

Beyond HVAC:

How Building Management Systems and Energy Optimization Revolutionize Commercial Buildings

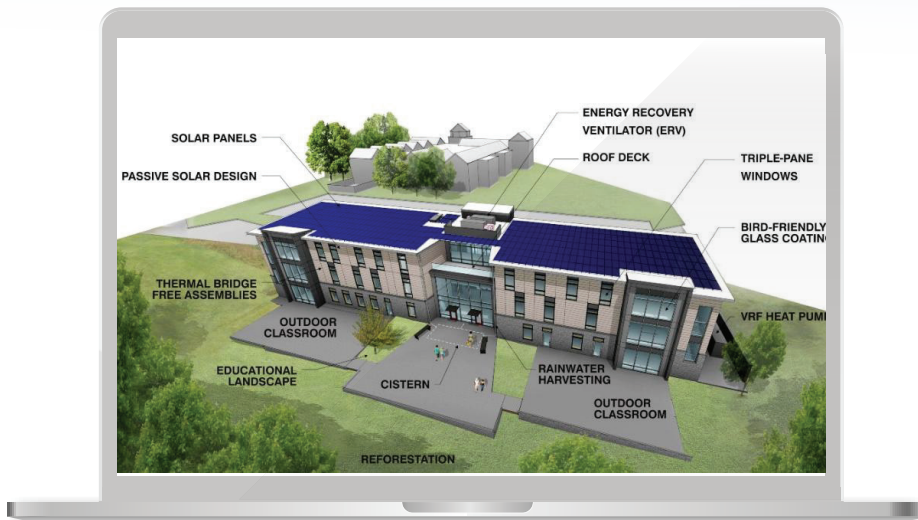


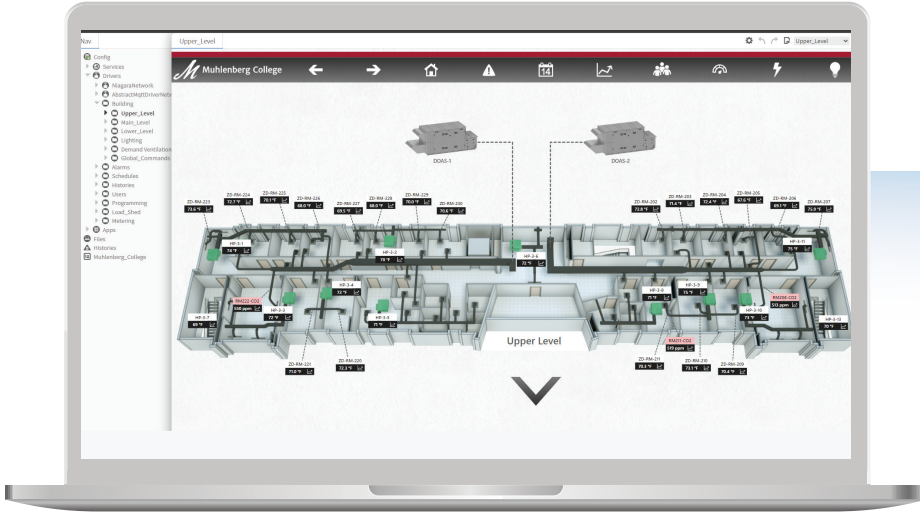
2022 HIGHLIGHT PROJECT: *M* MUHLENBERG COLLEGE PARKWAY COMMUNITY BUILDING



PROJECT FEATURES

- Rainwater Harvesting
- Intelligent Lighting Controls
- Photovoltaic Panels
- Tighter Temperature Controls





BUILDING MANAGEMENT SYSTEM

Building Management System or BMS once stood for control and monitoring of a facilities Heating and Air Conditioning System. With the evolution of technology and the technician's skillset, Building Management has become much more than centrally adjusting the temperature within a space.

In the highly competitive commercial real estate market, efficient and sustainable

building systems have become a key consideration for businesses and institutions seeking to reduce their carbon footprint and lower energy costs. Muhlenberg College, a liberal arts college located in Allentown, Pennsylvania, recognized the importance of investing in a cutting-edge Building Management System (BMS) that would allow them to achieve these objectives while providing a comfortable and healthy learning environment for its students and staff. Incorporating innovative features such as rainwater harvesting, photo voltaic panels, and intelligent lighting control, all on display at a central kiosk when entering the building. Provides tighter temperature control.



DUAL TEMP

Dual Temp Company, located in Lehigh Valley Pennsylvania, in cooperation with Whiting Turner Contracting, recently completed construction on a new classroom and community building for Muhlenberg College including a "next level" Building Management System.

The project was a major undertaking, with the design and installation teams working closely with the college's facilities managers to develop a system that would meet the institution's specific needs and requirements. The result was an integrated solution that not only provides precise control over heating, ventilation, and air conditioning (HVAC), but also incorporates innovative features such as rainwater harvesting, photovoltaic panels, and intelligent lighting controls, all featured on a kiosk display at the building entrance.



THE BASE HVAC

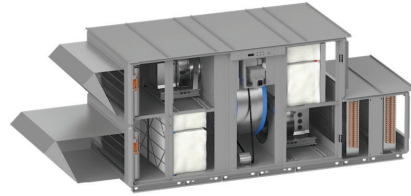
The Base HVAC System included a Variable Refrigerant Flow Simultaneous Heating and Cooling System. A unique approach was taken while designing this system with the addition of micro zone dampers and an intention to provide tighter control of space temperatures in areas of one single indoor unit providing comfort heating and cooling to multiple rooms. The VRF Central controller as well as the microzone thermostats are integrated to the Building Management System via BACNet MSTP giving the end user full adjustment and transparency of system operations.



MULTIPLE DEDICATED OUTDOOR AIR SYSTEMS (DOAS)

Multiple DOAS units provide conditioned fresh air to the interior of the building by way of Direct Digital Control dampers and controlled fan speed and duct static pressure. A modulating demand ventilation sequence was implemented on a room by room basis as an energy savings option while maintaining acceptable CO2 levels within the space.

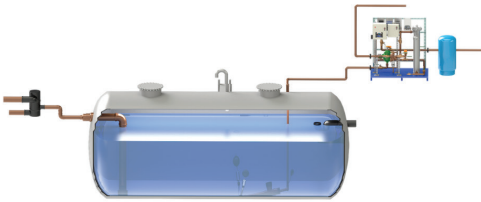
LG System / CU-3
DOAS-1
Fahy Commons



70.0 °F
Supply Air Temperature

72.0 °F
Exhaust Air Temperature

Rain Water Management System
RMS-200
Fahy Commons - Lower Level



432.5 gal
Rain Water Used YTD

421.7 gal
Domestic Water Used YTD



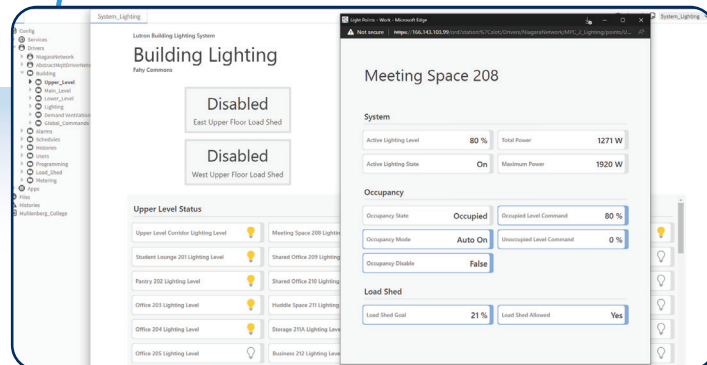
RAINWATER HARVEST SYSTEM

Moving on from HVAC, integration of the rainwater harvest system was achieved providing intricate data on the systems operational savings to the college, as well as, the health of the system itself. The rainwater is collected and used to support any gray water usage requirements, including water closets, urinals and outdoor irrigation systems.



LIGHTING CONTROL

Lighting control and monitoring is provided by way of the Building Management System as well. While Lutron Vibe was the lighting system of choice, all parameters including lumen output, energy consumption, system scheduling and ballast monitoring is routed to the BMS over BACNet IP for central monitoring coinciding with the monitoring of the other building systems.





PHOTOVOLTAIC IMPLEMENTATION

Photovoltaic implementation was high on the College's list of wants during the building's initial design phase. The solar system provides a large portion of the energy used throughout any given seasonal day. Being a good steward of energy from an already stretched electrical grid is highly important in today's tech and educational environments. The Dual Temp Building Management System provides photovoltaic operational information including array input, panel life, predictive maintenance and inverter output, displaying information in both graphical form and by way of historical trending.

Lastly, the operational efficiency of the community building as well as the immediate return on investment was required to be displayed to the staff and student body as an educational resource as well as an accountability piece for the technological investment.



INTELLIGENT EDUCATION DASHBOARD WITH KIOSK

Dual Temp Company in collaboration with Cloud Geshan Designs, provided the college with an intelligent education dashboard with kiosk displayed for building occupants as they enter. A peer to peer direct integration of Building Management System Data to the Geshan Server was achieved providing the system operational data required to put an educational face on the highly technical environment.

While there were many challenges along the way, the Dual Temp design and implementation team were steadfast and highly focused on bringing one of the most highly technical and environmentally responsible projects to the Lehigh Valley to date. The Muhlenberg College Parkway Community Building sets a new standard for building management and energy optimization, benefiting the college and the environment alike.

"The Muhlenberg College...Building sets a new standard...benefiting the college and environment alike."