

# “MU’s Energy Conservation Success”

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Highly reliable and cost effective utilities are essential for the University of Missouri (MU) to achieve its academic, research, and outreach missions. MU’s Campus Facilities – Energy Management department focuses on three key areas to help meet that requirement; Production Efficiency and Reliability, Energy Conservation, and Renewable Fuels. This poster presentation highlights MU’s energy conservation program and the associated economic and environmental benefits.

The annual utility cost avoidance from energy conservation measures has now reached \$4.3 million. This is equivalent to three degree programs or \$170 reduction in tuition per student. Since the program started MU has reduced energy use by 12% on a square foot basis. Based on EPA data, the corresponding reduction of CO<sub>2</sub> emissions is equivalent to the removal of 18,000 cars from our roadways or the planting of 28,000 acres of trees.

Following is a description of our program by energy saving category.

- Lighting – Approximately 99% of the exterior lighting and over 90% of the interior lighting on campus has been converted to high efficiency lighting. Incandescent exit signs have been replaced with LED, reducing energy consumption by 80 – 90%. Daylight harvesting has also been used to automatically turn off interior lights in areas that receive sunlight.
- Motion Sensors – Motion sensors have been installed in thousands of classrooms, offices, conference rooms, and laboratories to turn off lights and set-back thermostats when spaces are unoccupied.
- Efficiency Upgrades of Building Heating, Ventilating and Air Conditioning (HVAC) Systems – Major HVAC systems have been retrofitted to higher efficiency systems, by upgrading the controls, motors, regulation of air flow, and use of energy recovery systems to reduce building energy consumption.
- Design Standards for HVAC Systems – Energy efficiency design standards for HVAC systems are implemented on all campus projects to meet or exceed federal and state guidelines.
- Energy Management Control System (EMCS) – The EMCS is an automated digital control system for HVAC systems, which monitors, controls, and reports energy use while maintaining comfort in campus buildings. Over the past 16 years the EMCS system has been expanded

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from fewer than 10 buildings to over 110 buildings comprising approximately 80% of the campus.

- Reduced Building Energy Use and Analysis – All buildings are fully metered for energy consumption. Metering data is analyzed and energy consumption patterns are identified. Buildings showing a potential energy saving opportunities are audited and energy conservation projects are implemented.
- Window Film – Window film has been installed on several buildings to reduce radiant heating during the summer months.
- Chilled Water Loop – Over 17 miles of underground chilled water loop piping connects major campus buildings to form a loop, reducing the number of chillers required by 75%.
- Campus-wide Energy Conservation Awareness – Faculty, staff, and students are encouraged to conserve energy through the use of advertisements, tours, and presentations.