Goshen College Climate Action Plan

September, 2009

Introduction

In the spring of 2007, Goshen College President James E. Brenneman became a charter signatory to the American College & University Presidents Climate Commitment (ACUPCC). In doing so, Brenneman joined with leaders of 175 other higher education institutions to make a bold commitment: neutralizing their campus's greenhouse gas emissions. Neutralization is the point at which carbon-dioxide emissions produced by Goshen College-related activities are offset by three means: 1) reduction through conservation 2) use of renewable sources of energy and 3) increased sequestration through the absorption of carbon dioxide by trees and other plants.

"We are very concerned about life on this planet," Brenneman said. "This [commitment] is one more way we can heal and care for the world."

Goshen College became the second higher education institution in Indiana and the first Mennonite college or university to sign the landmark climate commitment, which is aimed at reducing emissions that scientists say are changing climates, threatening the planet's ecosystems and economy, and threatening many lives.

Brenneman said Goshen College has a history of taking environmental concerns seriously and acting to increase the campus's ecological consciousness and sense of responsibility. "We're calling it, in a broader way, our 'ecological stewardship commitment.' Goshen College, like the Mennonite Church, has always been committed to being global citizens," he said. "I see this as just another step in becoming more public about who we are and articulating more broadly what our core values have always been."

Goshen College is planning to sharply reduce and eventually eliminate all of its global warming emissions. To help stabilize the earth's climate, the college is supporting research, implementation, and educational efforts outlined in this document.

Goshen College Climate Commitment

Goshen College's commitment to ecological stewardship grows out of our biblical understanding that we are to serve and protect the earth (Genesis 2:15). As a ministry of the Mennonite Church, we seek to practice what is taught in the *Confession of Faith in a Mennonite Perspective* (1995) — "As stewards of God's earth, we are called to care for the earth and to bring rest and renewal to the land and everything that lives on it."

One of Goshen College's core values is Global Citizenship, which also underscores our commitment to ecological stewardship. Included in our articulation of this core value is the concept that, "In our academic program and campus life students will develop the knowledge, skills and values for a life of Global Citizenship with a responsible understanding of stewardship for human systems and the environment in a multicultural world."

The current 5-year strategic plan includes commitments to strengthening our sustainable and ecological practices. The plan states that, "Goshen College will establish an institutional culture committed to best practices. In each endeavor of this plan, we will seek models and methods that will keep us fresh and creative. We recognize the need to learn from the other individuals and institutions beyond our immediate campus community."

It is as a result of these foundational principles that we are committed to improving the integration of ecological stewardship in our academic programs and to reducing our ecological and carbon footprints as an institution of higher education.

Education, Research, and Public Engagement

The goal of campus education at Goshen College is that both the formal academic curriculum and also informal campus teaching opportunities will develop knowledge, attitudes and behaviors that promote ecological stewardship and sustainability.

Academic curriculum

Both undergraduate and graduate programs offer opportunities for education and research.

Undergraduate academic programs

Environmental Science major and minor

An undergraduate major in environmental science is housed in the biological sciences department. Core courses equip majors to analyze environmental issues from biological, economic and social/political points of view. In consultation with an academic adviser, students also select an area of concentration that reflects their interests and career goals: agroecology, conservation biology or resource management. A minor in environmental science can be added to any undergraduate major.

Goshen students have worked on projects in environmental education, city planning, municipal water quality assessment, organic agriculture, conservation biology, urban forestry, wilderness trail and facility maintenance, restoration ecology, wetland construction and planning, and field biology. The agroecology concentration includes four courses taken during a summer in residence at Merry Lea Environmental Learning Center.

Global economics minor

An undergraduate minor in global economics offered by the business department can include courses in environmental economics and economic development. Economics students often engage in practical projects such as a 2008 investigation into sustainable business practices commissioned by a local automotive dealer.

Courses related to environmental sustainability

Field biology courses offered at Goshen College:

- Agroecology*
- Biology of the Sea/Marine Biology**
- Forest Resources

- General Ecology
- Land Management
- Ornithology
- Small Farm Management*
- Properties and Management of Soils*
- Vegetable Crops*

*Component of an integrated summer program in agroecology.
**Taught each May term at Goshen College's own Marine Biology Facility on Long Key, FL

Goshen College is affiliated with the Au Sable Institute, which offers additional field biology courses on four campuses: Great Lakes, Pacific Rim, South Florida and India.

Many Goshen College academic departments incorporate ecological stewardship concerns into their curriculum. A sampling of courses and programs:

- BIOL 340 Field Experience in Environmental Biology – Taken by all elementary education majors. Participants develop and conduct interpretive programs in nature study for visiting school groups.
- BUS 410 Management Policy and Social Responsibility – A senior seminar for all business department majors. Emphasizes the importance of a triple bottom line for business: economic, social and environmental.
- CHEM 350 Environmental Chemistry – Includes sampling, statistics and techniques involved in determining the level of contaminants in the environment.
- ECON 375 Environmental Economics – Explores the interface between economic development and environmental sustainability.
- HIST 345 Environmental History – Explores conditions which have led to preservation or destruction of the environment, particularly in the non-Western world.
- PJCS 320 Borderlands – Examines U.S./Mexico border dynamics as they influence politics, economics, migration, the environment and more.
- PHED 255 Camping and Recreation – Hands-on experience in a wilderness setting. Emphasizes low-impact camping and learning from nature.
- English professors sometimes choose environmental themes for literature or writing courses.
- A required public health course in the nursing department includes environmental health issues.
- All international Study-Service Term sites include field trips focused on ecological stewardship concerns. (Approximately 85 percent of Goshen College students participate in an international Study-Serve Term as part of their General Education requirement in international education.)

General Education for all students

In addition to the academic programs described above, the General Education review committee, which began its work in 2008-09, is considering the topic of Ecological Stewardship as one of the key complex problems that all students will address during their four years at Goshen College.

Undergraduate research opportunities

Research opportunities in ecological stewardship are offered each summer through the Maple Scholars program. In addition, field biology courses and special research opportunities are available each semester. A prairie restoration project will be implemented in fall 2009.

In 2008, organic chemistry students proposed and built a biodiesel chemical conversion processor. Biodiesel fuel is produced from waste vegetable oil from the fryers in the cafeteria and snack shop for use in the college's back-up electrical generator. In 2008-09, students processed about 150 gallons of the college's waste vegetable oil, converting it to biodiesel.

Graduate program

M.A. in environmental education

The master of arts in environmental education program is based at Merry Lea Environmental Learning Center. This 12 month program immerses students in natural history, conducting ecological field research and engaging in environmental education programs for grades K-12. The degree includes core courses, a project, a portfolio, and an extensive practicum. Students integrate ecological learning with developing skills in pedagogy, land management and administration.

Informal education opportunities

In addition to the academic curriculum, a variety of campus interdisciplinary learning opportunities will promote ecological stewardship.

Orientation Curriculum

The Awareness sub-committee of the Environmental Stewardship Committee (described below) will collaborate with the Student Life and Academic Dean's offices to develop an ecological stewardship orientation curriculum for new students and new faculty members. It will include information about

- the President's Climate Commitment
- Recycling and waste management
- Public transportation and bicycling
- Energy usage
- Merry Lea Environmental Learning Center

Staff orientation is ongoing, throughout the calendar year, so materials on ecological stewardship will be developed with the Human Resources department for use in new employee orientation sessions and in regular staff development meetings.

Regular interdisciplinary venues

Each year, at least one weekly campus convocation or chapel service focuses on ecological stewardship. Also, each year, at least one interdisciplinary forum is organized by the environmental science program director, involving professors and students from a variety of academic fields and addressing a particular sustainability question or problem. Whenever

possible, these forums are linked to a guest speaker on campus. In 2008, the guest speaker was E.O. Wilson. In 2009 it was Bill McKibben.

Special events

Each semester the Awareness sub-committee of the Ecological Stewardship committee organizes and promotes at least one special event to promote ecological stewardship.

GoGreen Website

The campus sustainability coordinator and the Awareness sub-committee will continue collaborating, in order to expand, update and promote the ecological stewardship website: www.goshen.edu/gogreen

Public Engagement

Goshen College intends to become known throughout our region, our nation, and the global Mennonite church as a source of information and inspiration about ecological stewardship.

Regionally

In our geographic region, academic connections to local business and government will be encouraged via student research and service-learning opportunities. Students, faculty and administrators will participate in local sustainability efforts such as Sound of the Environment and the Sustainable Business Roundtable. Guest speakers with national and international reputations for expertise in sustainability are hosted for the campus community and the general public.

The Goshen College Merry Lea Environmental Learning Center, located near Wolf Lake, Indiana, will continue to host more than 6,000 K-12 students each year, for a variety of outdoor learning activities. Merry Lea also conducts a variety of programs to educate the public on topics such as wetlands restoration, sustainable living, and church and community activism. In addition, the Rieth Village living-learning facility at Merry Lea, which received the first Platinum LEED certification in the state of Indiana, continues to educate many visitors in sustainable building design and construction.

Nationally

Professors, administrators and physical plant leaders will continue to disseminate information about Goshen College's ecological stewardship efforts and research via professional conferences and news releases. We expect dissemination opportunities to increase as we make progress on our climate action plan.

In the global Mennonite Church

As a Mennonite college, Goshen College leads the denomination in ecological stewardship efforts. Merry Lea Environmental Learning Center staff hosts programs and communications for the Mennonite Creation Care Network, including its website, and presents workshops at biennial national conventions of Mennonite Church USA. The 2009 Mennonite World Conference

assembly in Paraguay, which brought together 6,000 Mennonites from five continents, included environmental sustainability workshops co-led by the director of Merry Lea.

Goshen College Carbon Footprint

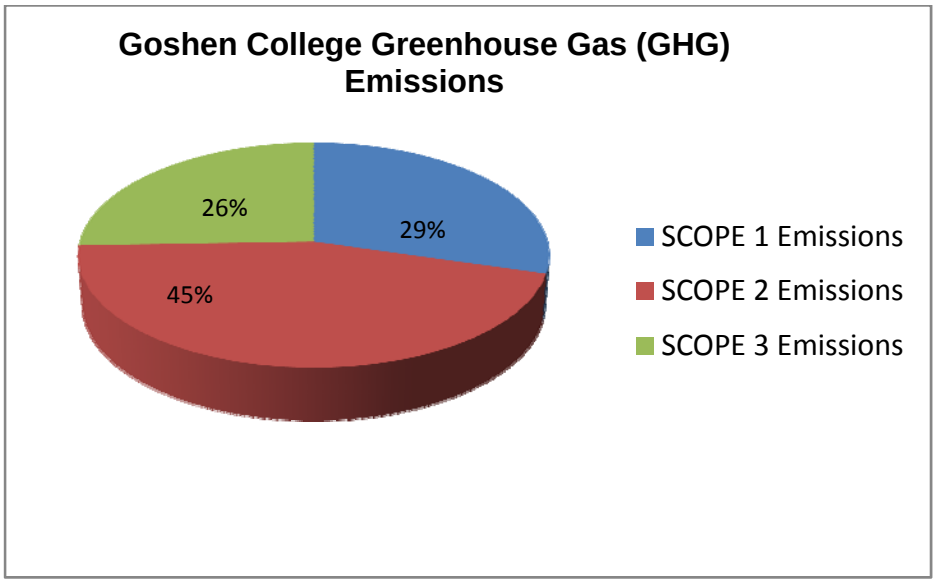
For the 2008-09 fiscal year, as reported in the ACUPCC greenhouse gas reporting system, Goshen College was responsible for the net emissions of approximately 9,500 metric tons of carbon dioxide (CO_2). This equates to about 10.4 metric tons per student or 11.9 metric tons per 1000 square feet of building.

Greenhouse gas (GHG) emissions are broken down into three main categories.

Scope 1 emissions - direct emissions generated on campus mostly from the combustion of natural gas, or by campus-owned equipment such as the maintenance equipment or vehicle fleet.

Scope 2 emissions - indirect emissions from purchased electricity. While the electricity is consumed on campus, the emissions occur at the regional power plants. Since 96% of electricity is produced from coal in Indiana, the scope 2 component is a significant portion of Goshen College's GHG emissions.

Scope 3 emissions - indirect emissions other than those covered in scope 2. For Goshen College, these are primarily emissions produced through commuting or by air travel of students, faculty and staff. Scope 3 also includes emissions produced from the solid wastes removed from the campus and taken to the county landfill.



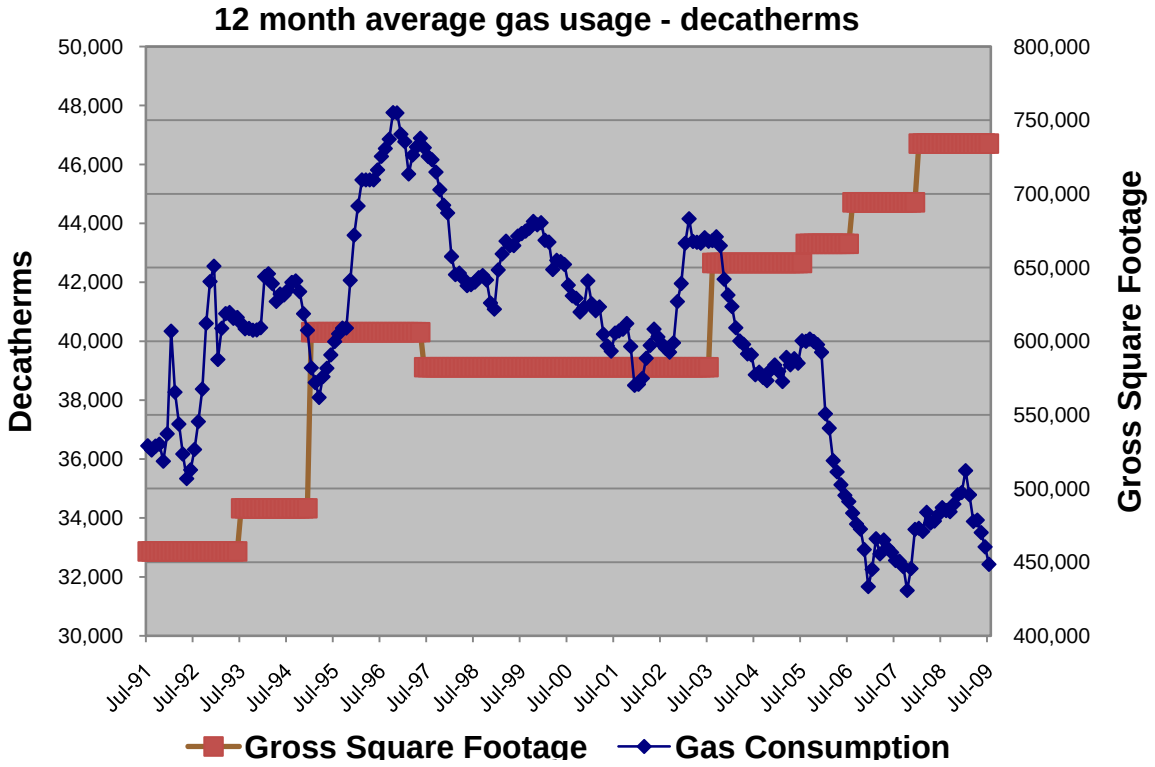
Scope 1 and Scope 2 emissions

Approximately 6800 metric tons or about 74 percent of CO_2 emissions are generated through the consumption of natural gas (scope 1), gas or diesel used by maintenance equipment and fleet

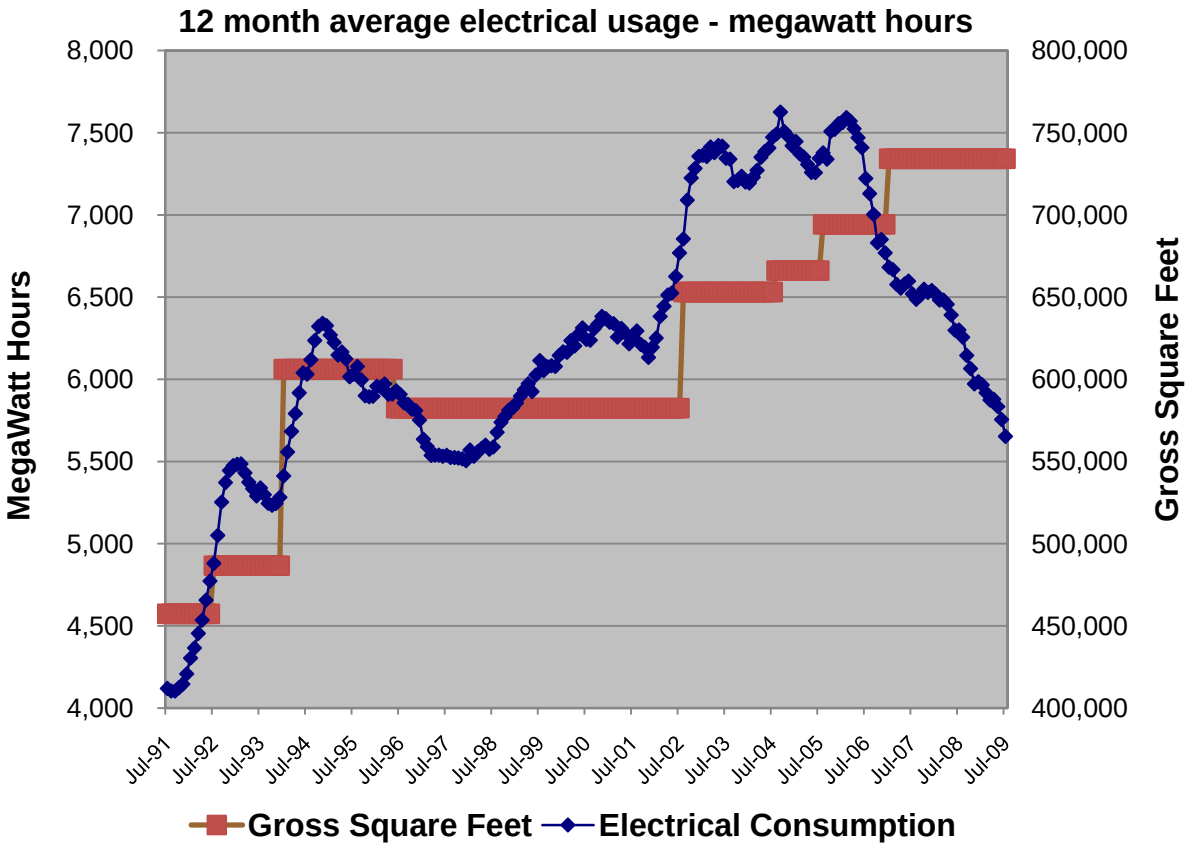
vehicles (scope 1) and electricity (scope 2). Through our utility bills, Goshen College has fairly comprehensive historical records dating back to 1990-91. We have less historical data for the gas and diesel consumption

Goshen College has been aggressively working at reducing our energy consumption through conservation measures for the past two decades. In spite of the addition of 60 percent more square footage, gas and electric consumption has been reduced dramatically. The following two graphs reflect the electrical and gas consumption since 1990-91. The blue lines reflect the 12 month energy averages while the red lines show that the campus building gross square feet has increased from about 457,000 square feet to over 734,000 square feet.

As the graph below reveals, campus natural gas consumption is significantly lower than it was in 1991, despite a significant increase in square feet of buildings.



The graph below shows that campus electrical consumption has returned to 1994-95 levels, despite increased building square footage and use of technology.



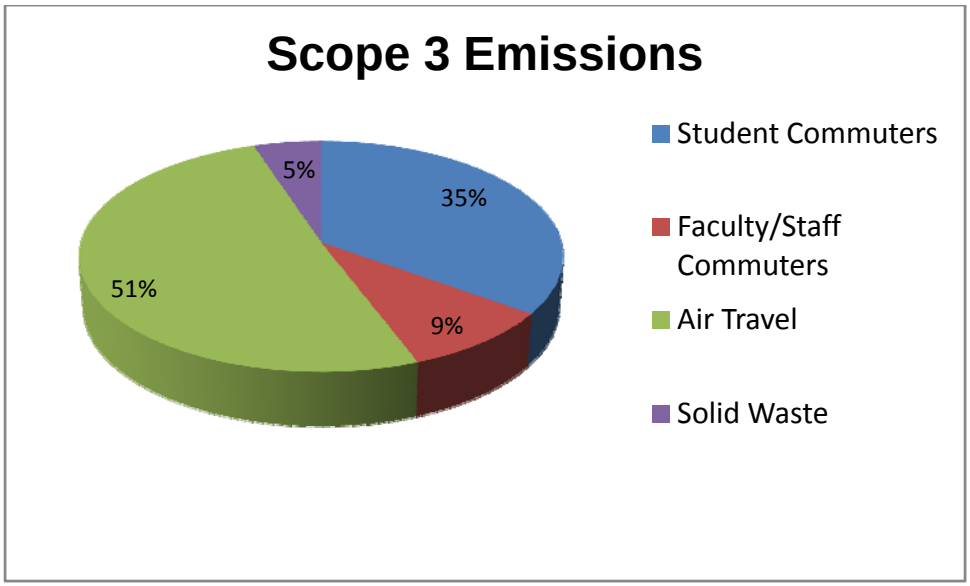
These significant reductions have been achieved through intentional development and utilization of the campus computerized energy management system, tight scheduling of occupied spaces, lighting and mechanical upgrades, daylight controls and temperature setbacks. Another factor in the reductions, which is difficult to measure, is increased awareness of environmental sustainability and resulting behavior change in the campus community.

Scope 3 emissions

Scope 3 emissions make up about a quarter of our carbon footprint. Commuting and air travel are the two primary generators of scope 3 emissions. Because Goshen College has a study-service term (SST), for which 100 to 200 students fly to countries in Central and South America, Europe, Africa and Asia each year, a significant portion of scope 3 emissions are from air travel.

During the 2007-08 school year, students from an Environmental Economics class conducted a campus-wide survey to determine commuting practices at Goshen College. Their results were used to help estimate commuting emissions for 2008-09.

The chart below shows the relative influence of each of these components on our total Scope 3 emissions.



Goshen College GHG Emissions Mitigation Goals

Goshen College has accurate energy consumption records for almost 20 years for natural gas and electricity usage. There are no historical records for transportation emissions, so determining the total GHG emissions for Goshen College is still a work in progress.

Institutionally, it is much easier to improve scope 1 and 2 emissions, through conservation measures described above. Scope 3 emissions (commuting, air travel and solid waste disposal) are much more difficult to improve because doing so affects the work and personal choices of the entire campus community. Improvement in scope 3 emissions will require significant changes in personal attitudes and behavior and also in program design.

Looking back, Goshen College has already made impressive progress in reducing scope 1 and scope 2 emissions. The campus has been able to reduce scope 1 emissions generated by natural gas consumption by more than one percent per year for more than ten years. It has reduced scope 2 emissions generated by electrical consumption by more than three percent per year for the past 7 years.

Goal #1: Continue to Conserve

During the next four years (through 2012-13), Goshen College is committed to the following goals.

Scope 1 emissions

- Continue to reduce natural gas consumption one percent per year.
- Develop accurate ways of tracking fuel consumption of campus vehicles.
- Purchase more fuel efficient vehicles

Scope 2 emissions

- Reduce electrical consumption two percent per year. (This would restore our scope 2 emissions to 1992-93 levels in spite of the substantial increase in square footage.)

Scope 3 emissions

- Minimize air travel.
- Increase recycling and composting to reduce solid waste disposal.
- Encourage alternative commuting options.

Some of the conservation initiatives that will enable us to achieve these goals will include the following:

- Evaluate LEED certification for existing buildings.
- Follow through on the Goshen College commitment to having all new construction LEED certified.
- Complete phasing out the central steam plant and move to local high-efficiency boilers.
- Expand use of geo-thermal heating and cooling.
- Continue to evaluate lighting conversions, as the technology changes.
- Develop more sophisticated strategies for HVAC operations.
- Use more fuel efficient fleet vehicles.
- Expand recycling and composting on campus.

Even though the college has a strong recent history of implementing energy conservation measures, there are still many more opportunities to continue to reduce our natural gas and electrical consumption. In addition to continuing and expanding the institutional efforts at conservation, to move towards climate neutrality will require substantial change in campus culture. Goshen College must work to promote a culture of sustainability that will encourage members of the campus community to change work and living habits to reduce our impact on the climate.

Cultural changes may include:

- Working in more moderately conditioned air, both heating and cooling.
- Living with reduced lighting.
- Turning off technology when not in use.
- Discouraging the use of individual refrigerators and microwave ovens in residence halls.
- Increased recycling and composting.
- Altering food choices.
- Increasing healthy transportation choices such as walking, biking and carpooling.
- Increased awareness of the direct link between lifestyle choices and CO_2 emissions, pollution and other strains on the environment.

Goal #2: Commit to alternative carbon free energy sources

At some point, it will become more difficult to reduce our carbon emissions strictly through conservation. Eventually it will become important to utilize alternative non-carbon based forms of energy. Target dates for these goals are still to be determined.

Scope 1 emissions

- Install solar hot water collectors for the Recreational Fitness Center.
- Expand biodiesel production.
- Explore biomass energy production.
- As technology matures, purchase hybrid, electric or hydrogen operated vehicles.
- Reduce dependence on petroleum based fertilizers.

Scope 2 emissions

- Install photovoltaic collectors.
- Install wind generators.
- Develop cogeneration facilities to simultaneously generate both electricity and heat.

Scope 3 emissions

- Promote bicycle transportation for commuters.
- Create a composting system for disposal of organic wastes.

Goal #3: Promote carbon sequestration, credits, or offsets

Finally, to achieve ultimate carbon neutrality, it will be necessary to find external ways to offset our inevitable carbon consumption. This might be done by promoting or enabling reforestation or some other natural method of carbon sequestration. This might also be done by investing in some form of carbon credits or offsets. While it is difficult to project what the options might be, they will likely include the following:

- ***Scope 1*** **–** Purchase carbon offsets for natural gas usage.
- ***Scope 2*** **–** Purchase "green" electricity.
- ***Scope 3*** **–** Create an internal "tax" to purchase carbon offsets for travel.

Costs and Financing

The Goshen College Climate Action Plan is expected to be a self-funded effort similar to other college initiatives. Ultimately all of the college's activities and initiatives are expected to stand on their own from funding sources they can generate. In addition, new initiatives and proposals are expected to contribute an appropriate level of support towards overall institutional overhead. The Climate Action Plan embraces these expectations. Savings from Climate Action Plan initiatives will both fund additional initiatives as well as help to support general institutional goals and priorities.

The following sources will be used to fund the Goshen College Climate Action Plan:

- The Goshen College Revolving Assets for Sustainability Projects (GRASP). See details below.

- Grants received from government, private and public foundations, or business partners
- Alumni and friend donations specified to enhance the college's efforts in sustainability
- Graduating class gifts
- Energy efficiency and renewable energy incentives provided by state or local governments or municipalities and/or utility companies or campus partners such as food service vendors, etc.
- Self-financing performance contracts
- Goshen College operating budget dollars that achieve multiple goals of both program enhancement or other administrative goals as well as sustainability outcomes

Goshen College Revolving Assets for Sustainability Projects

Mission

The mission of the Goshen College Revolving Assets for Sustainability Projects (GRASP) is to encourage sustainability efforts on the Goshen College campus and in our local community, by providing a mechanism to fund innovative projects that demonstrate environmental leadership and economic benefit. GRASP will fund renewable energy, energy efficiency and other cost-saving projects that demonstrate sustainable design and/or cost savings.

Goals of the GRASP

- To foster sustainable design and environmentally sound technologies and practices on the Goshen College Campus
- To provide a funding source for energy efficiency or renewable energy projects that benefit Goshen College
- To sustain itself financially and functionally without compromising (and where possible supporting) other student and institutional sustainability initiatives

After inception the GRASP will be entirely self-funding and will grow over time. Through a revolving mechanism which draws operational cost-savings from projects funded by the fund, GRASP will replenish itself while still providing cost savings to Goshen College.

Governance structure of the GRASP

The GRASP will be managed and administered by the Ecological Stewardship Committee, which must approve all projects funded by the GRASP.

Eligible projects

This funding source will primarily be used for projects that save money on fuel, electricity, water, building maintenance, storm water fees, or some other cost source, while making a positive impact on sustainability.

From a project's calculated (or best estimate) annual savings, 50 percent of the cost savings will be transferred to the fund. The other 50 percent of savings will accrue to the institution, thus providing some immediate financial relief. This process will be repeated

over subsequent years until 125 percent of the initial project cost (adjusted for inflation) has accrued to the fund. After this point, all further savings will accrue to the institution.

If at all possible, exact cost-savings measurements should be obtained, but in cases where this is unfeasible or deemed to be too costly, an educated estimate should be used. For example, known energy savings ratios of the installation of an energy saving product could be used where the exact effect on electricity usage may be hard to measure quantitatively through electricity readings.

In all cases, projects that are funded should take advantage of local, state, or federal incentives for renewable energy or efficiency investments.

Funds for projects may be used for all direct and indirect costs of the project, i.e. materials, labor, professional work or installation costs, research and testing costs, community education costs, publicity and other outreach costs, etc.

Parameters to ensure fund sustainability

The GRASP should be open both to smaller, rapid pay-back projects and larger, longer-term ones. All projects should seek to maximize the overall benefits of sustainability in a financially responsible manner. The Committee should not exhaust the fund or over-use long-term projects in a single year to the extent that the amount of funding available for projects in the subsequent year is less than half that available in the current year. That is, at least 50 percent of the fund's value in a current year must either be kept liquid or be regenerated through project or investment revenue or payback by the beginning of the following year.

Implementation Structure

Shortly after President Brenneman signed the Presidents Climate Commitment the Ecological Stewardship Committee (ESC) was formed to give direction to the Goshen College climate commitment. The committee is chaired by the vice-president for finance, and is comprised of administrators, teaching faculty, the director of facilities, students and the sustainability coordinator.

The purpose of the Ecological Stewardship Committee is to provide oversight to all sustainability initiatives on campus, review initiatives proposed by members of the campus community, prioritize resources and make recommendations for good environmental practices. The committee is responsible for developing a sustainability strategic plan, including this climate action plan.

While environmental stewardship is taking place throughout the entire campus by many people, it will be the responsibility of the ESC to monitor progress and promote new initiatives.

The Ecological Stewardship Committee has four sub-committees. Numerous other campus members participate in these subcommittees, providing broad representation in the important work of environmental sustainability. The subcommittees include:

Advancement

Forms and updates a sustainability strategic plan. Establishes benchmarks. Locates resources and invites support and participation from the campus constituency.

Audit

Gathers data to establish carbon footprint and fulfill other evaluation criteria in the sustainability strategic plan. This subcommittee is responsible for establishing and monitoring the campus carbon footprint.

Analysis

Reviews proposals for projects, helps to fine-tune plans, brings recommendations to ESC for action.

Awareness

Promotes ecological stewardship awareness on campus and broader awareness of Goshen College sustainability efforts through special events, goGreen website, and print media.

Communications Strategy

Campus and community interest in ecological stewardship is very high. In an effort to encourage and develop sustainability, the committee has built and will maintain the goGreen website. This site will be the place to post the progress on reduction of our carbon footprint, read about the various initiatives happening around campus, and articulate our commitment to sustainability.

Tracking Progress

Goshen College calculates its carbon footprint annually using the Clean Air-Cool Planet carbon calculator. The result of this annual calculation is posted on the AASHE website where it can be reviewed and compared to previous years and other institutions.

This climate action plan is a work in progress. As such, it will be necessary to update the status of our carbon footprint, redefine our benchmarks, and report on new initiatives and understandings as they develop. It will be the responsibility of the Audit subcommittee of the Ecological Stewardship Committee to review this document annually in September and make modifications as appropriate. This audit coincides with the reporting of results of the previous fiscal year's carbon footprint report.

Conclusion

Enthusiasm and commitment for environmental sustainability and ecological stewardship continues to grow on the Goshen College campus. This climate action plan was formed in response to the Presidents Climate Commitment (ACUPCC). It represents a significant effort toward responsible global citizenship, one of Goshen College's core values. The campus has made good progress in the last twenty years in conserving energy use, but much more can be done to reduce the college's negative impact on the earth's climate.

Key leaders in this effort include President Brenneman, the Ecological Stewardship Committee, the Goshen College Merry Lea Environmental Learning Center, and the campus sustainability coordinator. With their leadership, aided by a newly established funding mechanism, Goshen College Revolving Assets for Sustainability Projects (GRASP), we will continue to explore creative ways to reduce our carbon-based energy usage. In addition, we will pursue alternative carbon-free energy sources. And in the future, we will also consider carbon sequestration, credits or offsets in order to meet our ambitious goals.

This climate action plan connects Goshen College to a large and significant international movement toward ecological stewardship of our planet. We intend to monitor the Goshen College carbon footprint annually, to communicate progress in carbon reduction widely, and to create deeper campus commitment to the cultural change that will be required to reach our goal of zero carbon impact on the earth's climate.

The Goshen College Ecological Stewardship Committee for 2009-10:

Joe Friesen - *student*
Luke Gascho – *director of Merry Lea Environmental Learning Center*
Glenn Gilbert –*sustainability coordinator and utilities manager (secretary)*
Camry Hess - *student*
Jim Histand – *vice president for finance (chair)*
Becky Horst – *grants coordinator and associate registrar*
Kurt Neufeld - *student*
Jerrell Ross Richer – *associate professor of economics*
Ryan Sensenig – *assistant professor of environmental science*
Clay Shetler – *director of facilities*