

HYDRONICS OVERCOMES MODERN BUILDING CHALLENGES

xylem
Let's Solve Water

THE KEY TO COMMERCIAL BUILDING DECARBONIZATION
AND SUSTAINABILITY EFFORTS

Toyota Headquarters
Plano, Texas
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INTRODUCTION

Amidst today's modern environmental challenges, sustainability is increasingly top of mind across all sectors and industries. For the commercial building industry, specifically, modern HVAC system design is of growing importance, with building owners reevaluating HVAC technology and components both for new construction and retrofit. When faced with the trend toward sustainable building practices, including pressures to achieve decarbonization and reduce energy consumption, hydronic systems are emerging as the future-proofed, sustainable system of choice – and with good reason.



MAIN DRIVERS OF MODERN HVAC SYSTEMS

RISING TEMPERATURES

As temperatures continue to rise because of global warming, this will have a direct effect on consumer reliance on HVAC equipment. According to NASA's Global Climate Change report, recent research shows that the last eight years have been the hottest on record for the globe and the only way to combat this is through reducing greenhouse gas emissions that will help lessen the amount of future warming.

INCREASED COMFORT AND INDOOR AIR QUALITY (IAQ)

The COVID-19 pandemic redefined the importance that occupants place on their living spaces and health, and modern HVAC system design is one way for the built industry to maximize design efficiency while guaranteeing room comfort.

REDUCED ENERGY CONSUMPTION AND OPERATING COSTS

According to the U.S. Environmental Protection Agency, approximately 30% of the energy used in commercial buildings is wasted. HVAC systems account for 40% of the total energy use in commercial buildings, and as such, are a major contributor to high energy bills. Reducing wasted HVAC energy consumption is both an important element in the push for greater sustainability in the commercial building sector and in the reduction of operating costs.

DECARBONIZATION PRESSURES

According to the Carbon Risk Real Estate Monitor (CRREM) and the Global Real Estate Sustainability Benchmark (GRESB), only 15% of global assets currently align with the Paris Agreement's 1.5°C target. This means 37% of global buildings will need to be decarbonized by 2030, further increasing the need for renewable technologies and modern solutions that advance decarbonization efforts.¹

WHY HYDRONICS?

Water as a source for temperature regulation is naturally sustainable. By extension, hydronics systems – which draw on the natural thermal storage capabilities of water – are a future-proofed solution of choice and the key to a greener future.



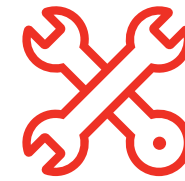
ENERGY EFFICIENT

Compared to forced-air heating systems, a hydronic heating system is about 25% more efficient.



REDUCED LIFECYCLE COSTS

Today's advanced hydronics systems include application of technologies like integrated and single pipe systems, along with the use of variable speed pumps and fans that offer significantly reduced lifecycle costs.



LOW MAINTENANCE COSTS

Hydronic systems are generally easier to maintain because of their piping runs and wide range of parts and service flexibility. These systems are also designed with universal components that can be installed and serviced by any HVAC technician.



SPACE-SAVING

Modern hydronic systems occupy about one-eighth of the space of ducted air systems, resulting in more useable building space.



FUTURE-PROOFED

Hydronic systems are extremely adaptable, offering the flexibility to switch heat sources while leveraging existing building systems. What's more, hydronic systems present a viable solution toward meeting the global push to phase out gas-fired boilers. As part of its vision to achieve net-zero emissions by 2050, the International Energy Agency (IEA) is posing a global ban on new fossil fuel boilers starting from 2025.



COMFORT AND SAFETY

In addition to distributing heat evenly throughout a building, hydronic HVAC systems feature a range of comfort control products such as thermostatic radiator valves and operators, which enable more accurate temperature control individually room by room.

HYDRONICS AT WORK

TEXAS HEALTH HOSPITAL MANSFIELD

Texas Health Hospital Mansfield is a 59-bed acute care hospital that is open 24/7, 365 days a year. As a result, air quality is of utmost importance as is accurate temperature and humidity control to keep patients comfortable and vital medical equipment functioning properly.

Bell & Gossett representative Oslin Nation provided HVAC and plumbing equipment for the hospital, including Bell & Gossett pumps, tanks and ancillary equipment for their HVAC, domestic plumbing and wastewater systems. The design included a primary and secondary water heating system, chilled water system, condenser system, domestic water and domestic hot water return pumps.

ASHRAE HEADQUARTERS

Within ASHRAE's new, renovated headquarters showcasing the latest HVAC&R equipment are cutting-edge hydronic equipment and products. Bell & Gossett utilized detailed analysis of the building's heating and cooling loads, and energy code standards to determine which equipment was suitable for the system. The result was highly efficient, DOE-compliant pumps that make the new ASHRAE headquarters a high-performance workplace.

COMPARATIVE ADVANTAGE

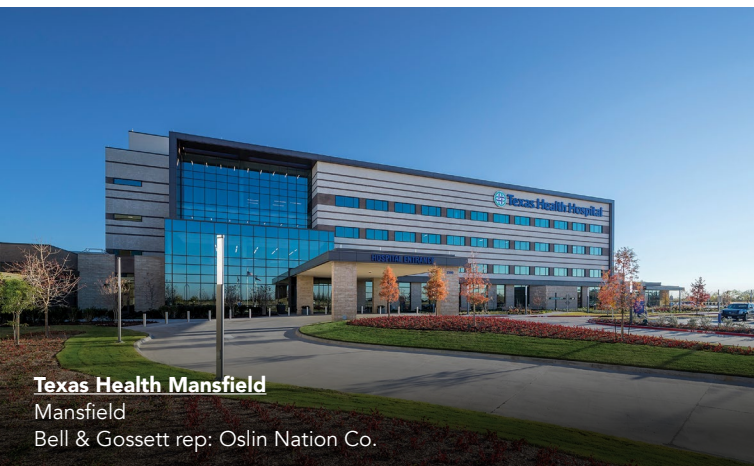
THE STUDY

A Xylem cost analysis analyzing seven elementary and middle schools located in South Carolina's Climate Zone 3A – a humid, warm climate – included upfront installed cost, replacement cost allocations and ongoing energy and maintenance cost of the following system types:

- Variable refrigerant flow heat pumps (VRF)
- Water source heat pumps (WSHP)
- Ground source heat pumps (GSHP)
- Direct expansion rooftop units (DX RTU)
- Water cooled chillers (WCC)
- Air-cooled chillers (ACC)

THE RESULT

In terms of lower energy use, cost and life expectancy, hydronic systems outperformed all other systems by as much as 24%. VRF and hydronic systems are generally compared the most in terms of energy consumption and system performance, but hydronic systems have a 20-to-25-year lifecycle, with VRF systems requiring replacement as soon as 10 or 15 years after installation.



Texas Health Mansfield
Mansfield
Bell & Gossett rep: Oslin Nation Co.



ASHRAE Headquarters
Atlanta
Bell & Gossett

Eighty Seven Park

Miami

Bell & Gossett rep: George A. Israel Co.



CONCLUSION

There is massive potential for hydronic systems to efficiently and systematically address the ongoing challenges of achieving decarbonization — and, while this potential is not a new phenomenon by any means, the existing environmental and sustainability pressures have reignited conversations surrounding the benefits and value of adopting this technology.

For more information about hydronics as future-proofed solutions, read Bell & Gossett's latest white paper, "Building a Sustainable Future: Solving Modern Building Challenges with Hydronic Systems" co-authored by Alan Jones, senior director of product management, and Mike Licastro, training and education manager for commercial building services and the Little Red Schoolhouse.

[READ THE WHITE PAPER ►](#)