



THE UNIVERSITY OF
TOLEDO
1872

SUSTAINABILITY AT UT





Leadership



- Reputation as a leader in renewable energy research
- Dedicated to renewable and sustainable energy practices
- Committed to reduce 2007 greenhouse gas levels by 20% by 2014





Energy Utilization



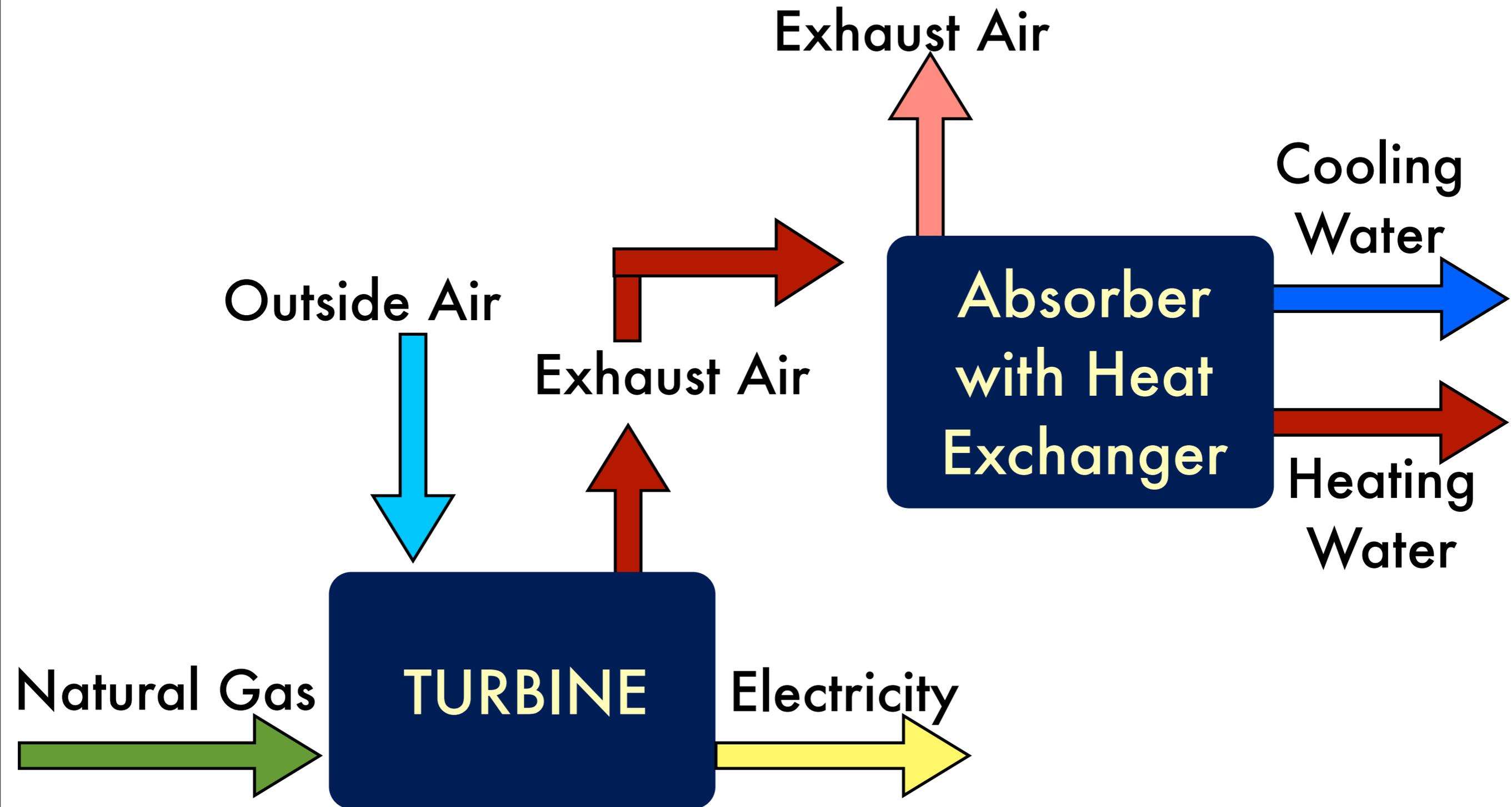
LED Exterior Lighting

- Main Campus, Health Science Campus and Scott Park Campus are 99% lit with LED lighting.
- Reduces night lighting power 50%
- Better lighting and safer environment for students, employees, patients and guests





Cogeneration





Cogeneration



Why Cogeneration?

- State of the art leading edge technology
- Clean energy production
- Replaces backup generators
- Eliminates need for independent cooling
- Three tiers of critical power redundancy





Cogeneration



2004 | Toledo Museum of Art





Cogeneration



2005 | Center for Visual Arts

- Test site for electricity generation with Capstone
- Project was implemented to reduce energy costs
- Lessons Learned:
 - * COGEN is limited by thermal use - What to do with waste heat?



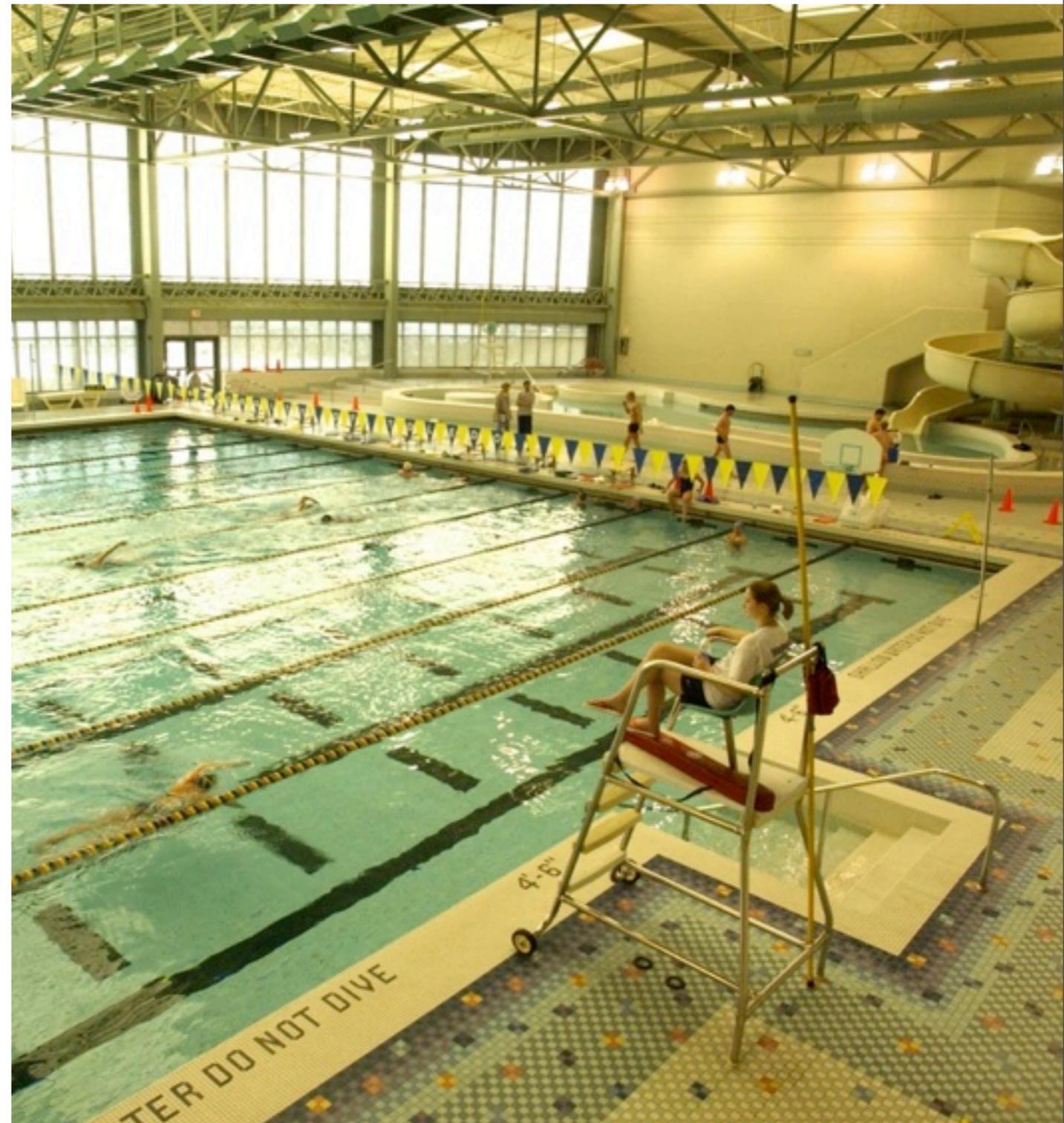


Cogeneration



2010 | Electricity Only Computer Study

- BHP Energy - Northwest Ohio business opportunity
- Use external container or building mechanical room
- Chilled water for cooling
- Use waste heat to warm pool at Student Recreation Center
- 50% funding through Ohio Third Frontier Grant





Cogeneration



2012 | University Computer Center

- Data Center is vital to the institution and requires critical power
- State of the art leading edge technology
- Main power, backup power and Cogen critical power - 3 tiers redundancy
- Eliminates need for independent cooling





Cogeneration



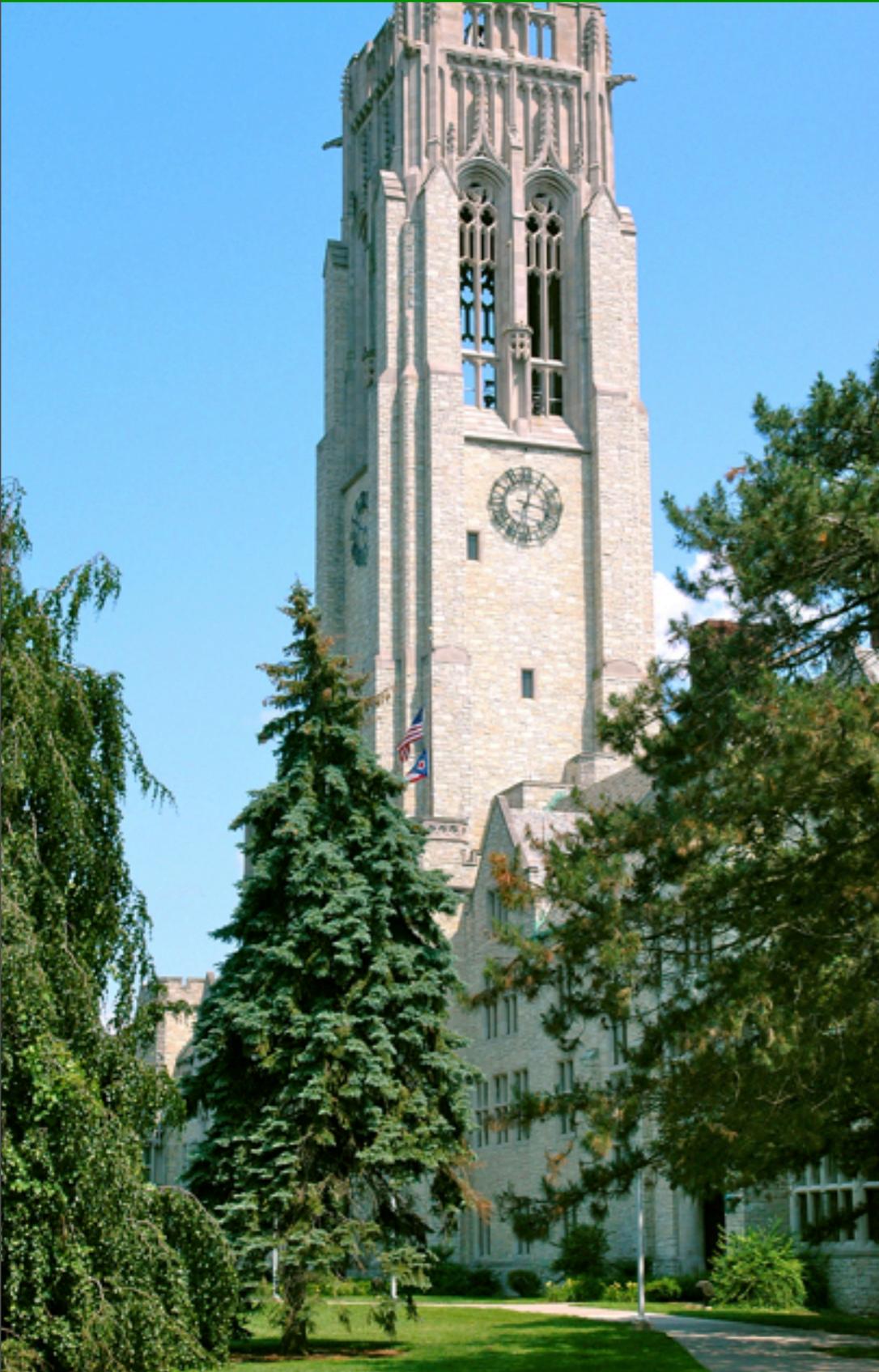
2015 | UTMC Future Planning

- Cogen plant to provide 100 % emergency critical power for hospital in case of grid failure
- This Cogen plant changes utility profile reducing cost of demand electricity





Cogeneration

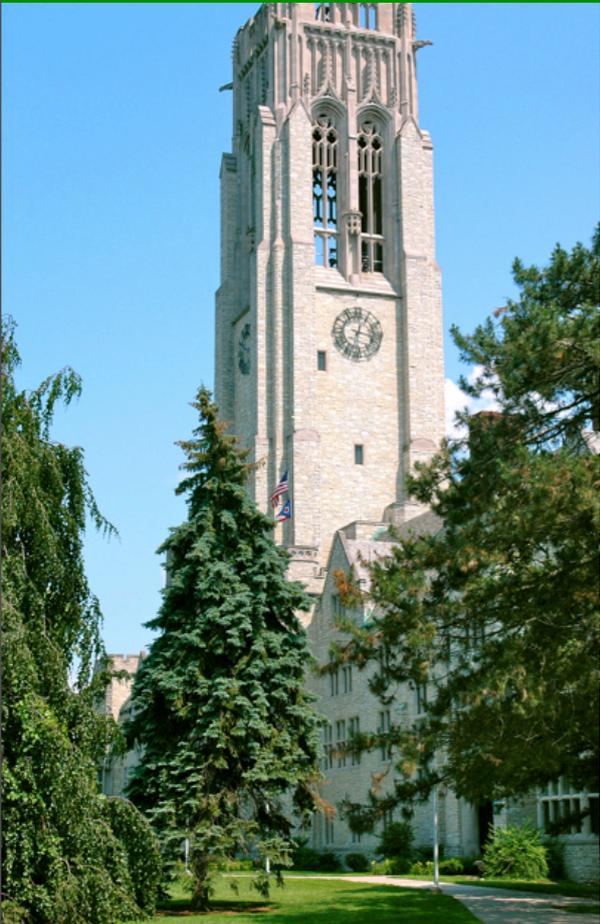


Strategic Investment

- Aligns with goal 6 in strategic plan, Directions 2011



Cogeneration



Strategic Investment

- Aligns with goal 6 in strategic plan, Directions 2011
- Built by GEM, which creates jobs locally
- State of Ohio 3rd Frontier Grant Supported
- Installation: Roof top or ground level
- Container size module can be easily transported all over the globe

GEM | Energy



Ohio

Third Frontier
Innovation Creating Opportunity



Cogeneration



Transportation and Logistics

- Container size modules can be easily loaded
 - * Rail - Intermodal Rail Hub
 - * Air - International Cargo Hub
 - * Sea - Largest Sea Port on the Great Lakes





Improving the human condition through sustainable practices and utilization.



Sustainability Accomplishments

- * Solar | 10kWh paneled roof display
- * Solar | 1.12MW 9 acre solar field
- * Wind | 4kWh turbine
- * Wind | 80kWh turbine
- * Geothermal technology heats indoor football practice facility
- * Green roof on Stranahan Hall - North for eating and cooling retention
- * Chill water plants cool Main Campus during summer months
- * Steam generators heat Main Campus during winter months
- * 99% LED exterior lit campuses
- * Boiler plant provides steam heat to the Health Science campus this summer
- * Memorial Field House awarded LEED Gold Certification in 2009
- * Savage Arena/Fetterman Athletic Center awarded LEED Gold Certification in 2011
- * Center for Biosphere Restoration Research awarded LEED Silver Certification in 2012
- * UT Transit fleet awarded Ohio Green Fleets 1 Star Certification
- * UT Transit fleet powered by biodiesel fuel
- * UT Paratransit Services utilizes hybrid electric bus
- * Northwest Ohio host site for the GEO Tour del Sol
- * Smart charging station on each campus for electric vehicles
- * Rocket Recycling Services recycled over 1 million pounds of material in FY 2012
- * Recycle Like Rocky annual recycling campaign at tailgating events during football season
- * Ranked 16th nationally for electronics & 1st place in MAC for paper during 2012 RecycleMaina Tournament
- * Printer ink and toner recycled to fund service project by UT Engineers Without Borders



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QUESTIONS

*Improving the human condition through
sustainability*

