

**Gustavus Adolphus College
Climate Action Plan
v. 1.0**

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Introduction

The following outlines the framework of the Gustavus Adolphus College Climate Action Plan, the “roadmap” which will guide the college’s efforts to reduce its greenhouse gas (GHG) emissions under the terms of the American College and University President’s Climate Commitment (ACUPCC)¹ framework of which Gustavus is a signatory.

The college has done much to reduce energy consumption, particularly since the 1998 tornado damage which necessitated significant campus renovations. As result, it has already made progress towards limiting the growth of greenhouse gas emissions without a conscious effort. But in light of the growing scientific understanding of how anthropogenic GHG emissions threaten to cause rapid climate change, which was highlighted by speakers at the 2007 Nobel Conference at Gustavus, the signing ACUPCC framework signals an intentional effort to make significant reductions in the campus GHG emissions.

Recognizing that the internal and external landscapes of the college are currently in flux, this plan is a barebones outline of the steps we need to take. Externally, there is uncertainty about whether not there will be strong U.S. Federal action to regulate greenhouse gas emissions, or whether it will be left to the states to create significant regulatory action. Internally, the college’s recently developed strategic plan, Commission Gustavus 150², will drive changes to campus facilities and operations. As a result, the plan will be reviewed frequently, with more the certainly that more specific plans will be developed, and most likely significant changes made as the landscape changes and we gain a better understanding of our capacity for GHG emission reduction.

At this stage, no specific timetable for achieving the 80% reduction in GHG emissions is specified. While we have the potential for rapid initial reductions due to conservation and energy efficiency measures, there will be a need for a longer-term commitment to lower carbon energy sources. It is not yet clear whether those will be lower carbon energy resources exploited directly by the college (and what resources those will be), or whether developments in the regional utilities will provide opportunities for GHG emission reductions. As a result, it would be imprudent to set a target date at this time. As the way forward becomes clear, time frames will be specified in subsequent revisions to this plan.

The dynamic nature of this plan is illustrated by the fact that we expect the Gustavus President’s Cabinet to undertake a review of the plan in February 2011 and explore ways that each vice-president can support the reduction effort through their areas of responsibility.

¹ See www.presidentsclimatecommitment.org for complete information about the ACUPCC effort.

² <http://gustavus.edu/commission150/>

Background Information

Table 1 presents the estimate of Gustavus' GHG emissions from Gustavus' **Green House Gas Emissions Inventory for FY 2007-2008**. Besides representing the preliminary starting point for this reduction effort, it also clearly points to where the college should focus its reduction efforts. Additional background information can be found in previous reports available upon request, particularly **Energy Use and Greenhouse Gas Emission Reduction Plan, Gustavus Adolphus College, Draft Vers. 1.0, January 2008**.

Given that over 80% of our emissions come from our natural gas and electricity use, no GHG emission reduction sufficient to address climate change issues will come without large reductions in the carbon intensity in those two areas.

As a result, the Gustavus Adolphus College Climate Action plan is focused on reducing the emissions generated by campus thermal loads (natural gas usage) and electricity consumption.

Table 1. Estimates of Gustavus' FY 2007-2008 Green House Gas Emissions

Source ³	GHG Emissions (tonnes CO ₂ e)
<i>Scope 1</i>	
Stationary Emissions: Natural gas use	8,316
Mobile Emissions: Campus operated vehicles	307
<i>Scope 2</i>	
Stationary Emissions: Electricity consumption	12,474
<i>Scope 3</i>	
Mobile Emissions: Outsourced air travel	2,260
Mobile Emissions: Faculty, staff, and student commuting	1,837
Mobile emissions: Outsourced bus travel	64
Solid Waste	-19
<i>Total</i>	25,239

GHG Emission Reduction Plan

The following components will be the focus of the our GHG emission reduction effort:

³ The "Scope" and "Stationary"/"Mobile" designations follow from the ACUPPCC reporting methodology (acupcc.aashe.org/instructions-ghg-report.php) which are explained below. The designation "tonnes" refers to a metric tonne—equivalent to 1000 kg or 2200 lbs.

- **Conservation and efficiency**
- **Planning and choices**
- **Utility context**
- **Renewable energy**
- **Education and outreach**

The following brief narrative addresses each of these areas with regard to what has already been done, what the next steps may be, and what the expected outcome will be where it is appropriate to be specific.

Conservation and efficiency

The environmental movement of the past several decades, and the energy crises of the 1970s and 1980s, gave Gustavus an institutional consciousness of the necessity of energy conservation that has been persistent. As a result, when an F3 tornado caused \$50 million dollars of damage to campus infrastructure in 1998, significant efforts were made (within the constraints of insurance settlements and the need to rapidly restore campus operations) to make the campus more energy efficient. At the same time, however, the renovations increased energy campus consumption through performance enhancement of buildings, particularly through additional AC and improved comfort, as well as additional square footage.

During the 2006-2007 academic year, student environmental action focused campus attention on energy conservation. In the fall of 2007, the college inaugurated the Johnson Center for Environmental Innovation. That center picked up leadership of the energy conservation effort, and with faculty and staff support and focused energy conservation investments lead by the Gustavus Physical Plant team, the past few years have seen almost a 15% reduction in campus electricity use.

Natural gas consumption also rose during the 1999-2007 period, and has also been a focus of campus conservation efforts. But due to there being fewer individual choices related to natural gas consumption, as well as fewer visual cues to that energy use (unlike lights and equipment operation for electricity), there has not been a notable decline in natural gas use, although trends are compounded by the fact that natural gas use is markedly affected by annual weather variability.

Preliminary investigations suggest that a significant part of our campus energy consumption (both electrical and thermal) is “hardwired” into the design and operation of our buildings. That knowledge leads to the very conscious recognition of “hardware” and “software” steps in our energy conservation plan—we will need both behavioral and engineering changes to make a difference.

To increase our energy conservation effort and drive the reductions necessary to make progress toward the ACUPCC goals, our strategy will take shape around the following the efforts:

1. Making our energy consumption visible. Through new monitoring initiatives patterned after the Gustavus electrical energy web page⁴, a key strategy will be to make the entire campus community—faculty, staff, students and guests—aware of our energy consumption.
2. Building on the awareness of 1, we will strive to make conservation behavior a distinctive value of the community.
3. Through retro-commissioning and overhaul of building energy systems, and regular reviews of building performance, we will seek to operate our facilities at peak efficiency. In support of that effort, there are currently preliminary discussions about hiring a dedicated energy manager.

Based on the significant reduction in electricity consumption over the past year, an overall 40% reduction in electricity use on campus (relative to 2008 levels) seems to be a challenging but possible goal. While there is more uncertainty about what is achievable, we are also setting a goal (subject to future revision) of a 20% reduction in natural gas usage. Together, these reductions could produce about a 25% reduction in our campus-wide GHG emissions.

Planning and choices

The aforementioned strategic plan, Commission Gustavus 150, has charted a course for significant development of the college's programming. Some of that development will require new and expanded building infrastructure. In light of the energy use increases of the last decade, expansion and improvement of campus facilities could increase our energy use and GHG emissions again.

As result, our climate action plan commits us to reviewing all commitments to expanded infrastructure in light of our GHE emissions profile. We will look for opportunities to use space wisely through renovation and re-purposing of current square footage. Where new construction is necessary, we will build with highest possible efficiency and conservation standards in recognition of the long-term energy commitment represented by new buildings.

A pattern for this commitment has already been established in the New Academic Building under construction now. This 125,000 sq. ft. classroom and faculty office building is targeting a LEED Platinum rating and energy consumption 40% below building code standards.

Even with high efficiency standards, new construction could still raise our GHG emissions profile if we are not careful. The key to mitigating that potential increase will

⁴ <http://gustavus.edu/energy/>

be vigorous pursuit of conservation in existing space (see above) and aggressive energy efficiency standards applied when existing building are renovated.

At this point in the development of our plan, there is insufficient data to project the energy consequences of our choices.

Utility context

As noted in the introduction, the current regulatory and utility context relative to GHG emissions is uncertain. Significant state or federal action could make achieving GHG emission reductions much easier. At present, the Minnesota state statutes mandate that the electrical grid be using 25% renewable energy by 2025. Assuming most of that energy comes from low carbon sources, and no unforeseen consequences occur (like increased GHG emissions from base load power plants compensating for variable renewable output), we might expect the electricity we buy from the utilities to decrease in GHG emission intensity by 20%. Applying that reduction to the electrical load remaining after the conservation and efficiency efforts outlined above, we could see another 2000 tonne annual reduction in GHG emissions—an 8% reduction.

Obviously, this amount is speculative. As a part of our climate action effort, we will have to regularly review the utility context, and adapt our plan to the changing context. We will also need to consider our role as public policy advocate, and decide how we can best support clean energy transitions in the wider society that will also support our own emissions reduction effort.

Renewable energy

This climate action plan first began to take shape in 2007, when the accumulated efforts of a number of students, faculty and staff, had provided sufficient justification for Gustavus to acquire one or two utility scale wind turbines which could have reduced our emissions significantly. Local regulatory action has blocked that effort for the foreseeable future, but in comparing possible reductions through conservation with our total load, it is clear that some form of renewable energy will have to be a part of our climate action plan.

There are, however, several outstanding strategic questions in this area. Obviously, it is not yet clear what the most useful and economically effective renewable energy choices are. In addition, as the utility context discussion above suggests, there are choices about the actual ownership and location of those resources: we can own and operate them on our own campus, third parties could own and operate them on campus, and either of these options could occur on an off-campus location. We will have to explore these issues as we develop our climate action plan.

In the meantime, we are already committed to developing the an understanding of the choices through some limited steps:

- a. The New Academic Building will have a solar thermal array on its roof that is slated to generate about 12% of that buildings energy.
- b. We also intend to add solar electric (photovoltaic) capacity of 30-40 KW to the new academic building.
- c. A mix (as yet undetermined) of solar electric and solar thermal capacity will be installed on other buildings a part of the same package of financial support for a and b.

While these initiatives will only mitigate the emissions we are adding with the New Academic Building, they will build our understanding and capacity for working with renewable energy, and enable us to make better choices as our path becomes clearer.

Education and outreach

While education and outreach is a significant requirement of the ACUPCC, Gustavus has already established this effort through decisions taken before signing the Commitment.

1. The college's Linnaeus Arboretum⁵ and Melva Lind Interpretive Center has already had ongoing community education programming that includes occasional presentations on natural resource and climate issues.
2. The college's long-standing Environmental Studies Program⁶ has been an on-campus environmental advocate for many years.
3. Gustavus' annual signature Nobel Conference⁷ has often focused on environmental themes, with the 2007 effort targeting energy and climate issues.
4. In 2007, the college administration, the Linnaeus Arboretum, and the Environmental Studies Program gained funding for and established the Johnson Center for Environmental Innovation⁸. The Director of the Johnson Center is directed to provide leadership to campus environmental efforts (including the ACUPCC effort) and to make environmental outreach connections off-campus.

In strengthening our outreach effort under this Climate Action Plan, we will be recognizing three interrelated, but distinct functions: supporting the behavioral and decision-making changes needed to reduce campus GHG emissions; enabling our students to be better environmental citizens and to lead the societal transition to lower emissions, and providing direct outreach support to the wider community as it makes that transition.

The Johnson Center will play the catalytic role in working with the campus on all three aspects. Work underway by multiple individuals and offices includes:

⁵ <http://gustavus.edu/arboretum/>

⁶ <http://gustavus.edu/env-studies/>

⁷ <http://gustavus.edu/events/nobelconference/>

⁸ <http://gustavus.edu/profiles/jdontje>

- A. Courses on sustainability, climate change and renewable energy as part of the Environmental Studies and First Term Seminar⁹ course offerings.
- B. An NSF-funded curriculum development effort to incorporate renewable energy topics broadly into instructional laboratory activities in the sciences.
- C. Work supporting campus energy conservation and efficiency efforts, including advocating for and specifying renewable energy initiatives.
- D. The Johnson Center Director serves on a regional economic development task force focused on renewable energy, and the board of a statewide renewable energy advocacy organization.

Summary and Reporting

The Climate Action Plan outlined above is clearly just a framework that serves as a starting point. It will need frequent review and revision to meet the concrete targets that are specified, namely a potential 30 to 35% reduction in GHG emissions from conservation, efficiency, and anticipated changes in the utility context.

Further reductions to the necessary level of 80% will have to be developed from a mix of increased conservation, renewable energy (on and/or offsite), and changes in the state and federal context. We will also have to be diligent to ensure that expected developments of campus infrastructure do not contradict our best intentions.

The progress towards reducing Gustavus' GHG emissions will be monitored, at a minimum, through the GHG emissions inventory reports required every two years by the ACUPCC. In further developing the process by which we prepare that inventory, we hope to institutionalize the process and make it a regular part of our annual fiscal and academic reports.

⁹ <http://gustavus.edu/fts/>