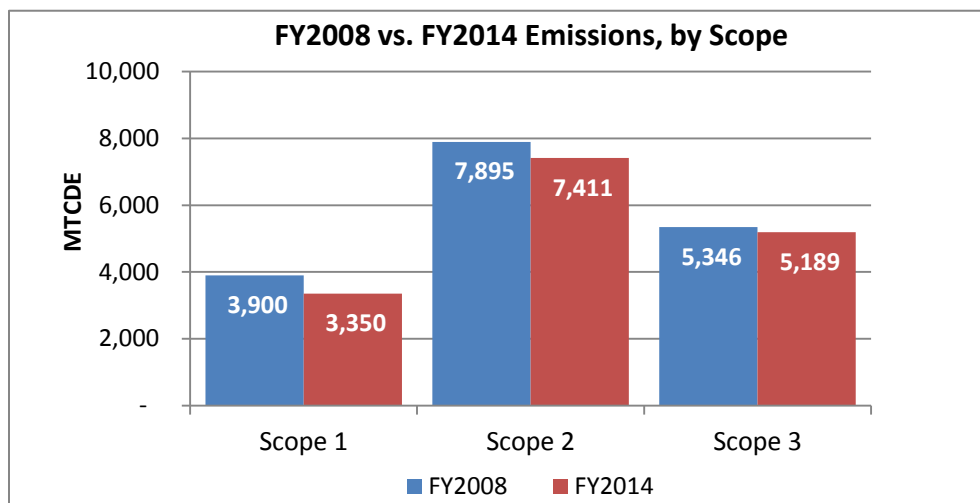
	Scope 1		Scope 2	Scope 3			Scope 2 T&D Losses	Total MTCDE
	On-Campus Stationary (gas and oil)	Fleet Vehicles	Purchased Electricity	Directly Financed Travel	Solid Waste	Faculty/Staff Commuting		
2008 - old MTCDE calculation (CCC v.5.0)	3,692	186	8,963	2,219	649	463	not part of CCC in 2008	16,172
2008 - new MTCDE calculation (CCC v.7.0)	3,711	189	7,895	1,641	2,032	892	781	17,141

DECREASE OF GROSS EMISSIONS SINCE FY2008

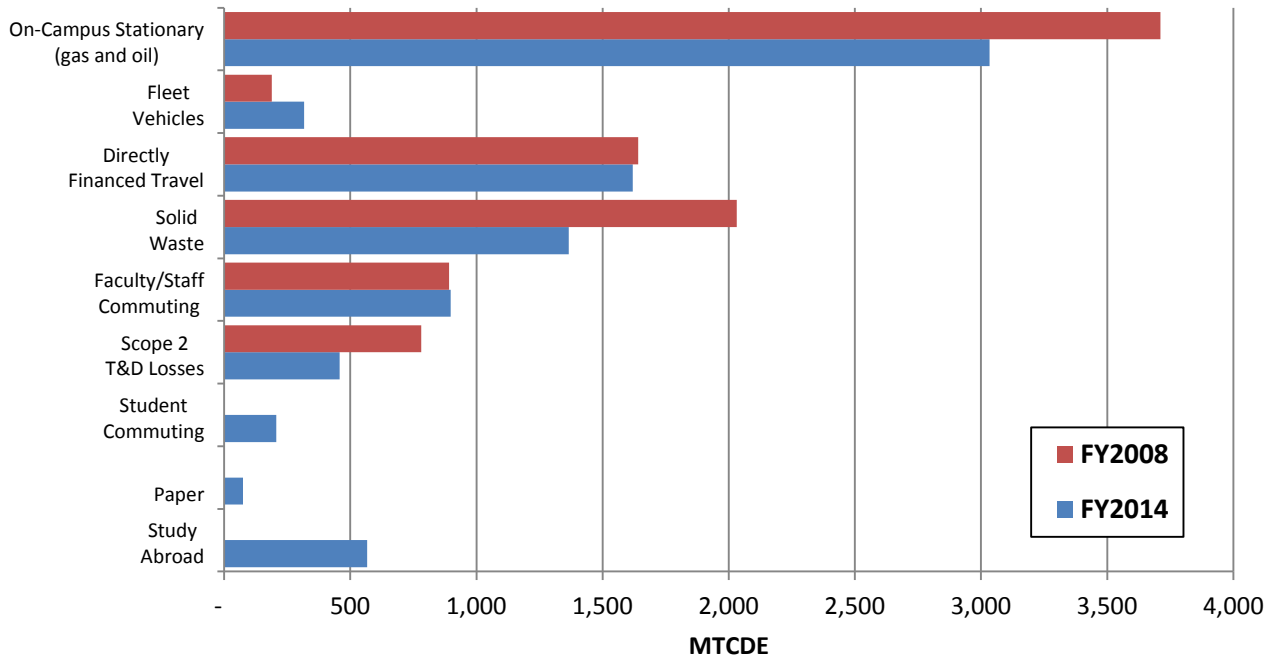
Driven primarily by the decrease in on-campus fuels burned and electricity purchased, Bryn Mawr College was able to decrease its gross emissions from 17,141 MTCDE to 15,949 MTCDE, a decrease of 7.0%, which includes the new emissions sources captured in FY2014.

	Scope 1		Scope 2	Scope 3					Scope 2 T&D Losses	Total Gross MTCDE	
	On-Campus Stationary (gas and oil)	Fleet Vehicles	Purchased Electricity	Directly Financed Travel	Solid Waste	Faculty/Staff Commuting	Study Abroad	Student Commuting			Paper
FY2008 - new MTCDE calculation (CCC v.7.0)	3,711	189	7,895	1,641	2,032	892	not collected			781	17,141
FY2014 - new MTCDE calculation (CCC v.7.0)	3,033	317	7,411	1,619	1,366	897	567	207	75	458	15,949
MTCDE difference between FY14 and FY08	-18.3%	67.5%	-6.1%	-1.3%	-32.8%	0.6%				-41.3%	-7.0%

If the added emissions factors (study abroad, graduate student commuting, and paper) are excluded from the FY2014 figures for consistency, the FY2014 gross emissions are 15,101 MTCDE, an 11.9% reduction since the FY2008 baseline.

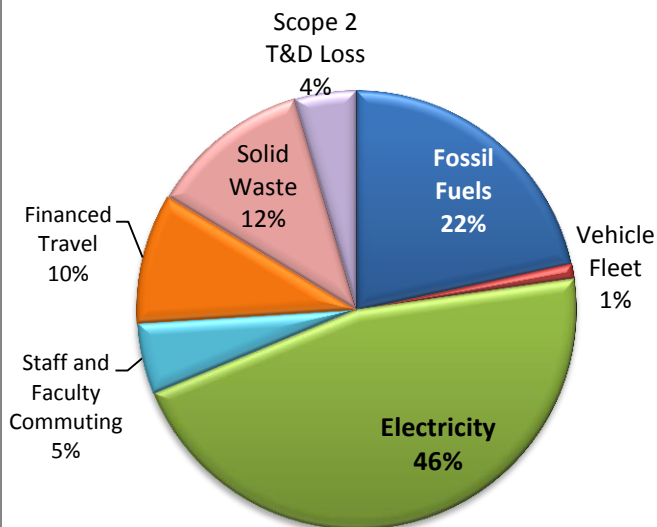


FY2008 vs. FY2014 Emissions, by Source Excluding Scope 2 (Purchased Electricity)



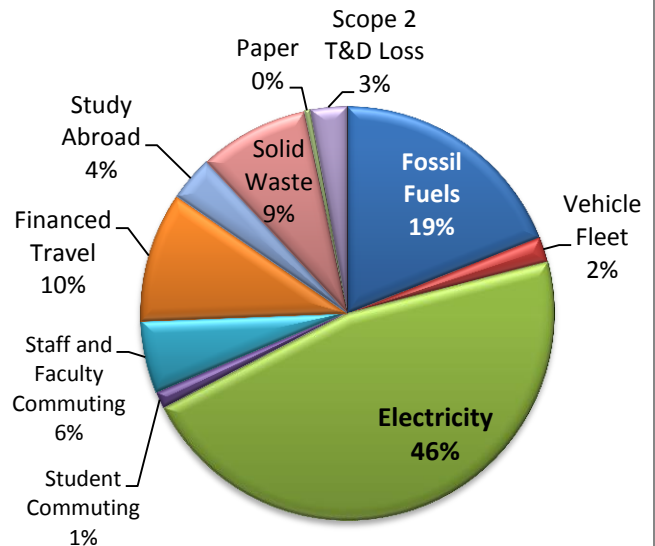
FY2008 Gross Emissions

17,141 MTCDE



FY2014 Gross Emissions

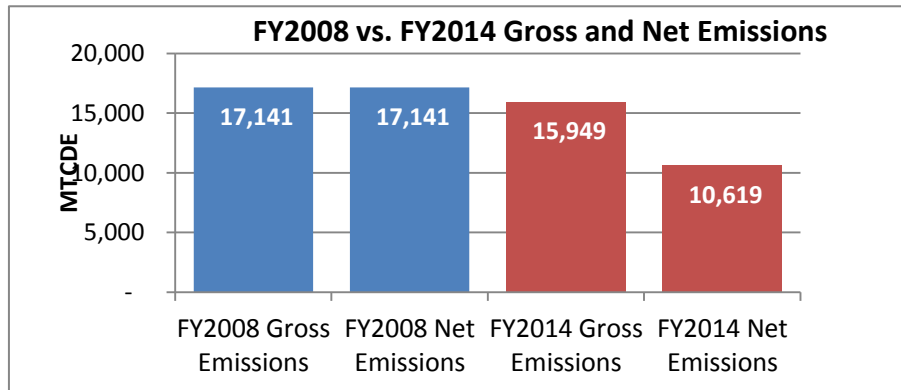
15,949 MTCDE



Offsets

In FY2014, Bryn Mawr College composted part of its waste, which offsets GHG emissions. The composting activity reduced the college's gross emissions by 214 MTCDE.

From June to December 2013, Bryn Mawr purchased REC's for 50% of its electricity purchased. Starting in January 2014, Bryn Mawr purchased REC's for 100% of its electricity purchased for the rest of the fiscal year measured in this analysis. In FY2014, Bryn Mawr College purchased at total of 11,243,589 kWh of REC's. This offset the college's gross emissions by 5,116 MTCDE.

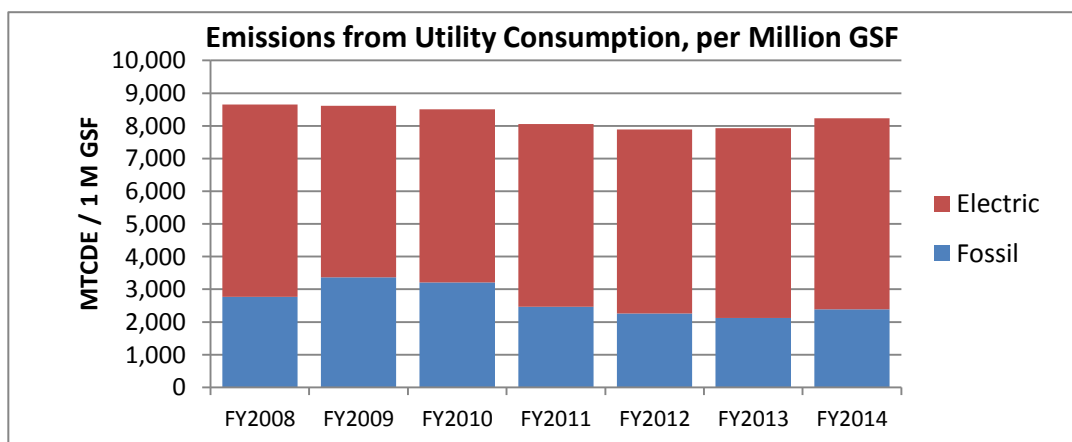


FY2008 vs. FY2014 Analysis

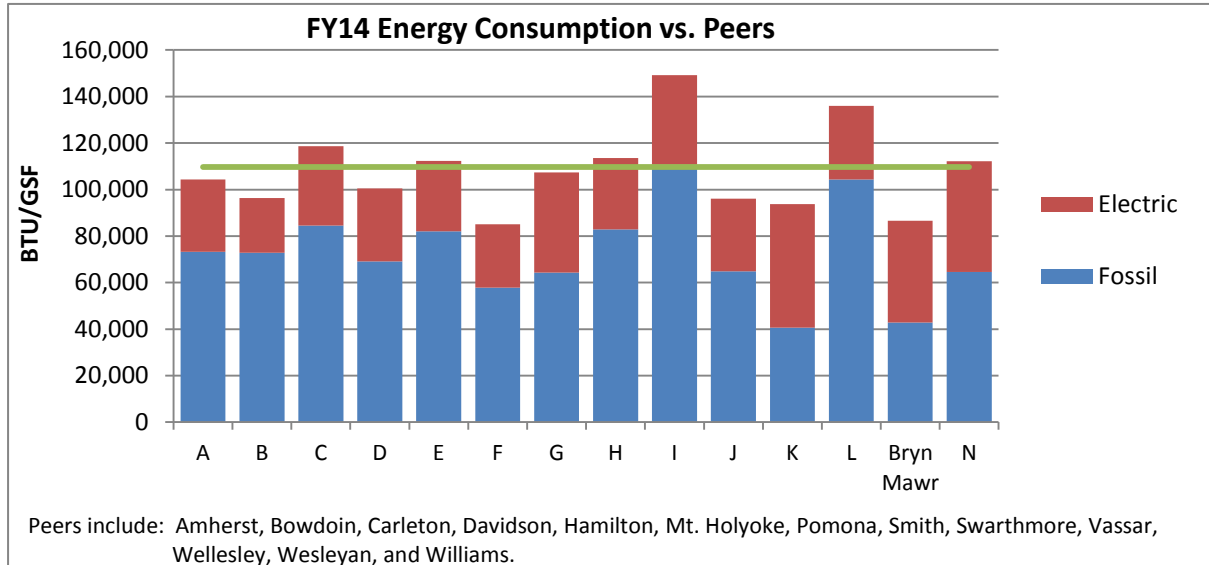
The four sources of emissions that decreased the most from FY2008 to FY2014, in order of highest to lowest amount of MTCDE reduction, were:

1. On-campus stationary fossil fuels
2. Solid waste disposal
3. Electricity consumption
4. Scope 2 T&D losses

Consumed fossil fuels decreased 18% and electricity decreased 6%, supported by energy management and a strategic space policy of reducing campus footprint. In FY2008, Bryn Mawr College owned 1,340,225 gross square feet (GSF) compared to 1,269,335 GSF in FY2014. Bryn Mawr College has been strategic about space management and use, which has contributed to the decrease of emissions, since Scope 1 and 2 are largely driven by space. Energy reductions, regardless of space changes, can be shown if emissions are normalized by GSF, as shown in the graph below. Analyzed this way, emissions from utility usage decreased by 5%.



The benchmarking service that Bryn Mawr subscribes to with Sightlines provides another perspective of utility consumption, expressed in British Thermal Units (BTU) per GSF. When compared to other private, liberal arts colleges of similar size and complexity, Bryn Mawr benchmarks very competitively with regards to energy consumption, consuming 21% below the peer average.



The solid waste decrease was attributed to less waste being hauled from the college. In FY2008, 11.7 tons of solid waste was hauled every week during the academic year, which decreased to 7.11 tons in FY2014.

The decrease in scope 2 T&D losses is directly related to the decrease in electricity consumption, combined with changes in the electricity grid, as calculated by the EPA.

Conclusion

In summary, Bryn Mawr College was successfully able to decrease its carbon emissions from FY2008 to FY2014. When all emissions sources are considered, Bryn Mawr reduced its gross emissions by 7.0% from FY2008 to FY2014. When only the emissions sources that were included in FY2008 are considered, with the version 7.0 Campus Carbon Calculator adjustments, Bryn Mawr reduced its gross emissions by 11.9% from FY2008 to FY2014. The change in net emissions was more significant because of composting and purchased REC's. FY2014 Net emissions were 38% lower than FY2008 emission levels.