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CAMPUS ecology®

Mount Wachusett Community College
Gardner, Massachusetts
Spring 2008, Energy

BACKGROUND

Campus Profile

Mount Wachusett Community College (MWCC) is a two-year, public institution with an enrollment of more than 9,000 full- and part-time students. The main campus (Gardner) is located in north central Massachusetts on a 300-acre campus set in a beautiful rural setting. The college also offers programs of study at satellite campuses located in Leominster, Fitchburg and Devens.

As a publically supported, community-focused institution of higher education, the college provides open access to affordable, high-quality programs and services that are relevant and responsive to the changing and dynamic needs of its service delivery area. MWCC offers more than 40 degree and certificate programs that prepare students for jobs in high-demand fields, such as health care and bio-manufacturing, or to transfer to a four-year college or university.

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GOALS AND ACCOMPLISHMENTS

Goals

Due to its geographic location and its total dependency on electricity (an all-electric campus), the college was faced with utility bills that were, on average, twice that of comparable institutions. The goal of the project was to convert the campus to an alternative energy source that addressed:

- The rising and disproportionate costs of energy in the Northeast;
- The nation's continued dependence on foreign oil and its impact on national security;
- The obligation to address the college's energy requirement in consort with environmental protection.

After a great deal of research, the college decided to convert its heating system to a closed-loop hydronic system that utilizes biomass as a fuel source. By incorporating biomass, the college is using a fuel source that is renewable, locally available, cost effective, environmentally friendly and publicly acceptable.

Accomplishments

Mount Wachusett Community College has developed a national and international reputation as a leader in using alternative energy and in energy conservation and carbon dioxide ($C0_2$) reduction. College staff have aggressively pursued numerous initiatives and projects to decrease the College's dependence on foreign fuel, reduce greenhouse gas emissions and to educate our students and our community on the

multitude of benefits associated with renewable energy options. The college's conversion of its all-electrical campus to a biomass hydronic district-heating system contributed to the elimination of woody biomass from the waste stream, addressed the nation's energy and homeland security policies, demonstrated the use of a sustainable and locally available feedstock and has had a very positive effect on the college's operating budget.

College personnel have developed an impressive list of projects that have built upon the success of the conversion to develop new and exciting initiatives that will further reduce the college's dependence on fossil fuel and reduce greenhouse gas emissions.

The following projects demonstrate MWCC's commitment and innovation:

- The college was awarded $1M from the U.S. Department of Energy to promote wind turbine technology and is currently in the permitting process to install two 1.65 MW turbines.
- The U.S. Department of Energy awarded the college $1M to install and test a biomass CHP gasifier that will produce electricity and thermal energy.
- The college was awarded a Clean Renewable Energy Bond (CREB) that, combined with a grant from the Massachusetts Renewable Energy Trust, will lead to the installation of a 100 kW photovoltaic array (summer 2008). The college is also in the process of installing a white membrane (cool roof) that will increase the efficiency of the photovoltaic array.
- As part of a U.S. Department of Energy grant, the college coordinated the efforts of eleven state energy offices to encourage the use of biobased fuels and biobased products for large private and public users. Partners included the Coalition of Northeastern Governors (CONEG) Policy Research Center, United Soybean Board, National Biodiesel Board, Brookhaven National Energy Laboratory and World Energy Alternatives.

These efforts illustrate the college's commitment to sustainable practices that will ultimately help achieve climate neutrality, climate protection and energy efficiency.

Challenges and Responses

The major challenge was to convince state regulatory bodies and funding sources that the use of biomass to heat a 435,000-square-foot facility was not only practical but also cost effective.

The conversion of the campus was coupled with a variety of energy conservation measures (ECMs) that led to a persuasive argument as to the benefit of demand-side management as opposed to generation or cogeneration. The tireless efforts of the campus to provide quantifiable data to support the availability of supply, the predictability of cost and the environmental impact led to the college being able to leverage funding from a variety of sources and to complete the $4.3 million project without using any institutional funds.

Additional challenges were attributed to the initial incorporation of a core separator to address particulate emissions. Although thought to be the best available technology at the time, this application was ultimately replaced with a conventional bag house.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

The project involved a tremendous amount of effort on the part of a variety of agencies and organizations including: U.S. Department of Energy ($1M Grant), Massachusetts Technology Collaborative–Renewable Energy Trust Fund ($750K), MassElectric (ECM Rebates), Coalition of Northeastern Governors, Massachusetts Division of Capital Asset Management, Massachusetts

Division of Energy Resources, Massachusetts Department of Environmental Protection and NORESCO (general contractor and performance contract).

Ongoing conservation and renewable energy initiatives have been led by a team consisting of the college's Executive Vice President, who also serves as the campus's resident engineer, the Director of Facilities Administration and the Director of Facilities Maintenance and Mechanical Systems.

Funding and Resources

The creative use of grants, contracts, energy rebates and performance contracting led to this project being completed without the use of any college resources. Major contributors to the project included:

- U.S. Department of Energy: $1,000,000
- Massachusetts Technology Collaborative – Renewable Energy Trust: $750,000
- MassElectric Rebates: $400,000
- Division of Capital Asset Management: Deferred Maintenance: $280,000

Community Outreach and Education

The college has expanded offerings within its Natural Resources Program to include the following courses: Renewable Energy Sources, Energy Efficiency and Conservation Methods and Introduction to Energy Management Principles. It has also recently hired a Director of Sustainability, whose role will include developing a concentration in Sustainability/Renewable Energy. Students in a variety of programs and disciplines have benefited from the college's renewable energy initiatives. For example, the Executive Vice President, Director of Facilities Administration and Director of Facilities Maintenance and Mechanical Systems are regularly scheduled lecturers in the natural resources program. Students analyze moisture content of the feedstock while others in our journalism and broadcasting/telecommunication programs have documented the success of our programs. Some students have formed a "green society" while others are planning a conference on renewable energy as part of a service learning project. The college's photovoltaic array will be linked to information kiosks that will be located throughout the building to report electrical generation, savings, CO_2 reduction, etc. A similar arrangement will provide information derived from the wind turbines.

The college has demonstrated its leadership in promoting renewable energy options to a wide variety of constituencies.

- The college has been working with its foundation to establish a Center for Sustainability & Renewable Energy, which will provide a formal setting to be used to disseminate information, educate both the public and private sector and promote sustainable practices that will ultimately help achieve climate protection and energy efficiency.
- The college's Executive Vice President was recently asked to be a member of a U.S. delegation of education and training professionals that traveled to Germany to study workforce development strategies that could be used to address annual renewable energy market growth in the areas of wind turbine technology, solar and photovoltaics.
- Both the Executive Vice President and the Director of Facilities Administration have been invited to speak throughout the country and abroad on renewable energy related topics
- Due to their expertise in renewable energy, college staff members have been asked to sit on numerous private, municipal and nonprofit-organization building committees and have provided free consulting services throughout New England.
- The President of the college has initiated a unique partnership with the Doyle Conservation Center, a nonprofit organization dedicated to promoting environmental stewardship. This

partnership will provide a lecture series focusing on sustainability and renewable energy strategies that will be free of charge and open to the general public.

Campus Climate Action: Your School's Carbon Footprint

The college's investment in renewable energy has led to savings of over $2.674 million over the past five years and to a reduction of greenhouse gas emissions by 22.5 percent. The college has offset more than 25.3 million kilowatt hours of electricity (a 45.97 percent reduction) and reduced its water consumption by 13.3 million gallons (a 52.52 percent reduction).

The energy savings accomplished by this project provide a significant environmental and health benefit from the reduction of air pollutants. Cumulative emissions reductions include: 11,000 tons of CO_2, 18 tons of nitrogen oxide and 47 tons of sulfur oxide. This translates to an equivalent of planting 3,012 acres of trees and removing 1,920 cars from the roads.

National Wildlife Federation's Campus Ecology® Program

MWCC benefited greatly from its exposure as a finalist in the Chill Out: Campus Solutions to Global Warming national competition. MWCC faculty, students and staff participated in the teleconference, and this helped promote new campus activities and initiatives.

Closing Comment

The fundamental challenge facing today's society is to create political, economic, and social systems that promote peace, humane welfare and sustainability of the environment on which life depends. We feel, and we trust you will agree, that MWCC's initiatives are providing unique opportunities to meet this challenge.