

Lynchburg College

Greenhouse Gas Emissions Inventory Report 2008

September 12, 2008

Association for Advancement of Sustainability in Higher Education
213 1/2 N. Limestone
Lexington, Ky. 40507

To Whom It May Concern:

It is my great pleasure to provide you with "Lynchburg College's Greenhouse Gas Emissions Inventory Report 2008."

This past academic year, we set a campus theme to raise awareness of the environment and our personal responsibility to it as we embraced "A Greener Tomorrow Today." We focused throughout the year on how human beings impact the quality of life on our planet and how we can make personal changes that will lessen the adverse effects. We began this effort when I signed the American College & University Presidents Climate Commitment, a pledge to reduce the campus "carbon footprint" at the ACUPCC Summit Meeting held June 11-12, 2007 in Washington, DC.

Throughout this past year, most of our speakers, activities and special events at Lynchburg College were focused on this effort and the effort to help sustain our environment and the ecosystem for future generations to survive and thrive. We organized and implemented a campus-wide recycling program which is and will be on-going. And this fall, after bringing the topic into all of our internal discussions, we will undergo a thorough campus energy audit assisted by a professional ESCO organization. The results of this project will lead to plans that will significantly reduce the amount of energy we use at this institution.

I am quite proud of the efforts on the campus of Lynchburg College and particularly so of Dr. Nancy Cowden, who continues her very effective work in her second year as Chair of the Positive Climate Committee. While I take great pride in the work accomplished to date, I am even more excited by what I see happening at this institution in the coming years. Thank you for your leadership in this most important global initiative.

Sincerely,

Kenneth R. Garren
President

I. Introduction

As a charter signatory of the American College and University Presidents Climate Commitment (ACUPCC), Lynchburg College takes with all seriousness its obligations to reduce our institutional climate impact. In following guidelines set forth by the ACUPCC, we have taken the immediate actions of committing to the purchase of Energy Star appliances and equipment whenever feasible and to participating in the Waste Reduction competition of RecycleMania. Lynchburg College designated the 2007-2008 academic year as the Year of the Environment, providing a campus-wide theme for events and our senior capstone course in recognition of signing the ACUPCC and to raise awareness of sustainability efforts on campus. For the academic year 2008-2009, Lynchburg College's year-long theme is the Year of the Citizen, incorporating individuals' responsibilities to the global community, including environmental responsibilities. The Lynchburg College Board of Trustees likewise signaled the College's commitment to reducing our environmental impact by revising the institutional values statement to include sustainability. The specific statement reads: "**Sustainability:** Everyone benefits when we recognize and act upon our environmental obligations to future generations." The College's current strategic plan reinforces the commitment to the ACUPCC with the inclusion of Strategic Initiative V, Campus facilities that support the College's mission:

Lynchburg College will continue to develop its physical campus to provide a beautiful setting, with attractive and modern mission-driven facilities that are an asset to recruiting and to the educational environment, that are energy efficient, and that embody appropriate and up-to-date technologies.

Strategic Priorities:

- B. complete a campus energy audit and develop a plan to minimize energy use and contain energy costs

- C. create greenways and walkways to make the campus more pedestrian and friendly as envisioned in the CFMP (Campus Facilities Master Plan).

This document represents our second ACUPCC-related action toward minimizing our energy use and its effects. Lynchburg College is currently reviewing the qualifications and services of Virginia state-approved energy services companies (ESCOs), with the intent to contract for a comprehensive energy audit and plan design to implement energy savings and reducing protocols beginning in September 2009.

This report was prepared by members of the Positive Climate Committee, a group of faculty, staff, and students charged with advising the College administration about increasing the institution's energy efficiency while decreasing its contribution to global climate change. With the assistance of the College's Business Office, Dean of the College's office, and Physical Plant staff, we compiled available data using the Clean Air-Cool Planet Campus Carbon Calculator, version 5.0 (here after referred to as "the Carbon Calculator" or "the Calculator"). Ideally we would have been able to gather information about all the carbon emitting factors included in the Calculator, but, due to variations in record keeping formats over time, not all data could be reported at this time in the suggested format. As one would expect, records detailing expenditures on items included in the Carbon Calculator are robust and are reflective of Lynchburg College's fiscal responsibility. While we can address annual costs we do not always have good records for resource consumption, as in the number of gallons of diesel fuel or gasoline consumed by campus fleet vehicles annually. The Carbon Calculator provides us with

the lesson that accounting for resource quantities is as important to our institution's health as is financial accounting. As we update our energy report annually and, particularly as we institute a comprehensive energy plan, Lynchburg College will serve as a model of increasing environmental awareness and responsibility.

II. Report Summary

The Clean Air-Cool Planet Campus Carbon Calculator recognizes a series of energy expenditures and also provides several categories of carbon offsets to be credited to the auditing institution. When these energy sources are viewed together with institutional data, patterns of campus activity emerge.

A. On-campus energy consumption

On-campus energy consumption includes purchased energies (electricity, steam and/or chilled water), co-generation facilities, stationary sources (fossil fuels, incineration, alternative energies), fleet fuels (gasoline, diesel, and others), agriculture, and refrigerant use. As a small, private liberal arts undergraduate and masters degree-granting institution, Lynchburg College does not engage in certain kinds of greenhouse gas-generating activities addressed by the Carbon Calculator. We do not house co-generation facilities nor do we engage in any agricultural activities, hence no carbon or carbon-equivalent expenditures exist at the College. Natural gas, used for heating off-campus houses owned by the College and for laboratory work, and fuel oil are stationary carbon-generating sources for which combined cost records exist, but MMbtu and gallons consumed records are currently challenging to partition. Likewise, fleet fuel consumption records detail financial costs combining diesel and gasoline usage. At present our institutional contributions to greenhouse gas generation are best quantified in terms of electricity and refrigerant consumption. The overall trend has been one of increasing consumption (Fig. 1), largely due to increased electricity demand, and correlated positively with an increase in full-time students, faculty, staff, and total building space.

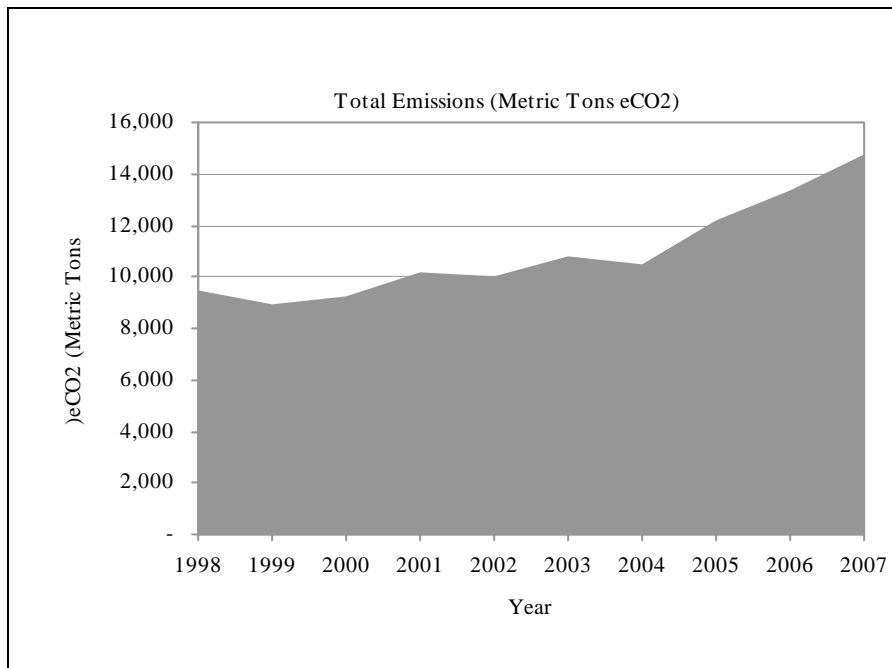


Figure 1. Carbon dioxide emissions equivalents for electricity and refrigerant (HCFC-22) consumption at Lynchburg College from 1998 to 2007.

While on-campus energy consumption exhibits an upward trend for electricity and refrigerant use, conclusions about other energy sources cannot be made at this time because current records are expressed in terms of monetary costs rather than carbon dioxide equivalent convertible units. Although the financial data are not included in this report, preliminary impressions suggest that the College has been reducing its consumption of fuels for fleet vehicles and off-campus heating. We plan to update this report with a more complete on-campus energy consumption picture. At that time we will be able to partition energy consumption patterns into particular components and more fully address possible reduction targets.

B. Transportation-related energy consumption

The movement of people and goods to and from campus obviously requires energy expenses. The Carbon Calculator specifically targets transportation due to airline travel and commuter vehicles. At this point in time, airline travel information is not collected in a way that easily permits documenting mileage traversed. Business flight expenses at Lynchburg College are tracked along with other transportation costs associated with attending conferences, business meetings, and other out-of-town events. In order to document air miles, we will need to revise documentation protocols; information for prior years simply may not be retrievable.

Lynchburg College is a largely residential institution and many faculty and staff live within a 15-mile distance of the College. At present we do not have data on distances traveled and means of conveyance for anyone not living in the residence halls. The Calculator worksheet for commuter data suggests the kinds of information to be gathered from surveys of commuting students, faculty, and staff. Lynchburg College's Positive Climate Committee, in conjunction with appropriate consultants, will construct and administer a commuter survey during the 2008-2009 academic year. This survey will be amended as needed to facilitate the gathering and reporting of this energy-consuming activity in subsequent years. Like information on air travel, we may be limited to reporting information beginning in the 2008-2009 academic year and may not be able to analyze past trends.

Solid-waste transportation at Lynchburg College moves non-recyclable and some compostable materials from campus to the regional landfill. Solid waste records have been kept primarily in terms of annual tipping fees, necessitating some additional calculation to determine actual short tons sent to the landfill. Some of our older records exist in paper form only and will require that members of the Positive Climate Committee convert them into a form reportable in future energy consumption reports.

Currently we are unable to report our short tonnage solid waste output, but we are able to comment on several factors related to solid waste generation. As was stated in the introduction to this report, Lynchburg College participated in the 2008 RecycleMania waste reduction competition. Our inaugural participation coincided with the institution of a campus-wide recycling program that now runs continuously throughout the calendar year. Our recycling program diverts aluminum and other recyclable metals, PETE beverage containers, office and mixed paper, and cardboard from the landfill stream. Records detailing weight and type of recyclable on a monthly basis, along with landfill materials, is now being collected. These records will enable us to track waste generation, and, in collaboration with the College's Natural Resources Committee, allow us to target waste reduction measures, thereby also reducing greenhouse gas-generating activities. We do know that, in comparison to the 2006-2007 academic year, our total landfill waste generation was similar in 2007-2008, when the recycling program was instituted. At first glance, this does not seem noteworthy, but it suggests that we are reducing our waste stream because the 2007-2008 academic year saw an increase of 200 additional full-time, resident students on campus over the previous year.

In addition to recycling, the College assists in some composting activities. Specifically, the Dining Services provides pre-consumer, compostable kitchen waste to a local community-sponsored agriculture organization for use in their vermi-composting facility. Likewise, the Grounds staff gathers leaf litter that is used for mulching at a local boxwood farm. Neither of these activities occurs at Lynchburg College nor do we have weights for materials donated, but these efforts do represent community-encompassing energy reductions.

Lastly, the regional landfill to which Lynchburg College sends its non-recoverable solid waste does employ methane recovery measures. The regional landfill provides methane for use in steam generation to a near-by liner board manufacturer and greater than 98% of the methane recovered from the landfill has gone to that purpose during the last two years. When steam generation is not occurring, the landfill employs flaring because it does not have methane storage facilities on site.

C. Energy offsets

In signing the ACUPCC Lynchburg College recognizes its role as a community as well as an academic leader. We are committed to reducing our carbon footprint by implementing practices that can be adopted by our neighbors in Central Virginia. As we gain experience in energy efficiencies, we plan to develop service-learning opportunities for our students and host energy awareness events that will focus on low expense and low carbon-emissions steps that concerned citizens can incorporate in their own energy savings plans.

To that end, Lynchburg College owns approximately 478.0 temperate, deciduous forested acres that serve a multitude of purposes including educational and carbon-sequestration purposes. Based on results by Botkin et al (1993) for a comparable forest area, we determined that Lynchburg College enjoys an annual carbon store of 23,049.0 metric tons inherent in preserved, forested property. The College values the ecological services provided by deciduous forest land and is currently increasing, by replanting, the number of trees on its properties. A considerable remaining fraction of the College's land consists of lawns and grasslands that also contribute to net carbon fixation rather than release. Because we were unable to identify studies that documented carbon storage in comparable grassland situations, we have not included carbon reduction due to grasslands in our offset calculations, but we recognize the benefits inherent in these vegetated areas.

For a relatively short period of time (2002-2006), the College maintained an on-campus composting facility and documented annual short tonnage composted. We include these figures in our carbon-offset documentation and plan to investigate the possibility of re-invigorating this activity or, failing that possibility, will examine ways to exchange compostable materials for finished compost with one or more local organizations. The former on-campus composting site space was incorporated into a ropes course area, necessitating the termination of composting on campus until another suitable site can be identified.

D. Institutional trends

As an educational institution, Lynchburg College has grown during the period from 1990 to the present. This growth is most evident in terms of full-time undergraduate enrollment and the expansion of graduate programs. To accommodate this enrollment increase, the College has added faculty, staff, classroom, and residential space. As a consequence our energy expenditures have grown as well.

In signing the ACUPCC Lynchburg College signifies its commitment to reducing our negative impact on the global environment. As we progress in designing and implementing a sustainable carbon reduction plan and reporting on our efforts, Lynchburg College will seek out opportunities to share our experiences with others.

Literature Cited

Botkin, D.B., L.G. Simpson, and R.A. Nisbet. 1993. Biomass and carbon storage of the North American deciduous forest. *Biogeochemistry* 20(1): 1-17.

Clean Air-Cool Planet Campus Carbon Calculator, version 5.0. 2008. <http://www.cleanair-coolplanet.org/toolkit/content/view/43/124/> accessed May 5, 2008.