

SUNY-Geneseo

Climate Action Plan



FINAL DRAFT

July 2010

This Climate Action Plan was created and submitted to AASHE in compliance with the American College and University President's Climate Commitment

Geneseo

Introduction

1 - The Challenge

Climate change is the most serious environmental problem facing the global community today. While perhaps the most obvious effect of climate change is the warming of the atmosphere and oceans, it is in fact a result of complex and interrelated social, cultural, economic, and environmental dynamics and its effects will be felt in all of these spheres. Higher education has an important role to play in responding to the challenge of climate change by preparing graduates for living and working in the world in a way that sustains human and non-human life on the planet now and into the future. This Climate Action Plan is the roadmap for SUNY-Geneseo's response to this challenge.

Since the beginning of the 20th century, the average global temperature has increased by almost one degree Celsius, with most of the increase happening since 1960. The increase in temperature is a result of increases in greenhouse gases (primarily CO₂, but also CH₄ & NO₂ and water vapor) in the atmosphere. The absorption of heat by these gases in the atmosphere and re-radiation downward of some of that heat is termed the greenhouse effect. This process helps regulate the temperature of our planet and is essential for life on earth. The increase in global temperature over the last century, however, reflects an increase in the concentration of greenhouse gases in the atmosphere and the resulting enhancement of the heating effect (NOAA). Preindustrial levels of CO₂ in the atmosphere were about 280 ppm, and currently the level has risen to over 380ppm. The scientific consensus is that human activities, primarily burning of fossil fuels and habitat destruction, have led to an increase in carbon dioxide levels in the atmosphere, and are the driving force behind global warming. And according to the International Panel on Climate Change 4th Assessment Report, by the end of the 21st century, CO₂ concentrations are estimated to be anywhere from 490-1260ppm.

Changes to the global climate system can already be seen and have the potential to dramatically impact the social and natural systems upon which humanity depends. Changes to the climate system are evident not only in changing air and ocean temperatures, but in changing patterns of precipitation and drought, melting permafrost, loss of sea ice, sea level rise and acidification, and changing animal migrations and plant phenology patterns. These changes will likely impact human social and economic systems through changes in agricultural production patterns, transportation systems, the range and prevalence of diseases, declines in biodiversity and ecosystem services, and access to freshwater

resources, among others. The United Nations Millennium Assessment report in 2005 stated that, “nearly two thirds of the services provided by nature to humankind are found to be in decline worldwide. Unless we acknowledge the debt and prevent it from growing, we place in jeopardy the dreams of citizens everywhere to rid the world of hunger, extreme poverty, and avoidable disease. . . “. The United Nations also reports between 25-50 million environmental refugees as a result of drought, flood, soil erosion, desertification, etc., a number expected to reach 1 billion in the next 50 years (Myers 2001). That is more displaced people than political, religious and war refugees combined. The climate change occurring now and into the future will have long-term impacts on people around the world.

In order to avoid the worst impacts of global warming, the scientific consensus calls for a reduction in global emissions of greenhouse gases of at least 80% by 2050. Further, the concentration of CO₂ in the atmosphere must be maintained at no more than 350ppm. Reductions of this magnitude will require dramatic changes in our political, social, and economic systems within a generation. A significant response is required because unlike other environmental challenges such as atmospheric ozone levels, water pollution, or acid rain, which repair themselves once the negative human input has stopped, warming driven by already increased CO₂ concentrations will have prolonged effects for generations to come.

Higher education institutions are in a unique position as potentially powerful transformative agents to respond to the challenge of global climate change. They can only thrive if the environments (ecological, social, financial) upon which they depend are also thriving. These institutions hold a privileged position in society as a center of knowledge creation and site of preparation of the educated professionals who will lead, manage, and influence society’s institutions in the future (Cortese 2007). Because of this, higher education has a responsibility to respond to climate change and its threats to the social, economic, health and environmental structures upon which civilization depends. Right now, “the overwhelming majority of [college] graduates know little about the importance of sustainability or how to lead their personal and professional lives aligned with sustainability principles” (Cortese 2007). This must change.

The State University of New York at Geneseo is a nationally recognized public liberal arts college that serves as a center of excellence in undergraduate education. Its mission is to create socially responsible graduates whose values include excellence, innovation, community, diversity, integrity and service to society. As a result, the College community is called upon to respond to the climate crisis by training students in the skills necessary to live and lead in this changing world. The College must provide a model for our students and the wider society of a community that understands the complex, interconnected problems associated with climate change and responds by making the difficult decisions that reflect our values.

“The university is a microcosm of the larger community. Therefore, the manner in which it carries out its daily activities is an important demonstration of ways to achieve environmentally responsible living and to reinforce desired values and behaviors in the whole community.” - Anthony Cortese EDUCATION FOR SUSTAINABILITY THE UNIVERSITY AS A MODEL OF SUSTAINABILITY (1999)

2- SUNY-Geneseo's Response

In the fall of 2006, SUNY-Geneseo's Environmental Impact and Sustainability Task Force, comprised of faculty, students, and staff from across departments and divisions at the college, was formed to implement strategies to reduce the College's environmental impact. On June 26, 2007, President Christopher Dahl signed the American College and University Presidents' Climate Commitment (ACUPCC) and initiated Geneseo's formal journey towards a goal of climate neutrality. The ACUPCC committed the College to calculating the College's greenhouse gas footprint, setting a date for carbon neutrality and establishing an action plan for achieving that goal. In addition, the ACUPCC also committed the college to initiating at least two specific tangible actions to reduce greenhouse gas emissions before the submission of the action plan.

Geneseo fulfilled this part of the commitment by establishing a policy that all new campus construction will be built to at least the equivalent of the U.S. Green Building Council's LEED Silver standard. In addition, the College has an appliance purchasing policy that requires the purchase of Energy Star certified products for all areas where these ratings exist, and has increased access to public transportation (through the LATS bus system) for the campus and wider community.

Beginning in 2008, the Task Force student intern, Alicia Kowsky, along with members of the Climate Impact and Monitoring subcommittee conducted a baseline greenhouse gas inventory for the College. This inventory was completed by our summer 2009 student intern, Hallie Miller, to include comprehensive information on the College's electricity, natural gas, transportation, solid waste, and wastewater contributions to greenhouse gas outputs from 1990-2009. This important information is critical for establishing a picture of the College's current and historical greenhouse gas footprint, and as basis for predicting future trends in our greenhouse gas emissions.

A large undertaking critical to the Task Force's mission is creating the Climate Action Plan for SUNY-Geneseo. This plan will make clear the actions that have already been taken to increase energy efficiency on campus, identify new projects to reduce or offset our energy usage, and set a timeline for climate neutrality with interim goals. The ultimate goal is to achieve climate neutrality by 2050 with less than 20% of the reduction at that time through purchased, off-site carbon credits. We recognize that the plan presented here is only a first draft, and that in the rapidly changing environmental and technological environment of the next 40 years, Geneseo's response to climate change will need to be flexible. The Climate Action Plan will require updates in alignment with these changing conditions, and includes a regular 5-year cycle of review and revision.

3- SUNY-Geneseo's Carbon Footprint

The SUNY-Geneseo carbon footprint was calculated from fiscal year 1990 to present, the results are listed below in Table 1. Over this time period the carbon footprint increased 7.64% from 22,449.10Mt eCO₂ to 24,164.20Mt eCO₂. After 1990, SUNY-Geneseo Emissions were as high as 20.4% above 1990 levels in 1995 and as low as 3.94% of 1990 levels in 2001 (see Table 1, Figure 1). This improvement in large part reflects a 2001 upgrade to the college's central heating plant enabling it to burn either #2 Distillate Oil or Natural Gas.

Fiscal Year	eCO ₂ Metric Tons	+/- difference previous year	+/- difference 1990
1990	22,449.10	-	-
1991	24,491.80	9.10%	9.10%
1992	24,161.40	-1.35%	7.63%
1993	25,804.80	6.80%	14.95%
1994	24,301.50	-5.83%	8.25%
1995	27,028.10	11.22%	20.40%
1996	26,436.10	-2.19%	17.76%
1997	25,777.70	-2.49%	14.83%
1998	26,472.30	2.69%	17.92%
1999	26,093.70	-1.43%	16.23%
2000	26,754.80	2.53%	19.18%
2001	23,332.60	-12.79%	3.94%
2002	25,840.50	10.75%	15.11%
2003	24,277.80	-6.05%	8.15%
2004	23,390.40	-3.66%	4.19%
2005	23,919.80	2.26%	6.55%
2006	24,037.70	0.49%	7.08%
2007	24,513.60	1.98%	9.20%
2008	24,164.40	-1.42%	7.64%

Table 1. Carbon Dioxide Equivalent in Metric Tons and percent change, 1990-2008

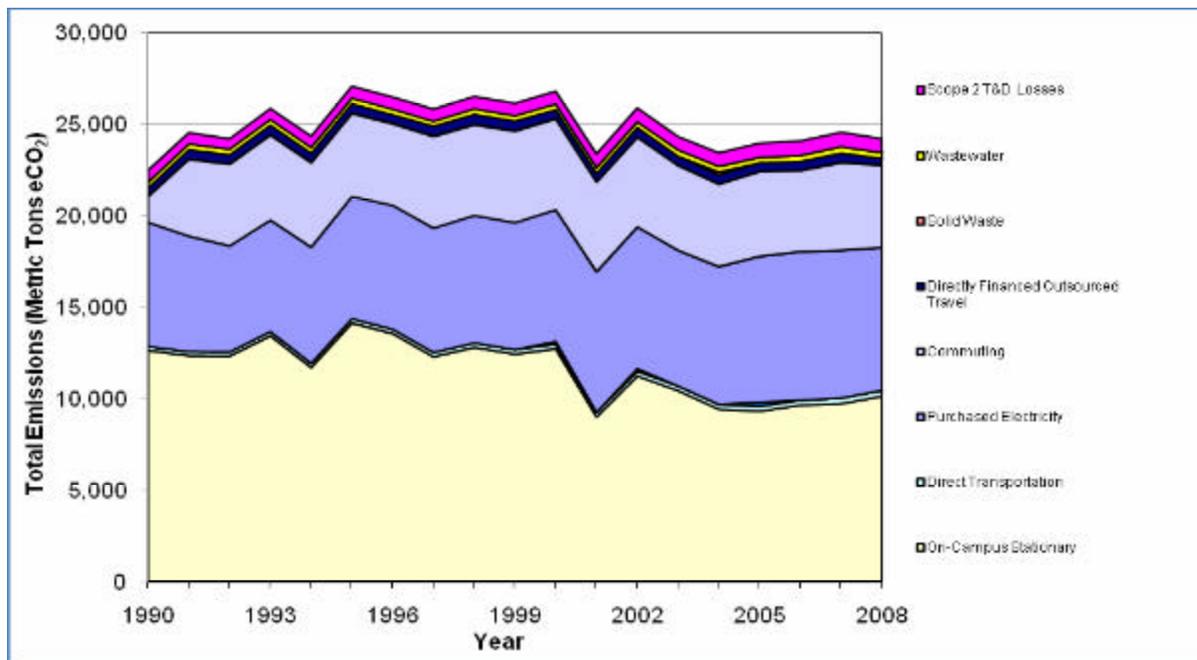


Figure 1. Total Emissions in Metric Tons eCO₂, 1990 to 2008

Sustainability Efforts at Geneseo to Date

Even before the establishment of the Sustainability Task Force, the College committed to sustainability projects in facilities and operations. In 2001, a major upgrade to the campus power plant resulted in substantial energy savings for the campus. The improvements included installation of variable speed drives, and an electronic energy management system, along with efficiency improvements on equipment. Other changes in policies and practices that have resulted in noticeable changes in energy usage include: reduced heat/cooling during college breaks and holidays, window replacement in older buildings, installation of occupancy sensors for lighting in several buildings, and the requirement that all energy related equipment purchased must be Energy Star rated. In addition to these improvements, other sustainability practices and projects already in place include: an annual Kill-a-watt dorm energy saving contest, 100% recycled-content copier paper use across campus, double-sided printing as the default setting on campus printers, use of the ANGEL electronic course information system to reduce the amount of printed paper used in courses, use of "green" cleaning products by custodial staff, addition of low emission and electric vehicles to fleet, and providing local public transportation via LATS bus system.

The Campus Auxiliary Services (CAS) has become a leader in environmentally sustainable projects on campus with projects such as the installation of energy efficient washers and dryers in the dorms, saving almost 2 million gallons of water per year. Other CAS-led projects include a reduction in use of paper napkins in all food service operations, elimination of plastic water bottles at on-campus catered events, reduced food waste through implementation of tray-less dining facilities, promotion of the use of refillable beverage containers with discount at campus food service establishments, purchase of locally produced food whenever available, and initiation of a Zipcar service on campus. In Fall 2009, CAS switched to a primary vendor and was able to eliminate their central warehouse. This resulted in elimination of a >25,000 ft³ of cooler/freezer space (and the energy required to maintain it). In cooperation with the campus grounds staff, CAS is composting all pre-consumer food waste on campus. CAS opened the 2009-2010 school year with a waste-free welcome picnic for the incoming freshman class.

Education and Community Action for Sustainability to Date

Geneseo offers the student body a number of ways to learn about and engage with sustainability issues in the curriculum and through co-curricular activities. All students have the option of undertaking a formal study of sustainability issues through an interdisciplinary Environmental Studies minor. In addition to the courses that are part of this program of study, a recent EISTF survey found that sustainability issues are mentioned as at least a somewhat important component of 46 courses in the College. These courses represented 22% of the courses taught by all 112 survey respondents. This suggests that students at the College may address issues of sustainability in at least one of their courses during their studies at Geneseo.

In addition to learning about sustainability through their academic experience at Geneseo, co-curricular life at the College also offers many ways for students to get involved with sustainability issues. Geneseo Environmental Organization (GEO), a student club, promotes environmental awareness and responsibility on campus through educational activities, and campus-based activism and stewardship. GEO is growing and gaining momentum on campus, with over 70 active members in the 2009-2010 school year. All residence halls on campus have an Eco-rep on the Hall Council responsible for supporting sustainable activities and events in the hall. Beginning in Fall 2010 Putnam hall will house "Ecohouse" a student-initiated, environmentally-centered residential community. Other campus groups active in sustainability related activities and issues on and off campus include: the Geneseo Food Program, the Community Garden, the College Union, Ecology Club, Geology Club, and the Geneseo Outing Club.

The Sustainability Task Force, together with other campus organizations, sponsors the annual Live Green event, Earth Week activities, and speakers on campus that draw students, faculty, staff, and community members together to engage with issues related to sustainability.

A Blueprint for Future Sustainability Efforts at SUNY-Geneseo: The Carbon Action Plan 2010-2050

Calculation of Geneseo's carbon footprint from 1990 to 2008 enabled the Sustainability Task Force to project SUNY-Geneseo's future carbon emissions if no changes were made and the institution continued a "business as usual" scenario. The outcome of this scenario can be seen in the linear growth of Geneseo's carbon footprint from the current 24 MTe CO₂ to 34 MTe CO₂ by 2050 (see Fig. 2). Through the adoption of a proactive scenario with strategic investment in emissions-reducing projects, and engagement of the Campus community in critical behavioral changes, we hope to avoid the business as usual increase in emissions.

The Carbon Action Plan outlined below, and in particular, the specific projects calculated by the Task Force in the Projects section of this report (Fig. 2), illustrate the means by which we may achieve reductions in our carbon footprint over time as steps toward carbon neutrality.

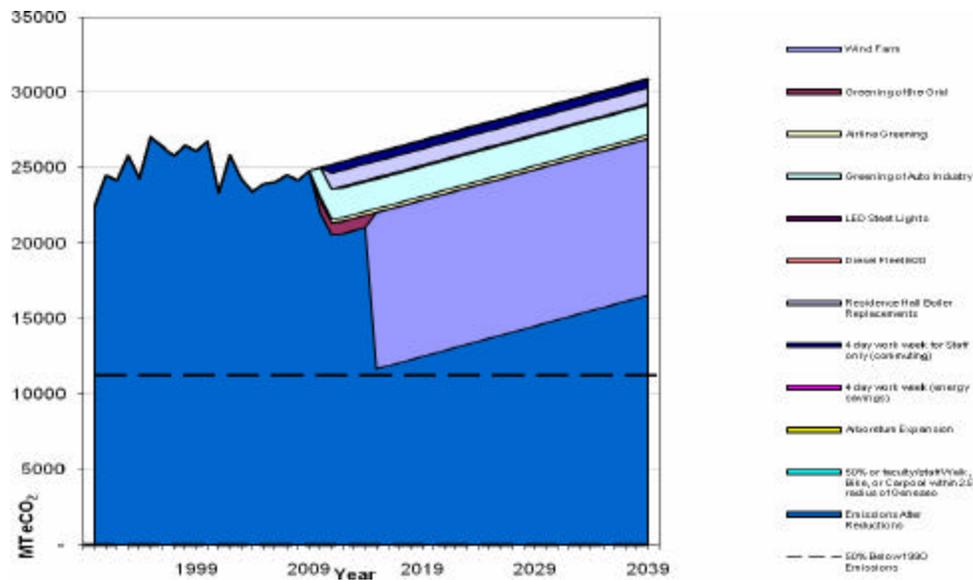


Figure 2. Projection of emissions under “Business as Usual” and showing reductions from both internal and external projects calculated for Geneseo’s carbon footprint.

Period 1: 2010-2020 – The first 10 years

The carbon emissions target for 2020, the end of the first 10-year period of the action plan is a 50% reduction (relative to 1990 emission levels) in campus emissions. This ambitious reduction will be achieved through a combination of increased on-campus efficiency from specific projects and behavioral changes by campus community members, and additional reductions from greening of the wider energy infrastructure (positive externalities).

In order to achieve this significant reduction in our energy usage during this 10-year period, several specific actions and goals will need to be achieved. The following represent our recommended plan of action:

1 – Precisely measure and track energy use on campus through building-level metering of energy and lighting, upgrade of energy equipment and lighting controls where necessary, and ensure all energy systems are working at optimum efficiency.

During the first two years of this period (2010-2012), an Assistant Director for Sustainability & Campus Utilities will enable actions that will allow us to reach our Period 1 goals, including:

- a. Establishment of building-level metering for all buildings, and initiation of monitoring and tracking of energy use. This will enable us to understand current building energy use, identify areas for improvement, prioritize improvement projects, and track progress of programs to alter user behavior.

- b. Continuation and acceleration of the current retrofitting program for building energy and lighting systems, using information collected from (a) to identify and prioritize energy-saving replacements and upgrades.

Additional on-campus energy systems projects for this period include: replacement of boilers in residence halls, solar hot water, and LED street lighting. (See **PROJECTS** section for details).

2 – Track and analyze behavioral patterns of campus community-members' energy use to identify specific programs and policies to support emissions-reducing behaviors. Put in place specific behavior change programs and policies targeted at both the community at large, and at the energy-related behavior of specific constituencies (on-campus residents, faculty & staff and others). These programs will include mechanisms for monitoring and rewarding energy saving behavior.

3 – By 2020 install a 9MW windfarm project and/or invest in purchase power agreement with local wind farm project to cover campus electrical use (see **PROJECTS** section for details).

4 – Educational & Community Outreach Goals: During the first 10 years of the action plan, a major focus of the work of the Sustainability Task Force will be to bring student learning about sustainability issues in line with the College's Mission and Goals. While the College Mission, Values and Goals statement does not currently explicitly mention sustainability, learning and understanding about sustainability issues across disciplines can support the College's current strengths in diversity, global education, active learning pedagogies, student engagement in research and in co-curricular programs that connect students with the local (and global) environment and community. The educational goals will be achieved through:

- a. Adding an explicit statement about sustainability to the College's Mission, Values and Goals. Clarifying the links between sustainability and the College's Mission, Values and Goals will be a useful means of engaging the entire College community (students, faculty and staff, and across admissions, academics, student life and administration) in actively participating in creating a sustainable community, which can serve as model for our students, graduates and the wider community.

- b. Implementing an Environmental Sciences major. The environmental sciences major has been approved at the campus-level. When the major is in place, it will serve to focus the coursework and research projects of students and faculty on the scientific basis of local and global environmental problems and solutions. As a result of this major, we should see an increase in the amount of science course content that addresses environmental and sustainability issues, and an increase in student and faculty research in this area.

- c. Broadening the faculty involvement across the College in sustainability education. While the College already has at least 46 courses that address sustainability in one way or another, in many cases sustainability is not a primary focus of these courses, and the courses are taught by a small proportion of the faculty. The first 10 years of our educational action plan will focus on broadening the involvement of faculty across disciplines in sustainability education. Efforts to engage faculty will include support for participation in local and regional workshops, and

recognition and/or rewards for addition of sustainability to courses, to faculty-mentored student research projects, and to cross- and inter-disciplinary teaching and research.

d. Expanding the idea and practice of sustainability education to include involvement of the Division of Student & Campus Life. Student co-curricular education that occurs through activities sponsored by Residence Life, the Center for Community, the Office of Multicultural Programs and Services among others in the Division of Student & Campus Life offers many opportunities to tackle sustainability related issues through service-learning, programming, volunteering and other activities on and off campus. One clear way this will be achieved will be through the student-initiated Eco-dorm community that will be in place in Putnam Hall beginning in fall 2010.

The overarching mission of the College is the education of our students. A byproduct of making sustainability a theme of that education will be the engagement of not only students, but also the faculty, staff and administration. A common focus on sustainability will also help achieve the behavioral changes (see #2 above) that will be necessary to reach our 50% reduction goal for this period.

Period 2: 2020-2035 – The next 15 years

The carbon emissions target for 2035, the end of the second period of the action plan is an additional 25% reduction (relative to 1990 emission levels) in campus emissions. This will bring the overall reduction from our starting date in 2010 to 75% of 1990 emission levels. During this period, we anticipate technological advances associated with positive spillovers will result in increased efficiency of energy using systems on campus. Of course, the increased efficiency will only be realized with policies in place to continue upgrading utility systems on a regular schedule that takes into account both the functional lifespan of the systems and the energy and financial payback times associated with early replacement of systems. Where payback times are short, early replacement of energy using systems should be prioritized.

The major focus of this period should include:

- 1 – Establishing a plan for replacing the campus power plant no later than 2035. Priority should be given to replacing the plant with a source of renewable energy, either generated on-campus or purchased locally/regionally.
- 2 – Continued focus on ensuring all on-campus energy production and use systems follow state-of-the-art energy efficiency practices so emission reductions are maintained over time .
- 3 – Supporting and maintaining a “culture of sustainability” across campus, such that sustainability is a priority in planning, policy and practice across all divisions of the College, from Academics and Student Life to Facilities, Finance and Administration.

By the end of this second period we should have a much better grasp of the opportunities and challenges that will determine our work in the final 15 years.

Period 3: 2035-2050 – The final 15 years

The carbon emissions target for our final 15 years period, takes us to 2050, when we will achieve a 100% reduction in our emissions relative to 1990 levels. This will require an additional reduction of at least 25% beyond reductions taken in Period 2. By this time we will have taken many actions to increase the efficiency of our buildings and energy systems, and to change the behavior of our campus community. The results of these actions will be a campus community that is using energy as efficiently as possible, and using only the energy we need. Clearly the steps taken in Periods 1 and 2 will not be enough to bring us to carbon neutrality. Our action during the first 25 years will serve as a foundation from which we can make more informed choices in this final period to reach our goal. In January 2010 we are not in a position to anticipate the types of projects and technologies that will be available in Period 3 to reach the goal of carbon neutrality. The goal of this final period should be:

1 – To use the wise council of our campus community (by now invested in creating and maintaining a sustainable community) to choose state-of-the-art technology that will not only allow us to achieve carbon neutrality by 2050, but to do it in such a way that the three pillars of sustainability (People, Planet, and Profits) all benefit from our decisions.

2 – To recognize that sustainability is a process, not an endpoint, and implement plans and policies to continue to strive to create a campus community that can be a model to the wider world of best practices for living lightly on the earth.

A Statement about the purchase of Carbon Offsets

At each of the stages of our Carbon Action Plan, after implementing as many mitigation strategies as possible, it is likely there will be some remaining emissions that must be offset. Purchased offsets will probably be a part of our path to climate neutrality, however, Geneseo understands that they must be secondary to projects that directly decrease emissions. In the situations where the College decides to use offsets to reach emissions goals, we are committed to using carbon offsets that produce legitimate emissions reductions. The Sustainability Task Force recommends that offsets used as part of Geneseo's plan for carbon neutrality not exceed 20% of the total campus emissions at any time during the 40 year plan. The Task Force also strongly recommends that purchased offsets should be as local as possible, and the College should investigate offset programs that have the potential to offer educational and/or research opportunities for students and faculty, and/or benefits to the local community.

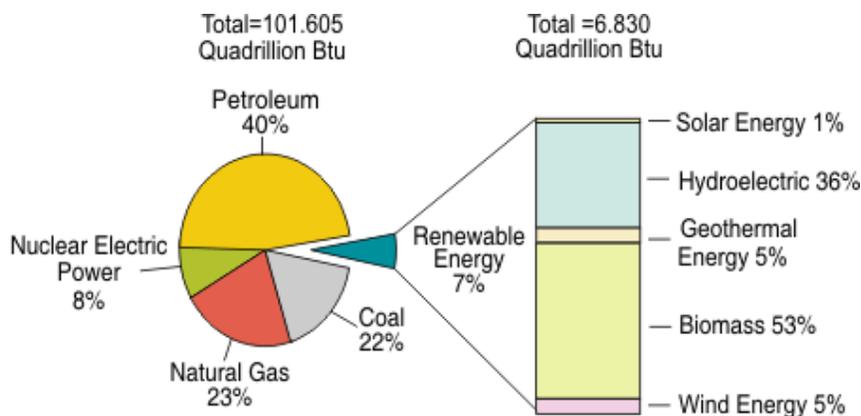
PROJECTS

Positive Spillovers

Positive spillovers are defined as improvements in the greenhouse gas emissions of external entities that have a direct effect on SUNY-Geneseo's carbon footprint. Below we have identified three positive spillovers that we believe have a reasonable expectation for improvement over the next thirty years. These spillovers should be updated and evaluated every two years by the Task Force to verify the accuracy of our assumptions and to monitor their improvements against our carbon footprint.

Greening of the Grid

In 2007 the renewable energy portfolio of the United States electrical grid was approximately 7% (Figure 3). The Obama Administration has committed to renewable portfolio of 10% by the year 2010 and 25% by 2025. However, taking into account our proposed Wind Farm project, we will not be subject to the changes in the renewable portfolio beyond 2015. Prior to 2015, we assumed a modest 0.5% increase in the renewable portfolio per year. From 2009 to 2015 this equals 15 million kWh generated from renewable sources and a total reduction of 4,783.32Mt eCO₂ annually.



Note: Sum of components may not equal 100 percent due to independent rounding.
Source: EIA, *Renewable Energy Consumption and Electricity Preliminary 2007 Statistics*, Table 1: U.S. Energy Consumption by Energy Source, 2003-2007 (May 2008).

Figure 3. Energy Portfolio of the U.S. electrical grid.

Airline Greening- 0.88% eCO₂ Reduction

The airline industry is expected to become greener; the actual rate at which this will occur is speculative, however the goal of the International Air Transport Association is to be 25% more efficient by 2020. To reflect this, we have conservatively projected that the airline industry will be 42% more efficient by 2050, equal to 1% per year from 2009 to 2050. Taking into account SUNY-Geneseo's projected increase in air travel from 654,499 miles in 2009 to 796,701 miles in 2050; we have determined that over that period an average yearly reduction of 304,751 miles can be expected.

Greening of the Auto Industry- 7.30% eCO₂ Reduction

The Obama Administration has set the goal for the average fuel economy of 35mpg for new cars by 2015. By 2020 we believe that most cars on the road will have this rating. The clean-air-cool-planet calculator assumes that the current average is 22.10 mpg. We have projected that the average miles per gallon over the time period of 2010 to 2050 will be 39 mpg. The input for this type of "project" in the clean-air-cool planet calculator is required in total miles. We included the mileage savings in our calculation of commuter miles. As a result, we determined that an increase in miles per gallon will lead to a decrease in 4,885,955 miles per year through 2050.

Internal Projects:

The Sustainability Task Force has identified seven internal projects that, if undertaken, will decrease our carbon footprint by almost 50% by the year 2020 (Tables 2 & 3). We acknowledge that the financial commitments required to proceed with these projects have not been fully investigated. However, we are fairly confident that the opportunity for NYSERDA funding is available based on projects being undertaken at other institutions across New York State. Also, we have thoroughly researched the myriad of potential projects that the college could undertake, and we have chosen to only list those projects that we feel strongly have potential for success.

Internal Projects & Positive Externalities	Mt eCO₂	Reduction
Greening of Auto	1,973	7.30%
Greening of Airline	236.59	0.88%
Wind Project	10,367	38.38%
Boiler Replacements	1,086	4.02%
LED Street Lighting	74.17	0.27%
B20 Diesel	37.86	0.14%
Commuting - 2.5 mile radius	13.99	0.05%
Arboretum	46.70	0.17%
4 day work week	549.03	2.03%
Total	14,384.34	53.25%

1990 Emissions	22,449.10
2020 Projected Emissions	27,012.80
2020 Emissions Target	11,224.60
Projected Emissions Reduction 2020	14,384.34
2020 Total Emissions after Reductions	12,628.47
Shortfall of Emission Reductions	1,403.87

Table 2 (left) – Total eCO₂ reductions in Metric Tons, and percentage change of 2020 emissions

Table 3 (above) –Emissions Projections comparison

Wind Energy- 38.38% eCO₂ Reduction

In Fiscal Year 2008 Geneseo consumed approximately 20 million kWh of electricity. Based on a linear projection, Geneseo's electricity consumption will increase by 70% over 1990 levels to 34 million kWh by 2050. Currently, wind and solar are the only two viable options for producing this amount of electricity through renewable energy projects. Dr. Scott Giorgis in Geological Sciences calculated the capital costs of both solar and wind. From those calculations we determined that wind energy is more fiscally feasible than solar energy for our geographic region. To offset the 20 million kWh of electricity via wind we have identified two options.

- 1: Enter into a power purchase agreement with a wind energy provider.
- 2: Collaborate with the Town and Village of Geneseo (or other local entity) to construct a local wind farm capable of meeting the electricity demand of all three entities. Working hand in hand with the Geneseo community would help to add credence to the project as well as help disperse the capital costs.

In order to offset SUNY-Geneseo's electricity consumption in 2015, and account for the projected increase, six 1.5MW wind turbines would need to be installed for a total of 9MW.

Residence Hall Boiler Replacements - 4.02% eCO₂ Reduction

There are eleven Residence Halls on campus that have 20+ year-old stand alone natural gas fired boilers. These boilers are very inefficient and they are approaching the end of their life cycle. With the assistance of Bill Cox, Plant Utilities Engineer, it was determined that if each of these boilers were replaced we could see a 20% to 30% drop in natural gas use, and a reduction of 1,086Mt eCO₂ annually. We have contacted NYSERDA and we have been told that boiler replacements will be eligible for financial assistance in late 2010. In anticipation of this funding, SUNY-Geneseo should begin planning in order to be prepared to take advantage of the possibility of "first come first serve" NYSERDA funding.

Four day work week (commuting) - 2.03% eCO₂ Reduction

Reducing SUNY-Geneseo employee's work week to four days would translate into up to a 20% savings in eCO₂ for commuting or 549.03Mt eCO₂ per year. There may also be a significant energy savings if academic buildings were placed in unoccupied mode, 24 hours early on a Thursday afternoon. SUNY Canton recently switched to a four day work week and they are estimating a \$250,000 per semester savings in energy costs (Jacobs, 2008). While we recognize that SUNY-Geneseo is a residential college, and some offices and operations cannot be condensed into 4 10-hour workdays, there is ample potential for a move to a four day work week at least during the summer. The energy and financial benefits of this type of change could be maximized with careful analysis of building occupancy and usage by different departments/divisions and housing low-use departments together in buildings that could be

powered down for 3-day weekends. The Task Force recommends revisiting the possibility of a four day work week based on the added sustainability benefits.

LED Street Lighting - 0.27% eCO₂ Reduction

Replacing all 516 street lights on campus to more efficient LED lamps should be investigated. If this project is undertaken the preliminary calculations have shown a reduction of 199,514.72 kWh of electricity per year, which equals 74.17 Mt eCO₂. Other benefits of LED street lighting include the opportunity for programmable controls, such as bi-level lighting and reduced maintenance costs due to longer bulb lifespan.

Arboretum Expansion - 0.17% eCO₂ Reduction

Increasing the amount of land controlled by Geneseo that serves to capture carbon, and landscaping other areas of campus for low-carbon input can result in cost savings and CO₂ reductions for the campus. This approach can lead to cost savings by reducing the amount of land that is intensively mowed, which practice actually emits a large amount of carbon.

In Western New York each square meter of land that is released from management and grows toward a forested community sequesters, or captures, about 600 grams of carbon. We propose that SUNY-Geneseo consider expanding its natural areas by simply ceasing its total managed holdings. These areas can be turned over and managed as natural areas by the college's Roemer Arboretum, a current area of 20 acres found on the south side of campus. The extension proposed here (and see attached map, Figure 4) would add a total of about 19 acres, nearly doubling the carbon fixation currently exhibited by its natural areas and increase carbon sequestration from approximately 50 metric tons of carbon to a total approaching 100 metric tons per year.

We have divided the new natural areas into four separate parcels for consideration (see Table 4 below and Figure 4). Most of annexes #2, #3, and #4 are mowed areas and would result in a reduction in more than 10 acres of mowing. Also, some of the area in annex #1 would be released and allowed to develop into natural vegetation.

Some concern would certainly arise as to what is a move toward sustainability being viewed as simple neglect. To counter this we would request that the Roemer Arboretum Board of Directors, as overseers of the new holdings, work with students to develop signage that would explain the benefits to the sustainability efforts of the college of releasing these sites from active management. We believe this project offers a good opportunity for educating students and the community about the value of reducing our carbon footprint. This project has the approval of the chair of the Board of Directors of the Roemer Arboretum.

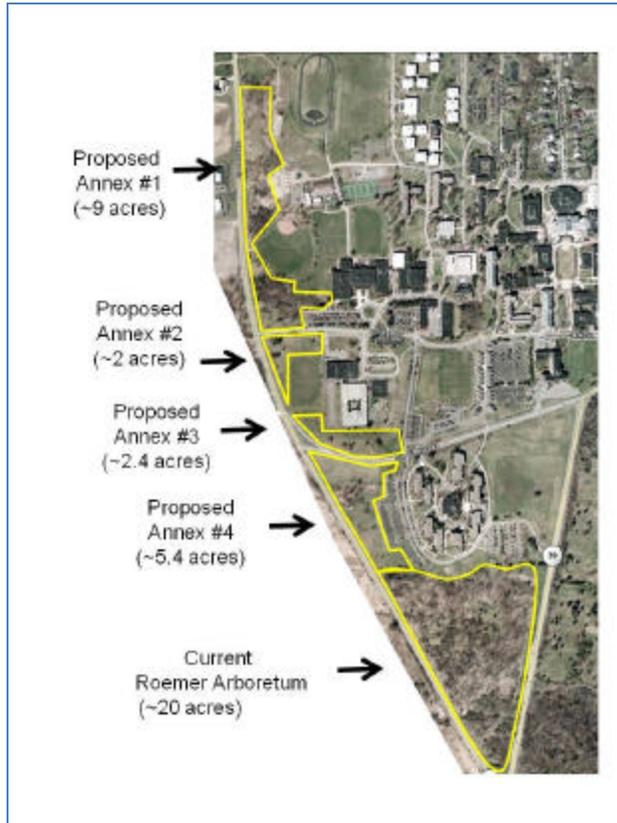


Figure 4. Satellite image of proposed Arboretum Expansion

Annex	Approx. Acres	CO ₂ Sequestered annually (metric tons)
#1	9	22.3
#2	2	5.0
#3	2.4	6.0
#4	5.4	13.4
Totals	18.8	46.7

Table 4. The approximate area covered by each of the four proposed parcels of land and their respective contributions to offsetting the College's carbon footprint.

B20 Diesel Fleet – 0.14% eCO₂ Reduction

By 2012 the SUNY-Geneseo should consider using B20 diesel for the entire campus diesel fleet. We recommend that at first we utilize B20 diesel because it is more stable in the cold climate but the ideal scenario would be to use B100 during the warmer months and switch to B20 during the winter months. We estimate that switching the entire diesel fleet to B20 will result in a yearly reduction of 37.86Mt eCO₂.

Commuting by Biking, Walking, and Carpooling – 0.05% eCO₂ Reduction

If 50% of faculty/staff that live within a 2.5 mile radius of the Geneseo campus were to bike, walk, or carpool we could realize a reduction of 13.952Mt eCO₂ annually. We would like to accomplish this goal by the year 2015. Carpooling could be encouraged through reserved “carpool” parking in the most desirable spots on campus. Biking could be encouraged through establishment of covered bike racks, and other incentives.

Other Internal Projects

The “other internal projects” that follow are recommendations of projects worthy of investigation that may lead to additional reductions in our carbon footprint. The exact reduction is has not been calculated at this time and will take more research and time to determine.

Campus Lighting

The task force recommends that college evaluate building lighting and engage in a de-lamping by removing excessive and unnecessary lighting. SUNY-ESF evaluated their lighting and estimated an annual savings of \$42,000, and a yearly reduction of 131 Mt eCO₂. This project can be undertaken with negligible costs to the college and carries a significant potential for savings.

As part of the evaluation of building lighting, SUNY-Geneseo should determine areas that are ideal for light sensing. Most buildings on campus have areas of natural day lighting. However, the lights in those areas remain on during daylight hours. Light sensing could help to reduce the lighting when sufficient day light exists.

Another possible savings is to install occupancy sensors in elevators that automatically turn off lighting when not in use. This should not be an issue since elevators should only be utilized by the disabled and deliveries.

Conversion to all Electric Fleet Vehicles

A further reduction in emissions may be realized through the conversion of gasoline campus fleet vehicles to electric. The additional electricity usage consumed for charging could be offset through the wind energy project.

Website for Carpooling

In 2010 an interactive website will be created that will help to foster the pairing of potential carpoolers. In order to promote carpooling SUNY-Geneseo should consider offering incentives to carpoolers such as privileged parking. SUNY-Geneseo should make a point to remind the college community of the benefits of carpooling at the beginning of each semester.

Programs for Supporting Individual Behavioral Change

As the successes of the student-run Kill-a-watt contest in the residence halls (which have saved up to \$10,000 in utility costs in a single month in 2008), and Recyclemania have shown, programs to stimulate individual behavioral change can result in real reductions in carbon emissions on campus. In order to realize the reductions needed to achieve Geneseo's emissions goals over the next 10 to 40 years (Table 3), members of the campus community will need to adopt changes in individual daily behaviors. The College will need to find ways to support and encourage these individual behavioral changes. Support may come in the form of education about the benefits of behavioral change or financial incentives and "prizes" for those who make a significant change. Active and visible participation in behavioral change programs by Administrators and other leaders on campus will be necessary for the success of these programs.

Conclusion

The aforementioned positive spillovers and internal projects on their own will not accomplish our first Emission Reduction Milestone of 50% of 1990 levels by 2020 (Fig 5). In order to achieve this goal we must undertake these projects and find additional means to reduce our emissions. If we only undertake the projects outlined here we will fall short of our goal by 1,403.87Mt eCO₂ in the year 2020 (table 4). However, it is possible that further reductions may be met through better than expected efficiencies from positive externalities and internal projects. We also expect that our efforts to further educate the SUNY-Geneseo community on sustainable practices and the resulting behavioral changes will help to achieve our goals.

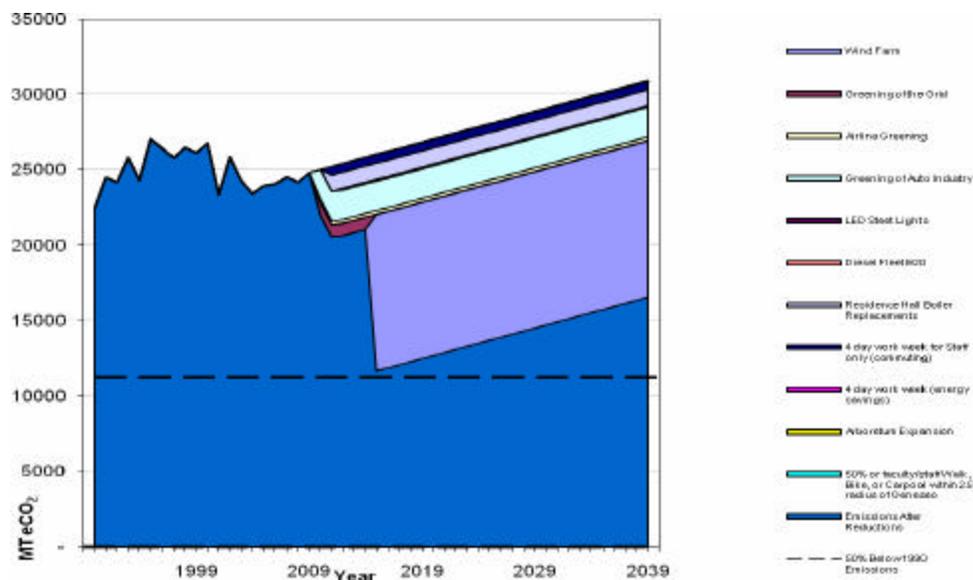


Figure 5. Projection of emissions under “Business as Usual” and showing reductions from both internal and external projects calculated for Geneseo’s carbon footprint.

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