

Greenhouse Gas Emissions Inventory

2006-2007

Green Mountain College, Poultney, VT
August 2008



Green Mountain College

From the President's Desk

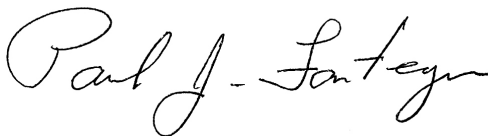
My predecessor, John Brennan, took the bold step in 2007 to make Green Mountain College the first Vermont institution to sign the American College & University Presidents Climate Commitment. This greenhouse gas inventory represents an important step from Green Mountain's path to climate neutrality. As the new president, I enthusiastically reaffirm Green Mountain College's pledge to meet the objectives outlined in the Presidents Climate Commitment.

Climate change is arguably the most critical issue of our time. It is vital that institutions of higher learning demonstrate that climate neutrality is indeed an achievable goal. I have no illusions that this will be an easy task. I am, however, deeply committed to working with our talented staff and faculty to chart a responsible course for Green Mountain College. This greenhouse gas inventory will serve as the baseline as we develop our Climate Action Plan in the coming year.

Green Mountain has been a leader in the rapidly expanding campus sustainability movement. In fact, the College's environmental mission and its award winning Environmental Liberal Arts curriculum convinced me to pursue the presidency. I believe that Green Mountain can offer valuable insights and strategies needed for the broader societal transition to a carbon free economy.

I look forward to working with the hundreds of other colleges and universities across the country that have signed the Presidents Climate Commitment and to playing a leadership role in this movement.

Warmest regards,

A handwritten signature in cursive script that reads "Paul J. Fonteyn". The signature is written in black ink and is positioned above the typed name and title.

Paul J. Fonteyn, Ph.D.
President, Green Mountain College

Inventory Summary

Green Mountain College recently conducted its first comprehensive greenhouse gas (GHG) inventory. The College’s net GHG emissions impact from July 1, 2006 to June 30, 2007 equaled 4,667 metric tons of carbon dioxide equivalent (CO₂e). Emissions and their sources are documented in the figures below. Institutional offsets are accounted for in Figure 2.

Figure 1: Percentage GHG Emissions by Source

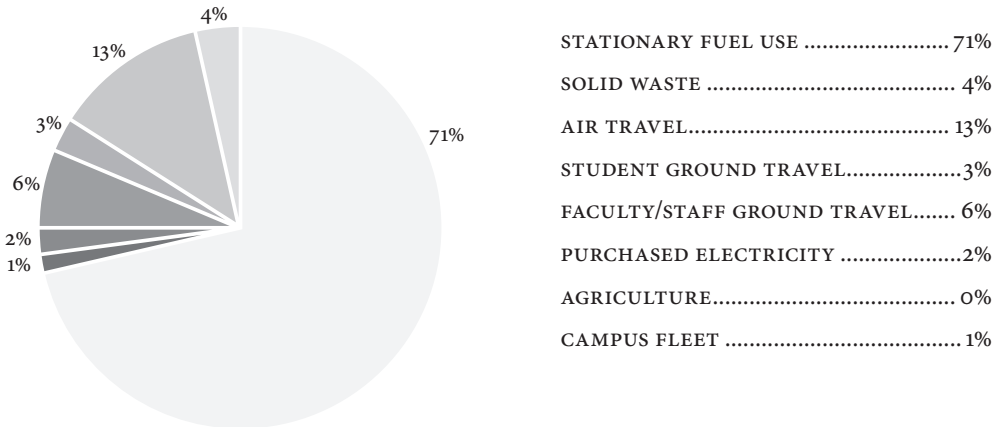


Figure 2: Total Greenhouse Gas Emissions in Metric Tons CO₂e

	Emissions Source	Metric Tons CO ₂ e
Scope One*	Stationary Fuel Use (<i>heating and cooking</i>)	3,355
	Campus Fleet Fuel Use (<i>passenger & maintenance vehicles</i>).....	59
	Agriculture (<i>organic fertilizers & farm animals</i>)	11
Scope Two*	Purchased Electricity.....	106
Scope Three*	Faculty/Staff Ground Travel (<i>commuting and meetings</i>).....	282
	Student Ground Travel (<i>commuting & campus programs</i>)	118
	Air Travel (<i>faculty, staff, & student for campus programs</i>)	591
	Solid Waste	185
Offsets	Cow Power Renewable Energy Credits	-40
	Total.....	4,667

* See definition of Scopes under “Methods”

Introduction

Green Mountain College was the nation's first Energy Star Showcase Campus (1998), and has been recognized by the EPA's Green Power Partner campaign for support of renewable energy and local economies through Central Vermont Public Service's Cow Power program. In 2007, the College's overall commitment to sustainability earned the Campus Sustainability Leadership Award from the Association for the Advancement of Sustainability in Higher Education (AASHE). Sustainability permeates our academic program through the Environmental Liberal Arts curriculum, and students are encouraged to make sustainability an integral part of the extra-curricular and everyday activities. Furthermore, the College has attracted an impressive list of faculty members, many with extensive expertise on cutting-edge sustainability topics. In 2007, then President John F. Brennan became the first Vermont college leader to sign the American College and University Presidents Climate Commitment (ACUPCC). In accordance with the ACUPCC's Implementation Guide, Professor Steven Letendre, Chair of the Campus Sustainability Council, conducted Green Mountain College's first greenhouse gas inventory in the context of his course, Special Topics in Energy and the Environment. This inventory establishes a baseline against which future progress toward climate neutrality will be measured and a methodology suitable for a small college campus that will be used for future GHG inventories.

Methods

Collection of data began in September, 2007, and measures emissions during the period July 1, 2006 – June 30, 2007 for all Green Mountain College properties. The inventory follows the Clean Air-Cool Planet model, consistent with the GHG Protocol for GHG accounting by the World Business Council for Sustainable Development and the World Resources Institute., an established standard in the field.

Researchers relied upon the Clean Air-Cool Planet Campus Carbon Calculator to convert all measurable greenhouse gas emissions (carbon dioxide, methane, hydrofluorocarbons, and others) for the 06-07 fiscal year into their carbon dioxide equivalent, or CO₂e, expressed in metric tons. Dr. Letendre collected data on Scope One and Scope Two emissions from facilities management and contract personnel, while Scope Three emissions data were collected primarily by students through a survey instrument.

Emissions sources have been classified by "Scopes" which are defined in the ACUPCC Implementation Guide as follows:

Scope 1 refers to direct GHG emissions occurring from sources that are owned or controlled by the institution, including: on-campus stationary combustion of fossil fuels; mobile combustion of fossil fuels by institution owned/controlled vehicles; and "fugitive" emissions. Fugitive

emissions result from intentional or unintentional releases of GHGs, including the leakage of HFCs from refrigeration and air conditioning equipment as well as the release of CH₄ from institution-owned farm animals. **Scope 2** refers to indirect emissions generated in the production of electricity consumed by the institution. **Scope 3** refers to all other indirect emissions - those that are a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution.

ACUPCC Implementation Guide v1.0, September, 2007

Consistent with our approach to nearly all sustainability initiatives on campus, student engagement was an important part of the data collection phase of our GHG inventory. Throughout the fall semester, 2007, students in Letendre's Special Topics course (ENV 2019) surveyed staff, faculty, and College fuel vendors to determine emissions from the following sources:

- fuel use by college-owned vehicles and equipment,
- faculty ground and air travel,
- staff ground and air travel,
- student commuting,
- travel for study abroad programs, and
- agriculture, refrigerants, fertilizers, and solid waste.

Two student Teaching Assistants managed these groups and the collection of pertinent data for the class with 24 students. Additional data collection was conducted by Letendre and members of the Campus Sustainability Council during the spring and summer of 2008.

Though ACUPCC signatories are only required to report on air and ground travel sponsored by the institution (e.g., study abroad programs, faculty travel to conferences, staff driving to meetings, etc.), we have made every effort to quantify other Scope Three emissions for this inventory. As such, we have calculated not only daily commute of personnel and students as discussed below, but also emissions related to our disposal of solid waste, application of organic fertilizers, and boarding of agriculture animals. As other Scope Three emissions were determined by best estimates to contribute less than 5% of our total emissions, they have been designated as de minimis, or small sources, and are not included in this report. These are primarily fugitive emissions from refrigeration and other chemicals on campus, as well as the application of some synthetic fertilizers. Designation of these sources as de minimis is in keeping with standards established by the ACUPCC in its Implementation Guide.

Though Scope One and Scope Two emissions data were complete and accurate based on sales records for fuel and electricity, some Scope Three data was adjusted to account for non-response by campus community members. Specifically, faculty, staff, and commuter student ground travel was estimated for all campus members of those groups based on the average number of gallons used by survey participants in each group.

Respondents to travel surveys represent a reasonable cross-section of the group as a whole and the Campus Sustainability Council is confident in the use of this data for establishing a baseline. CO₂e for ground travel takes into account the various fuels and fuel economies of vehicles used for commuting and College-sponsored travel.

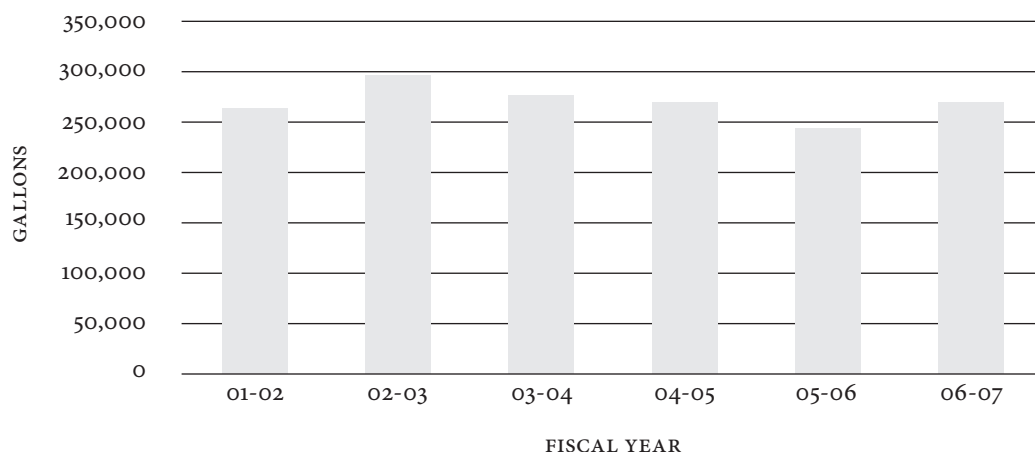
Once emissions were determined by the methods outlined above, institutional offsets were incorporated to account for Green Mountain’s October, 2006 enrollment in Central Vermont Public Service’s Cow Power program. Through this program the College paid an increased fee for nearly 870,000 kWh of electricity during the reporting period, thereby mitigating 40 tons of CO₂e from its purchased electricity emissions.

The analysis of data and compilation of this report was completed in August, 2008.

Conclusions / Next Steps

Clearly, Green Mountain College’s greatest emissions come from stationary sources, primarily from the use of residual fuel oil (#6) to heat main campus facilities – 271,282 gallons during 06-07 fiscal year. Figure 3 shows main campus use of #6 fuel oil for the reporting period and the preceding five years. Though the trend in #6 fuel oil use is decreasing slightly, the College’s use of this petroleum-based heating fuel has remained largely unchanged over time. Any attempt to significantly reduce GHG emissions in the future will necessarily address Green Mountain’s reliance on residual fuel oil for heat.

Figure 3: Main Campus #6 Fuel Oil Use 2001 – 2007



Another significant portion of emissions is directly related to transportation, including air travel (13%), faculty and staff ground travel (6%), student ground travel (3%), and the campus vehicle fleet (1%). Researchers attribute relatively low Scope Two emissions (106 tCO₂e) to the low-emitting power supply mix from the College's electricity provider, Central Vermont Public Service.

As with many historic New England institutions, Green Mountain College must contend with an aging infrastructure and a cold climate. Significant facilities upgrades – including the systematic replacement of campus steam pipes and residence hall windows – have increased thermal efficiency on campus in recent years, and will continue to be a facilities department priority moving forward. Additionally, administrators are investigating the feasibility of converting the campus steam plant into a biomass facility, using wood chips from regional forests under sustainable management regimes. Opportunities certainly exist to reduce GHG emissions from sources in all Scopes.

The Campus Sustainability Council will use this inventory to inform Green Mountain's Climate Action Plan and to set a goal for campus climate neutrality. Lessons learned from this initial inventory will lead to the implementation of campus structures that encourage all community members to track and report GHG emissions resulting from their college-sponsored activities. The next greenhouse gas inventory will cover the period from July 1, 2008 to June 30, 2009.

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