

***District Energy
at
Mizzou***



2017 System of the Year!

University of Missouri

- Founded in 1839 in Columbia, MO as the 1st public university west of the Mississippi River
- Over 33,000 students from all 50 states and 120 countries
- Strong research focus and member the of the Association of American Universities
- Over 15 Million sqft of facilities including critical utility service to hospitals and clinics, a research reactor, a safety level 3 biocontainment laboratory, and numerous research buildings

MU Energy Management

a campus utility enterprise

Reliable!

Cost Efficient!

Sustainable!



Comprehensive Utility Micro-grid

- **66 MW electric generation capacity**
- **40 MW 69KV transmission connection**
- **1,100,000 lb/hr steam capacity**
- **32,000 Tons chilled water capacity**
- **4 Million gal/day drinking water capacity**
- **110 miles of under-ground utilities**
- **Fully metered and automated**



Reliable and Resilient

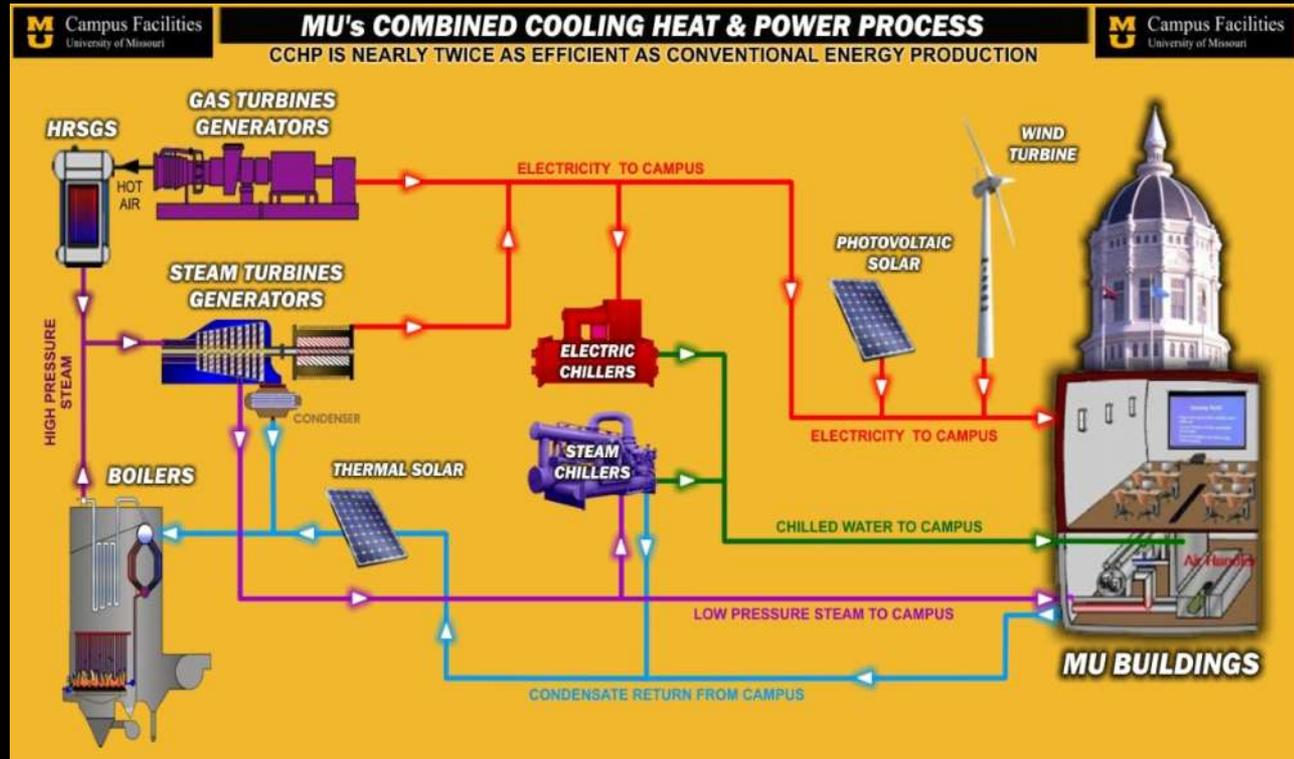
- Full on-site generation
- N-1 operational availability practice
- 40 MW 69kV electric grid tie
- Black start capability
- Multi-fueled energy plant
- Underground distribution and looping
- Proactive maintenance practices
- Over 99.9993% utility availability



24/7 monitoring and optimization to ensure highly reliable utility service

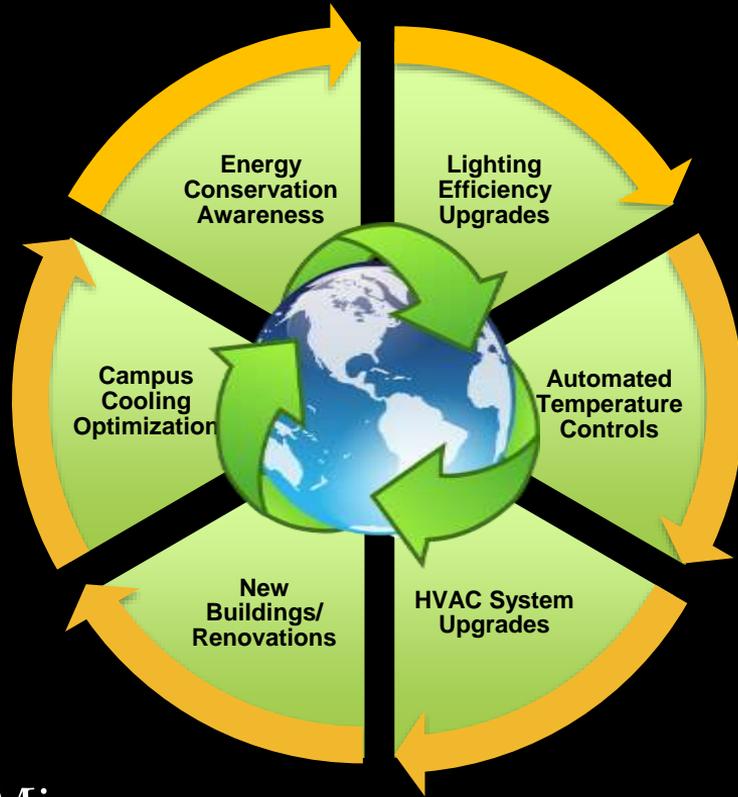
Combined Cooling Heat & Power at Mizzou

MU produces its utilities using highly efficient technologies dispatched with a focus of cost effectiveness!



A 2010 EPA CHP Award Winner!

Energy Optimization and Conservation



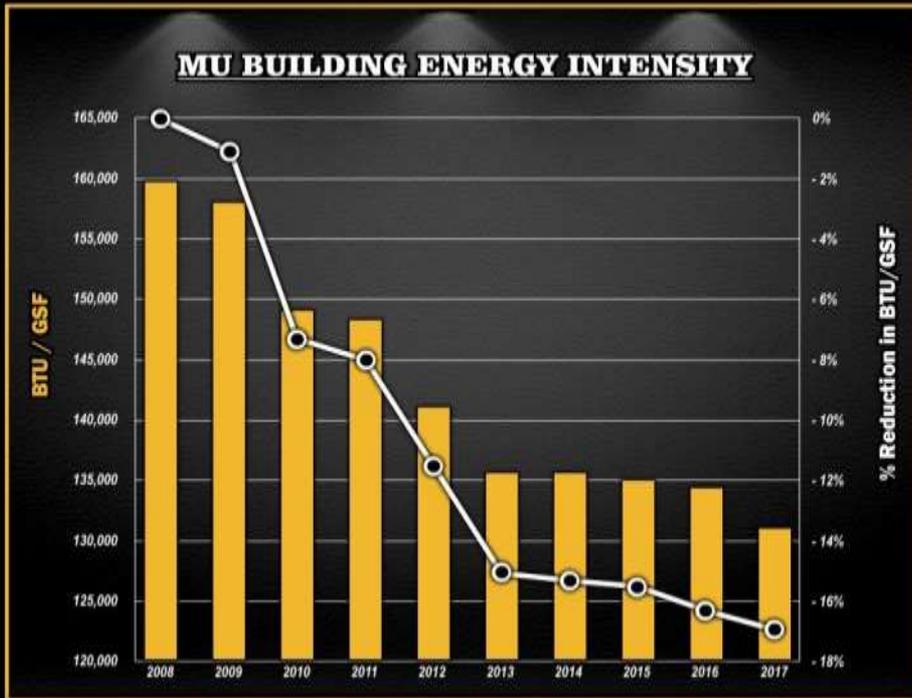
MU's nationally recognized energy conservation efforts began in 1990!

21% Reduction in Energy Use (per GSF)

\$9.5 Million Annual Utility Cost Avoidance

\$85 Million Cumulative Utility Savings

Energy Intensity Continues to Drop



Current Initiatives:

- LED Lighting Conversions
- Improved HVAC Controls
- Automated Fault Detection
- Retro Commissioning
- Waste Heat Recovery

Renewable Energy for Mizzou



*Biomass Combined Heat & Power
Grid Wind Energy
On-Campus Wind Energy
On-Campus Solar PV
On-Campus Solar Thermal*



Our on-site renewable technologies are education resources for students!

Energy Sustainability Success!

- **Over 39% total renewable energy portfolio of biomass, wind, and solar**
- **Over 51% reduction in greenhouse gas emissions since 2008**
- **Over a 21% reduction in academic building energy use and a 50% reduction in water use through conservation efforts**
- **EPA's Green Power Partnership recognized MU as a national leader in the development and use of renewable energy**



Thanks for our Missouri Military Bases!



Fort Leonard Wood Army Base – Home to the Maneuver Support Center of Excellence which trains over 80,000 military and civilians each year!



Whiteman Air Force Base – Home of the 509th Bomb Wing, which operates and maintains the Air Force's premier weapon system, the B-2 bomber!