The University of Maine System

System-wide Energy & Environmental Sustainability Initiatives

2014 Report
Established in 1968, the University of Maine System is comprised of seven distinct universities, some with multiple campuses. With an annual enrollment headcount of nearly 40,000 students, it is the State of Maine’s largest educational enterprise.

The System, much like higher education institutions nationally and globally, has experienced extraordinary energy price inflation and volatility over the last several years. Unlike its many national and global peers, these challenges have been compounded by a historical lack of viable and readily available energy supply alternatives, particularly in a state that has traditionally been heavily dependent on fuel oil for much of its energy needs. Together, these factors have significantly increasing implications and have underscored the vital importance of energy to the University of Maine System’s education, research, and public service mission; as an essential service in the delivery of the mission, as an environmental impact, and as a cost driver to the institution.
Executive Summary

In response to energy market demands, the universities have collectively and individually pursued projects and initiatives that have lessened the System’s environmental impact and helped to ensure the continued affordability of education to the citizens of the State of Maine, while allowing for allocation of resources to the research enterprise, and public service mission that serves Maine’s citizens and businesses. This report illustrates and highlights some of the many system-wide actions and accomplishments:

- **System-wide gross carbon emissions have been reduced** by 22 percent since 2006.

- Implemented **supply-side projects** have included conversions to natural gas, combined heat and power, and nearly every type of renewable alternative energy source, including: solar, geothermal, biomass, wind, and air-source heat pumps.

- **Demand-side projects** have included building envelope, variable speed drives, lighting, water conservation and heat recovery.

- **Upcoming noteworthy projects** include: expanded geothermal at UMF, biomass central heating plant conversion at UMFK, and central steam plant upgrades at USM.

- Energy efficiency, conservation, and sustainability efforts are ongoing on every campus. **New and updated projects will save the equivalent of hundreds of thousands of gallons of heating oil annually.**
Overview

In 2010, the University of Maine System formed the Collaborative System-wide Energy Management Committee, comprised of one representative from the University of Maine System office and one from each of the seven universities in the system.

The purpose of the “System Energy Team” is to serve as an enterprise-wide virtual energy manager. This objective is achieved through a collaborative effort by each of the universities in communicating and sharing their respective information, available resources, expertise, and perspectives in seeking to identify and realize opportunities for improving both supply and demand side energy management, and continuing the significant improvements made to date with respect to environmental stewardship across the seven universities of the University of Maine System.

In 2011, the System Energy Team first prepared the System-wide Energy & Environmental Sustainability Initiatives report in order to represent its collective and individual actions across the depth and breadth of the System.

Today, this presentation builds upon these past accomplishments and reflects the new initiatives and opportunities the System Energy Team pursues.
Since 2006 the seven Universities have cumulatively reduced their total Carbon Footprint by 22%. For the industry benchmark performance metric of MTCDE/Student FTE, UMS lowered its average to 3.30. The peer average in FY13 was 4.82 MTCDE/Student FTE.
USM recently completed an overhaul of the central heating plant at the Gorham campus.

The main buildings on the Gorham campus are heated by a hot water distribution system that supplies high temperature/high pressure hot water through a campus loop to the buildings.

The $2,700,000 project included the removal of the three existing 1960’s vintage boilers, which were obsolete, and the installation of three new gas fired boilers, as well as the auxiliary tanks, pumps, and controls.
UMaine Alternative Transportation Programs

-The **Black Bear Orono Express** is a free shuttle service that provides much-needed transportation for our students, staff and visitors within the University and the Town of Orono communities, providing thirty loops between Orono and the University of Maine throughout each day during the academic year. There were 53,870 rides in FY2013.

-The **Community Connector** is a fixed route public transit system operated by the City of Bangor for the communities of the Greater Bangor Urbanized Area. Each member of the University community is able to ride for free upon presentation of their Maine Card. University ridership in FY2013 was 83,406.

-The **Blue Bikes Program** recycles abandoned bikes into free transportation for campus community members. Anyone with a valid Maine Card is eligible.

-The **Campus Carpool** consists of two or more people traveling in the same vehicle, who receive a free Carpool parking permit which provides access to Reserved Carpool posted spaces on campus.

-UMaine’s **Anti-Idling Policy** seeks to reduce overall emissions on campus and improve air quality. All vehicles on university property are prohibited to idle unnecessarily.
Renewable Energy, Alternative Fuels, & Innovation

Collaborative System-wide Energy Procurement

The University of Maine System, Office of Strategic Procurement, advertised a Request for Proposals for alternative fuel sources for the Universities of Maine at Augusta, Presque Isle, Farmington, and Machias. The RFP was open to any energy source solution, and generally sought alternatives to #2 heating oil and propane at the campuses. This scope covered the potential replacement of approximately 800,000 gallons of heating oil.

Competitive proposals were received for each of the respective university campuses. Some campuses received multiple proposals. Thus far, UMA and UMF have moved forward with awards under the RFP -- their respective projects are highlighted, below, in this report.

The University of Maine at Machias and University of Maine at Presque Isle both received proposals for compressed natural gas (CNG). Both University’s continue to pursue these attractive opportunities.

These solutions offer the promise of significant cost savings and environmental emissions reductions, as well as improved heating reliability and fuel diversity as a hedge against future fuel price volatility.
Through the collective efforts of the System-wide Energy Team’s members, and as the result of the System-wide Alternative Fuels RFP, the University of Maine at Augusta successfully negotiated a natural gas service contract for its Augusta campus.

For a total project cost of $103,000 the boilers have retained #2 fuel oil capability, ensuring reliability, fuel supply diversity, and protection against potential costs from future natural gas price increases.

The conversion from #2 fuel oil to natural gas is estimated to provide a simple payback period of approximately 1.5 years cutting fuel cost by 50%, and an environmental emissions reduction of 27%.
The University of Maine at Farmington has received Board of Trustees approval to develop an $11 million dollar project for the construction of a Central Heating Plant and distribution system on its campus. The Central Plant will be dual-fuel, with natural gas as the planned primary fuel and with a #2 oil backup. A bridge fuel is planned until the natural gas pipeline is constructed and natural gas delivery is available at the Plant. The Plant will also be designed with future provision for the addition of biomass fuel. UMF is currently in the design phase of this project.
Renewable Energy, Alternative Fuels, & Innovation

Pleasant Street Academy Biomass Boiler Project

This $5.5 million Project, so named to reflect the elements of educational collaboration between UMFK and the local school district (MSAD # 27, which is directly adjacent to the University campus), is an ambitious initiative which includes a central heating plant and an underground distribution heating system that supplies hot water to the University of Fort Kent and three MSAD # 27 buildings.

This project will spur northern Maine’s growing wood pellet and biomass fuel industry by consuming more than 1,300 tons of wood biomass annually; lower fuel costs by up to 80 percent (compared with #2 fuel oil); stabilize fuel prices; stimulate the local economy; strengthen energy independence by reducing dependence on foreign oil; reduce maintenance costs by displacing eight oil-fired boilers with two new pellet boilers; and help UMFK meet its climate neutrality obligations under the American College and University Presidents’ Climate Commitment.
Energy Efficiency, Conservation, & Optimization

Retro-commissioning Mechanical and Electrical Systems at the UMS System Office

The UMS Office of Facilities Management had a retro-commissioning study performed at the System office, located on Central Street in Bangor, which identified a series of issues concerning air balancing, mechanical controls and temperature control settings that could reduce heating and electrical costs, if corrective action was taken to address the issues.

A mechanical contractor was hired to implement the corrective actions. The study and upgrades to the mechanical systems will total approximately $32,800. If the modifications follow the engineers’ calculated savings, electrical consumption of the major air handling units will be reduced by approximately 30%, with an estimated annual savings near $16,000. This would result in a two year payback.
System-wide Commitment to Climate Leadership

Each campus President of the University of Maine System signed the Presidents’ Climate Commitment.

The seven universities joined the 680 colleges and universities that have signed to date, recognizing their unique responsibility to serve as role models for their communities and to develop solutions to reverse global warming.

Each institution pledges to develop and implement a plan for carbon neutrality.