

**Energy Conservation**  
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## **Abstract**

Whether a campus is interested in the economy of energy costs, the social impact of energy policy or entering the arena of renewable energy, one of the first and most important steps is to operate the existing infrastructure as efficiently as possible.

In November 2005, Wisconsin Governor Jim Doyle issued Executive Order 132, which directs state agencies to take immediate steps to reduce energy consumption 10% by 2008 and a 20% reduction by 2010. UW-Stout has the lowest energy usage rates in the UW System as well as operating below the average for the Midwest campuses in the 2004-2005 APPA benchmarking study and is committed to further reducing energy consumption.

UW-Stout has implemented a comprehensive energy management program and energy conservation campaign. The campaign includes both communication and facility initiatives with the goals of remaining number one in the UW System for lowest energy consumption rates, improving public awareness of UW-Stout's positive environmental record, persuading the campus community to reduce energy usage further and to coordinate/connect efforts of various campus and community environmental groups.

UW-Stout has implemented several successful energy conservation initiatives including implementing an Energy Management System, monitoring energy consumption daily by dedicated personnel, conducting preventative maintenance, and communicating to the campus community.

## **Introduction of the Organization**

The University of Wisconsin-Stout (UW-Stout) is one of the 13 publicly supported universities in the University of Wisconsin-System (11 comprehensive institutions plus UW-Madison and UW-Milwaukee). The UW-System designates UW-Stout as a special mission institution, forged from the heritage of its founder, Senator James Huff Stout, a Wisconsin industrialist. Stout believed that people needed advanced education to prepare them for America's developing industrial society. To implement this vision, Mr. Stout founded a private institution called the Stout Manual Training School, in 1891. In 1911, the training school became a public institution named Stout Institute and received teacher-training accreditation in 1928 with programs centered on industrial arts and home economics. In 1932, Stout was accredited as a college and received Master's degree accreditation in 1948. In 1971, UW-Stout became part of the UW-System, when a State of Wisconsin law combined its two public university systems under one Board of Regents.

Now, 116 years since it was founded, UW-Stout's 8,416 students are enrolled in undergraduate and graduate programs in the College of Human Development; the College of Technology, Engineering and Management; the College of Arts and Sciences; or the School of Education. UW-Stout offers a distinctive array of 30 undergraduate and 18 graduate degree programs, which taken as a whole, are unique in the country. UW-Stout offers the smallest number of undergraduate programs within the UW-System.

Approximately half of these programs are offered at no other campus in the UW-System, and several are unique in the nation. Even degree programs appearing to be similar to programs elsewhere are unique in the extent of applied focus.

## **Statement of the Problem/Initiative**

Whether a campus is interested in the economy of energy costs, the social impact of energy policy or entering the arena of renewable energy, one of the first and most important steps is to operate the existing infrastructure as efficiently as possible.

In November 2005, Wisconsin Governor Jim Doyle issued Executive Order 132, which directs state agencies to take immediate steps to reduce energy consumption 10% by 2008 and 20% reduction by 2010. The order prescribes certain guidelines such as room temperature, maintenance and calibration checks on control systems, and types of fixtures in restrooms. Other more innovative ideas are left to the discretion of the agency – items such as scheduling of facilities or personal conservation measures. In 2005, UW-Stout spent more than \$2.5 million on electricity, heating, cooling and other utilities. Complying with this Executive Order means cutting the equivalent of \$500,000 (in 2005 dollars), from our energy budget. With the cost of energy prices rising, energy conservation is a concern across the United States, with no clear sign that the energy prices will stop rising in the foreseeable future.

## **Design**

UW-Stout has created an energy conservation campaign. The campaign includes communication initiatives and facility initiatives. The target audience of the communication campaign is the faculty, staff, community members and students. The goals of the campaign include:

- Improve public awareness of UW-Stout's positive environmental record
- Persuade campus community to reduce energy usage further
- Coordinate/Connect efforts of various campus and community environmental groups

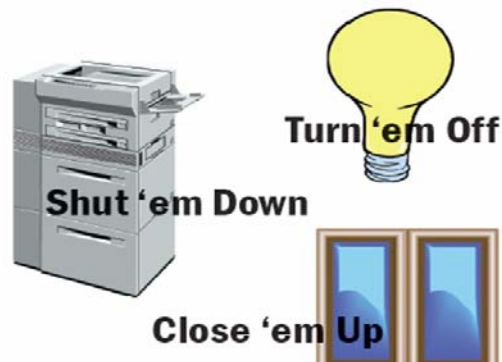
Several campaign vehicles were identified:

- Senior level administration direct communication
- Website and website advertisement
- Print and electronic newsletter
- Articles on UW-Stout's status and action plan

Below is an example of encouraging the campus community to reduce energy usage.

What you can do:

- Power down fume hoods, office equipment, and coffee pots when not in use.
- Shut off lights in unoccupied rooms.
- Power off computers, monitors, printers and other office equipment during nights and weekends.
- Eliminate personal space heaters, fans, microwaves, and refrigerators.



What the administration is doing:

- Occupancy sensors will be installed for interior lighting control, where applicable.
- New purchases will have an Energy Star requirement when the rating is available.
- Vending machine lights are turned off and future contracts will include more efficient machines.
- Computers in Telecommunications and Networking supervised labs are shut down remotely after closing and turned on the next day only when used.
- Buildings will be kept well sealed and climate control equipment well tuned.

As part of the facility initiatives, computer technology is doing its part to help the University of Wisconsin-Stout save energy. Physical Plant's computerized Energy Management System (EMS) is capable of monitoring, regulating, and operating heating, cooling and ventilation equipment in all the buildings on the UW-Stout campus. The system is operated from a central control point in the General Services Building. One of the most important functions of the system is energy management. Two primary features, the HVAC Manager and the Load Manager work together to save energy.

The HVAC manager feature allows for a maximum efficiency in the use of heating, ventilation, and air-conditioning equipment.

The computer determines at what time of day it should turn on equipment in order to heat or cool an office, classroom or laboratory to a comfortable temperature. Throughout the day, temperature and equipment are continuously monitored and adjusted. In the summer daytime thermostats are set to 76 degrees and winter daytime thermostats are set to 68 degrees, with system shutdowns at night. HVAC equipment is scheduled to operate according to class schedules and building open hours for each semester. Adjustments to the schedules are made weekly for special events, changes in class locations or times, and for weekend activities.

The Load Manager feature is more concerned with moment-to-moment energy consumption. It is possible to shut down less-critical equipment for short periods of time in order to save electricity.

This is important when the demand for electricity on campus is at its highest level. The university is charged not only for the number of kilowatt-hours used in each billing period, but also for the number of kilowatts used in excess of an acceptable limit during the peak demand period.

When electrical use approaches that limit, the computer will begin to shut down equipment, according to a pre-programmed priority list. HVAC equipment is scheduled to operate according to class schedules and building open hours for each semester. Adjustments to the schedules are made weekly for special events, changes in class locations or times, and for weekend activities. Weekly schedules of campus activities are given to Physical Plant every Thursday by the athletic department, recreation department, and student center. All changes from the normal schedule are then programmed in on Friday, for the weekend and following week. An alternate schedule is programmed on the EMS for all Holidays observed by the campus. All building temperatures are set back at night and on weekends.

In addition to its regulating functions, the system also collects, collates, and tabulates statistical data that can be used for energy consumption studies that lead to changes for more energy-efficient equipment and its use.

Physical Plant dedicates one full-time position as a HVAC Specialist to operate the Energy Management System, troubleshoot HVAC controls and calibrate controls. The HVAC Specialist checks the operation of equipment on the EMS at the beginning of his work shift. He checks the operation of all air handlers for discharge temperature, return air temperature, position of outside air dampers, and static pressure. He checks the temperature of chilled water in the summer and heating water in winter. Anything that seems out of the normal range is noted and given to the appropriate building mechanic to check.

Physical Plant has six building mechanic positions. Each building mechanic is assigned three to five buildings for which he is responsible. Sixty percent of each building mechanic position is for the daily operation and preventive maintenance (P.M.) of the mechanical equipment in each building. Each piece of equipment has an equipment identification number and a P.M. schedule.

Physical Plant's computerized maintenance management system (TMA) issues a P.M. work order to each building mechanic every month, every other month, quarterly, bi-annually, annually, every two years for each piece of equipment scheduled for P.M. work. Some additional P.M. efforts include the checking of steam traps annually, cleaning of chillier condenser and evaporator tubes annually, re-insulating steam pits, changing filters on air handlers, and checking exterior weather stripping.

Campus custodians and maintenance personnel are asked to turn lights off in any unoccupied rooms that they notice. A reminder is published each year in the campus newsletter asking all faculty and staff to turn off lights when they leave meetings, and breaks, and to turn off office equipment and computers at the end of each day.

### **Implementation**

The implementation of the energy initiatives is monitored by the Vice Chancellor for Administrative and Student Life Services, the Director of Physical Plant, and the Associate Director of Physical Plant. The success of the energy conservation campaign depends on the support from the UW-Stout campus community and the implementation of new ideas and initiatives. Administrators will continue to explore ways to reduce energy consumption, continue to inform the campus community about the success of energy initiatives, encourage individuals to take steps to be an active participant in energy conservation, and will solicit new ideas from faculty, staff and students.

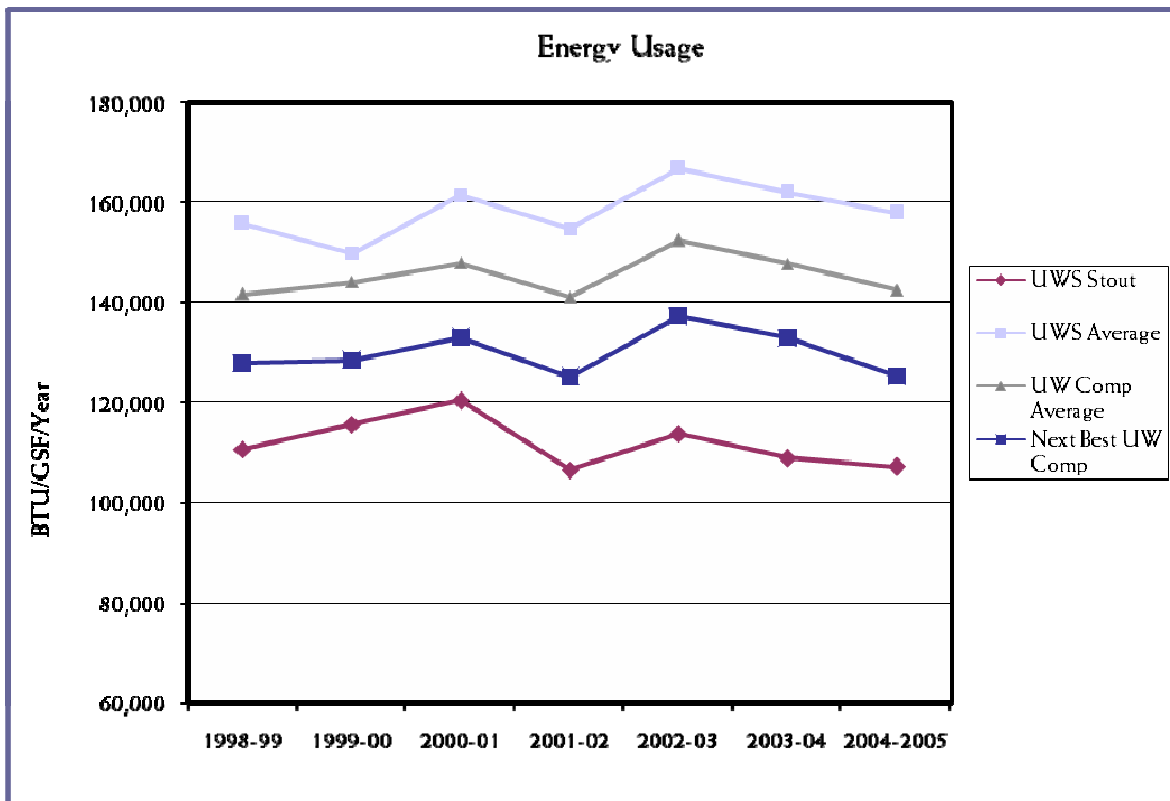
### **Benefits**

The benefits of having an energy conservation program in place range from saving money to diminishing air pollution. UW-Stout has had the lowest energy usage rates in the UW System for over a decade.

The graph below shows trend data from 1998 to 2005.

2005 UW System Energy Data

	BTU/GSF/Year
UW-Stout	107,175
UW System Average	157,966
UW System Comprehensive Average	142,519
Next Best UW Comprehensive	125,281



UW-Stout participates in the APPA Facilities Performance Indicators Report annually. In 2004-2005, UW-Stout had lower Energy Total Cost/ GSF compared to MAPPA (Midwest Region), Master's institutions, Public Institutions, and institutions with enrollment of 5,000-11,999. The benchmarking report compares energy usage, below are the results from the 2004-2005 survey.

2004-2005 APPA Facilities Performance Indicators Report  
Energy Data

	Energy Total Cost/GSF w/o Purch Util	Energy Total Cost/GSF w/ Purch Util
UW-Stout	\$0.0182	\$0.698
MAPPA	\$0.411	\$1.902
Master's	\$0.300	\$1.781
Public	\$0.386	\$2.066
5,000-11,999 (enrollment)	\$0.0444	\$2.022

