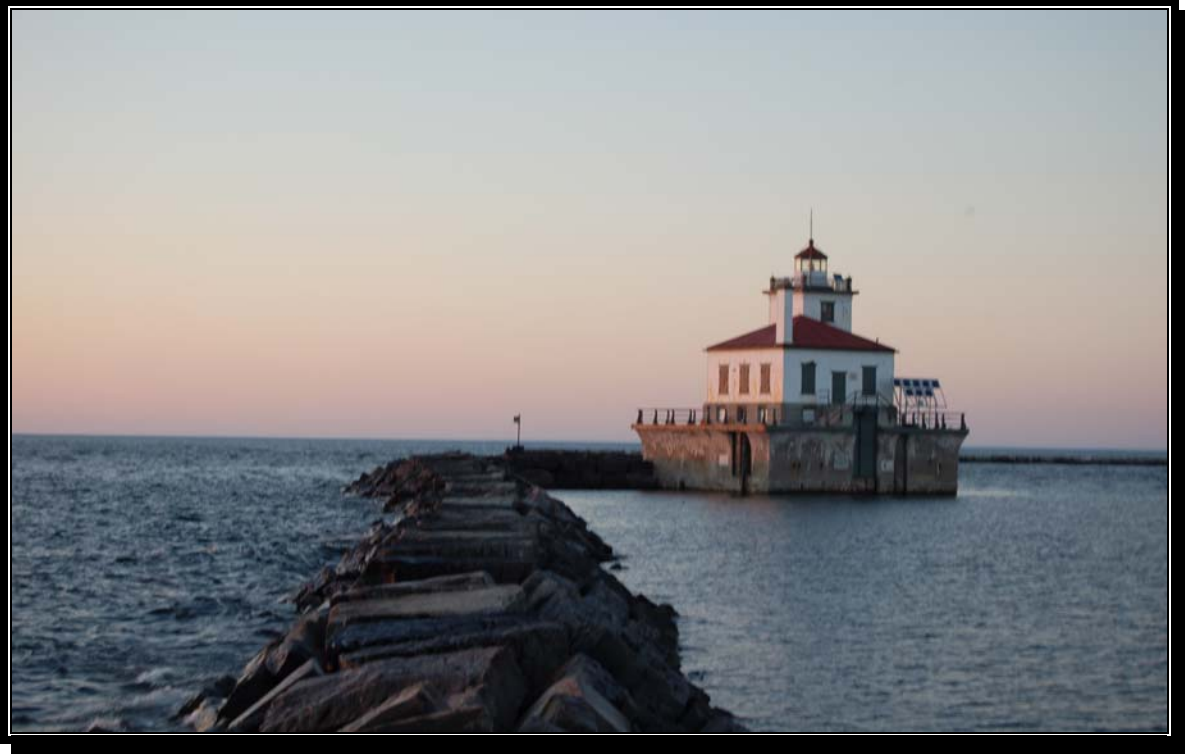


SUNY OSWEGO



Climate Action Plan

September 2009

1. PRESIDENT'S MESSAGE

I am pleased to present Oswego's first Climate Action Plan. This forward looking and ambitious document represents our continuing commitment to leadership in resolving complex global issues. Building on the expertise and creativity of the Oswego community, this plan aspires to be a challenge to all of us to imagine new ways of advancing economic, social, and environmental quality simultaneously in the face of significant global challenges. The challenges and opportunities that this effort presents will help us to create innovative solutions that enrich the lives of students, communities and our world.



Through the climate action planning effort we seek to set a new direction for the college as a catalyst for thoughtful transition of the way in which our community and the region use and protect vital resources. Guided by our commitment to excellence, SUNY Oswego will strive to emerge as a resilient and efficient institution, recognized for its leadership in engaging members of the college community and the region to integrate strategic and resource planning on a meaningful level and to develop personal and structural relationships that leverage learning, research and service in ways that benefit all members of our community.

Our goal is also to ensure that all our students are fully prepared for the future with the intellectual capacity, skills, and access to technologies that enable them to innovate and adapt in an equitable, ethical and sustainable way. The strategic directions and goals contained in this plan will help to advance our ongoing response to the rapidly evolving circumstances of a new era. We envision a future where intentional learners with clear understanding of the interdependencies of social, economic and environmental challenges invent a better world and are prepared to address the root causes of societal issues.

I am deeply grateful for the many members of the college community who informed, strengthened and participated in drafting the plan that will serve as an important guide to our support for the health and well being of future generations.

Deborah F. Stanley

President

2. SUSTAINABILITY VISION STATEMENT

Adopted 4/7/09 – Campus Concept Committee

SUNY Oswego will transform its educational, operational, and financial cultures to provide leadership in a world where the efficient and equitable use of natural, social, and economic resources is critical. Going well beyond energy conservation and recycling, we will engage all stakeholders in the challenge of creating a resilient society and a sustainable future. We will create and support institutional structures that continuously measure, evaluate, and improve our environmental and social performance along with our traditional financial and accreditation assessment models. Through the development and execution of this vision SUNY Oswego will be a more innovative institution, achieve its goal of carbon neutrality and fulfill its mission of education, research, and service in a sustainable world.



Educationally, SUNY Oswego will advance students' understanding of environmental, cultural, political, and economic aspects of sustainability through curricular and co-curricular programming. Students will graduate with an understanding of the regional, national, and global dimensions of sustainability and an appreciation of their civic responsibilities. Faculty and staff will be encouraged to pursue research and professional development related to sustainability. These educational commitments will extend beyond statements of concern to significant actions as environmentally conscious citizens of the world.

Operationally we will create a learning organization at all levels. We will transition to sustainable energy sources through effective evaluation and implementation of new technologies. We will plan and execute investments in facilities, infrastructure, and operational methods in a manner that maximizes social benefits and minimizes the use of non-renewable resources. We will use an integrated academic, administrative, and operational decision support system to attain the lowest possible resource use.

Financially and administratively, the institution's employees, affiliates, suppliers, contractors, and investment partners will demonstrate the highest level of resource conservation, social responsibility, and ethical standards. The institution will promote and facilitate the development of local and regional relationships that are beneficial in all aspects of community life.

3. CARBON REDUCTION STRATEGY SUMMARY

SUNY Oswego’s strategy towards operational carbon neutrality can be broken down into five areas:

- Improve operational efficiency
- Reduce fossil fuel use through expansion of geo-thermal heat pumps for building heating and cooling
- Community engagement and integrated community planning to better manage transportation, housing, local and regional supply chains, and appropriately scaled infrastructure.
- Development of alternative sources such as lake sourced geothermal, wind power, passive and active solar applications, and combined heat and power.
- Residual carbon management through local and regional carbon credits

We recognize that while SUNY Oswego accepts full responsibility for its carbon footprint, becoming carbon neutral will require successful engagement and integration of strategic planning beyond the borders of the SUNY Oswego campus. To that end a successful strategy must involve the Greater Oswego area, including the Town and City of Oswego, the County of Oswego, the City School District, the Oswego Hospital, and other local businesses and institutions. Taking this expanded approach towards sustainability will maximize the economic benefits of infrastructure investments and optimize benefits to the social and environmental aspects of the “Triple Bottom Line”. We believe that community resilience and sustainability can only be achieved through cooperative planning and development of appropriate and diversified energy, housing, transportation, education and skill development, job and business growth, and health and wellness opportunities.



Energy conservation and efficiency opportunities include measures such as high efficiency lighting, demand controlled ventilation, and water use reduction to reduce the energy need for the

campus. The reduction of dependence on fossil fuels in facility operations will be implemented primarily through the widespread application of geothermal heat pump systems. The phased conversion to this proven and rapidly developing technology will occur through our ongoing building renovation process and will achieve the operational and supply chain expertise necessary to position the campus and its partners to take advantage of future investments in lake source geothermal from Lake Ontario.

Lake source geothermal offers the greatest energy opportunities on a regional basis with many questions to be answered to optimize the cost and system scale. Once a minimized fossil fuel demand has been replaced with electricity demand, the electricity will have to be produced in a carbon neutral manner. The strategies for this include the campus and its partners developing applications of wind power, co-generation, and solar photovoltaics as well as purchasing green power and carbon credits to offset the remaining direct and indirect fossil fuel use.



Transportation, and more specifically commuting, contributes a large percentage of the CO₂ emission on the campus. Strategies for reducing emissions include making the campus friendlier for walking, bicycling, and mass transit through implementation of a traffic demand management plan that will include both physical and policy initiatives. Transportation energy demand can only be addressed regionally.

The availability and effectiveness of mass and multi-modal transit, need reduction through housing and urban planning policies, and incentives for reduction in single occupancy vehicle commuting will require broad engagement as well as changes in market and policy dynamics that will continue to present challenges. Optimization of a transportation plan will only achieve success if implemented regionally and beyond to meet the needs of the students, faculty, staff and visitors.

4. FINDINGS

A carbon footprint for the SUNY Oswego campus was prepared utilizing “Clean Air – Cool Plant Campus Carbon Calculator” and was updated in 2009. Results showed that SUNY Oswego Campus produced a net eCO₂ of 44,736 metric tons during the year 2008. On-campus stationary equipment is the largest contributor of CO₂ on the campus (40% for 2008). The largest contributor in this area is the campus’ central heating plant that utilizes natural gas to produce steam for heating the campus. Fuel oil is occasionally used as a backup source. Purchased electricity is the second largest contributor of CO₂ (31% for 2008). The third contributor is transportation (29% for 2008) that includes commuting, direct transportation, and air travel, with commuting being the largest factor in this category.



In preparation of the Climate Action Plan, a Campus Wide Sustainability Study was conducted to identify potential opportunities for reduction of CO₂ from the campus operations. Each of the opportunities was evaluated utilizing performance indicators for environmental, economic, and social/academic benefits (Triple Bottom Line). Included in the evaluations were CO₂ reduction, first cost, payback, social advancement, and learning opportunities. The top opportunities were then evaluated further for implementation and synergies and plotted against the overall campus CO₂ emissions. If all of the selected strategies are implemented successfully, the campus can reduce its emissions by approximately 25% by 2015 and 40% by 2020. For the campus to reach carbon neutrality by 2050, a combination of green electrical power purchases and carbon-offset purchase is required. The following figure shows the CO₂ reduction trajectory utilizing the selected strategies.

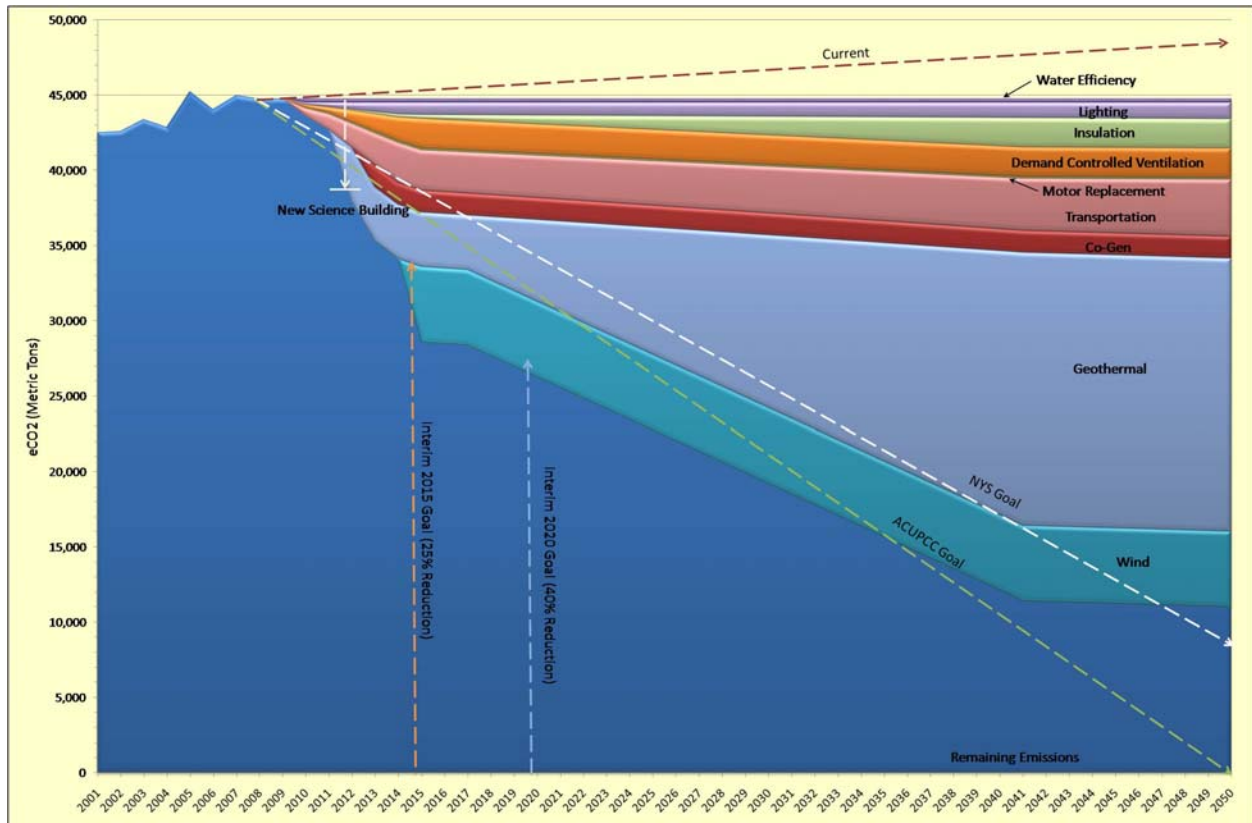


Figure 1. SUNY Oswego Carbon Neutrality Strategies

One of the results of this climate action plan will be to convert the SUNY Oswego campus to as near a fully electric campus as possible, eliminating the use of fossil fuels for heating. Converting all of the buildings to a geothermal heat pump system for heating and cooling will have a dramatic effect in reduction of fossil fuel burning. Strategies for reducing purchased electricity include such things as replacing lighting and motors and production of green energy through wind and solar power. In completing these actions, green house gas emissions opportunities can be realized through the production and purchasing of renewable carbon-free power.



A key factor in reaching the goals of the climate action plan is the involvement of the Greater Oswego community, including local leaders, schools, hospitals, the City of Oswego, and transportation providers. All working together can provide a greater whole than the sum of the individuals. Working towards shared facilities such as lake source cooling and heating and wind power will allow for economy of scale, reach more people, and become more economically feasible. Developing a regional transportation system to encourage mass transit will require close collaboration and cooperation.



Table 1 outlines cost for CO₂ reduction opportunities found feasible for the campus and figure 2 shows graphically the relative current cost per metric ton of CO₂e reduction. It is anticipate that the cost per ton of CO₂ reduction will change over time as technologies and availabilities of products improve. It should be noted that the figures for lake source geothermal are shown as if the campus initiated a

standalone project without community involvement. The overall cost for implementing a community wide lake source system would provide for economy of scale and result in overall lower costs to SUNY Oswego while increasing the overall CO₂ reduction benefits.

| Opportunity | Total Cost | Savings/Year | Annual CO ₂ e Reduction | Cost/ Metric Ton CO ₂ e |
|-------------------------------|--------------|--------------|------------------------------------|---------------------------------------|
| Water | \$39,238.20 | \$30,395 | 242.5 | \$162 |
| Demand Controlled ventilation | \$841,500 | \$469,011 | 1973 | \$426 |
| Lights | \$318,886. | \$88,047 | 683 | \$467 |
| Ground Source Geothermal | \$30,096,825 | \$2,094,739 | 12949 | \$2,324 |
| Motors | \$321,803 | \$32,785 | 112 | \$2,873 |
| Wind | \$15,550,000 | \$1,200,000 | 4992 | \$3,115 |
| Cogeneration | \$4,800,000 | \$348,000 | 1470 | \$3,265 |
| Lake Source Geothermal | \$52,000,000 | \$2,425,760 | 13746 | \$3,782 |
| Solar Thermal (Per Building) | \$172,516 | \$3,875 | 25 | \$6,900 |
| Solar PV (per 25kW) | \$87,500 | \$1,669 | 7 | \$12,500 |

Table 1. CO₂ Reduction Opportunities

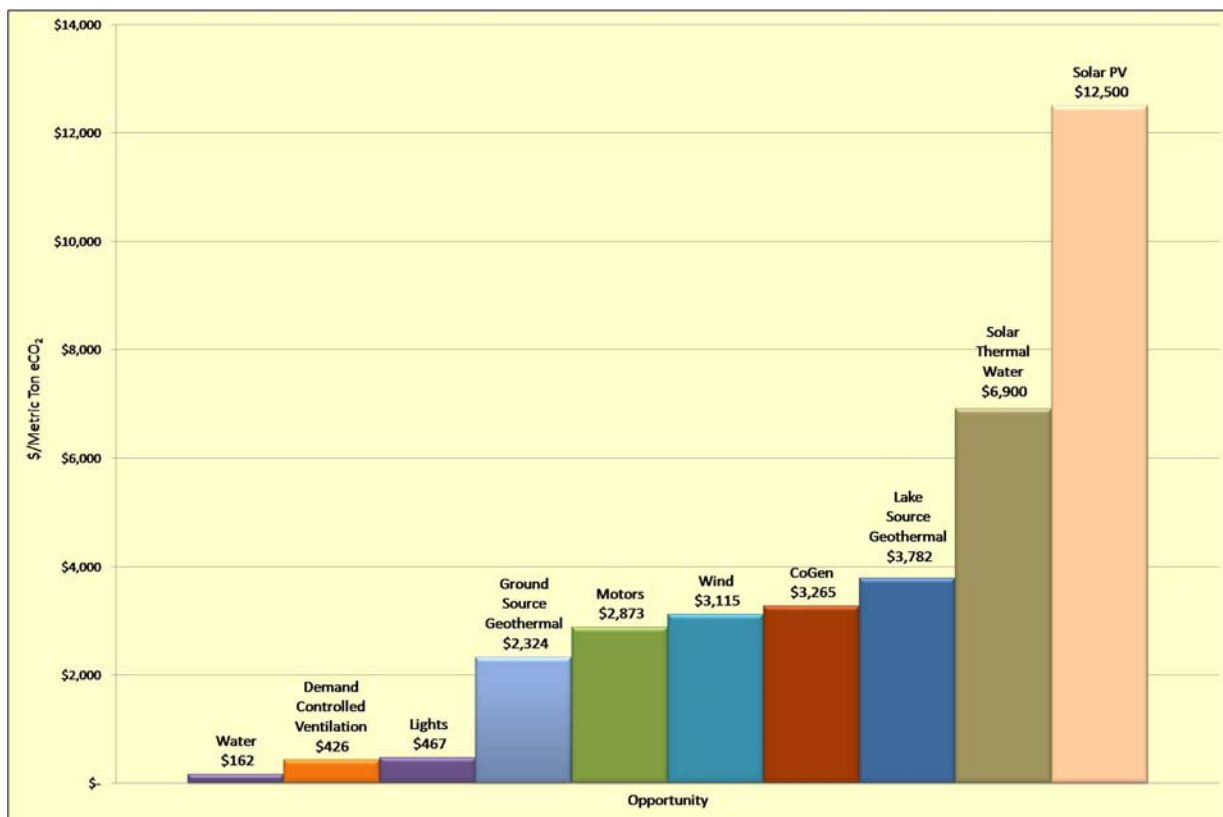


Figure 2. Cost per Metric Ton CO₂e Reduction

SUNY Oswego has a large cohort of commuters to the campus and this one factor is the hardest to control. Through the implementation of a Transportation Demand Management Plan, reductions in this source of CO₂ are achievable and will require behavioral changes by students, faculty and staff that can be encouraged through transportation policies



The following is recommended schedule for implementation of the emissions reductions measures shown in Figure 2 above:

Near Term Strategies (25% GHG reduction by 2015):

1. Demand controlled ventilation systems for academic buildings
2. Start a program for replacement of standard efficiency motors with premium efficiency motors
3. Replacements of fluorescent light bulbs with higher efficiency light bulbs
4. Install lighting occupancy sensors in buildings
5. Replacement of shower heads in dorms with low flow fixtures
6. Roof replacements with additional insulation on three buildings
7. Continue new construction efforts with geothermal heat pumps
8. Renovation of three existing buildings with geothermal heat pumps, increased insulation, high efficiency lighting, etc.
9. Investigate strategies for wind power cogeneration and involve community leaders for possible shared facilities
10. Investigate strategies for cogeneration
11. Investigate strategies for lake source geothermal cogeneration and involve community leaders for possible shared facilities
12. Implement Transportation Demand Management Plan with regional involvement

Longer Term Strategies (40% GHG reduction by 2020):

1. Construct/invest in large turbine wind energy
2. Construct cogeneration system
3. Implement lake source geothermal system if feasible
4. Continue implementation of new high efficiency buildings with geothermal heat pumps
5. Continue renovation of existing buildings with geothermal heat pumps, increased insulation, high efficiency lighting, etc.
6. Investigate feasibility of solar photovoltaic and thermal hot water heating and if cost effective, implement.
7. Continue developing wind energy

8. Revisit Transportation Demand Management Plan and implement

Long Term Strategies:

1. Continue implementation of new high efficiency buildings with geothermal heat pumps
2. Continue renovation of existing buildings with geothermal heat pumps, increased insulation, high efficiency lighting, etc.
3. Revisit Climate Action Plan every 5 years and adjust accordingly to previous progress, successes, and new technologies.

One of the keys to reaching the targets on this climate action plan is the renovation of existing buildings and construction of new buildings. As predicated by New York State Executive Order 111, all new construction and major renovations are required to meet LEED-NC Silver status. It is anticipated over the 40-year period of this action plan, most all of the existing buildings on campus will be renovated. Basic elements of both renovations and new construction include:

1. Geothermal heat pump systems
2. Demand controlled ventilation systems
3. Electric demand side control through building management system
4. High efficiency lighting system with occupancy sensors and day lighting controls
5. Natural day lighting
6. Water conservation measures
7. Implementation of solar photovoltaic and/or hot water systems
8. Increase insulation for wall and roof systems

SUNY Oswego is currently in the final design stages of a new LEED gold science building that will replace two existing buildings. By incorporating the strategies listed above a reduction of approximately 6,000 tons per year of CO₂ is anticipated compared to the two existing buildings and will provide the campus with a state of the art science facility. The new facility is planned to open 2012.

The strategies for carbon neutrality have been prepared utilizing today's techniques and technologies while trying to forecast what is beyond the horizon. With the ever-changing technologies and increasing efficiencies of equipment, this action plan will be revisited and updated at a minimum every five years to increase the overall sustainable strategies for the campus. SUNY Oswego is committed to sustainability and carbon neutrality for our campus and will provide the resources to implement this Climate Action Plan.

5. Acknowledgements

SUNY Oswego would like to thank the following individuals and organizations for their support and assistance in completing this document:

Jerry DeSantis, P.E.

John Moore, P.E.

Melissa Henriquez

Nancy Bellow

Dr. Lorrie Clemo

Jeffrey Robbins, P.E., LEED-AP

Glenn Heyer, P.E., LEED-AP

Joseph Moreau

Thomas Simmonds

Nicholas Lyons

Dr. Susan Coultrap-McQuin

Dr. Susan Camp

Deborah Haynes

C&S Engineers

New York State Energy Research and Development Authority

State University Construction Fund