BELIMO ENERGY VALVES

Maximizing Energy Efficiency and Ensuring Patient Comfort

Belimo Energy Valve Enables Data-driven Optimization of University of Florida's Shands Cardiovascular Hospital

University of Florida (UF) Health Shands Hospital is a top-tier academic medical center. In the U.S. News & World Report's 2020-21 Best Hospitals survey, UF Shands had nine medical specialties placing in the nation's Top 50 – more than any other hospital in the state of Florida.

TYPE OF BUILDING
Hospital

PROJECT
New Build

SECTOR
Healthcare

PRODUCTS
Belimo Energy Valves

BELIMO

In addition to its world-class medical and patient care, the hospital also prides itself on the energy efficiency of its facilities. In recent years, several Shands buildings have received ENERGY STAR® certification from the U.S. Environmental Protection Agency (EPA). The Energy Services group at the hospital is responsible for energy management initiatives, policies and procedures, and best practices for state-funded facilities on the main campus, including UF's Health Science Center. The unit also provides technical guidance on new construction projects and implements energy conservation and optimization strategies in the hospital's buildings.

To fulfil its duties, the team employs a highly digitalized approach to commissioning, operation, and maintenance of building and HVAC systems. For this, they rely heavily on the transparency provided by Belimo Energy Valves.

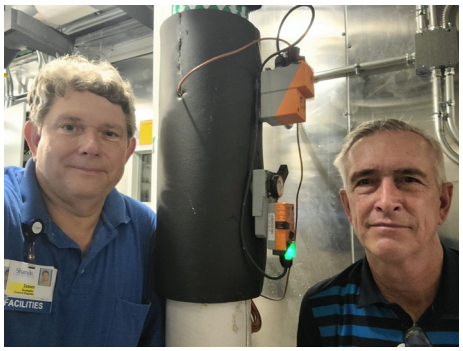
Project Overview

The first application of Belimo Energy Valves on the UF Shands campus was in 2018 at the hospital's new Health Heart & Vascular center. The ~200-bed facility is state-of-the-art in terms of patient care and contains a range of spaces to meet the needs of its occupants, including pre- and post-operative care, ICU, diagnostic, in-patient and out-patient rooms, etc.

In addition to maximizing energy efficiency and ensuring patient comfort, the UF Shands Energy Services team made a point to select technology for the cardiovascular center that would enable a predictive maintenance approach. The team was already highly advanced in terms of how it was using data to optimize systems and schedule service activities across the hospital's buildings. This included techniques such as trending and fault detection to quickly identify problems and determine early on when potential failures might occur.

The team also wanted to select technology that would facilitate what Mark Dykes, the UF Facilities Energy Manager, refers to as "global commissioning."

"The health heart and vascular center is 90% full nearly 100% of the time", said Dykes. "This makes conducting traditional commissioning and maintenance a difficult task. It simply is not practical to have technicians going from room to room to check components and service systems on a periodic basis. We knew going in we wanted to take a more data-driven approach. To do this, we needed complete visibility down to the individual air handler level."



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University of Florida

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Mark Dykes, Facilities Energy Manager
University of Florida

Solution

With these objectives in mind, the decision was made to equip all 20 air handler units (AHUs) installed across the Health Heart & Vascular hospital with Belimo Energy Valves.

As an IoT-enabled device, the Energy Valve has a suite of cloud-based services that can be used to benchmark coil performance, analyze glycol concentration, store energy data, send alerts and commission for optimal performance. The valve is pressure independent and measures and manages coil energy by using an embedded ultrasonic flow meter, along with supply and return water temperature sensors.

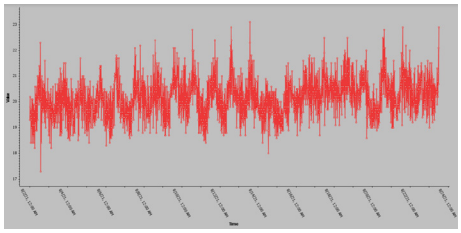
Its built-in patented Power Control and Belimo Delta T Manager™ logics monitors coil performance and optimizes the available energy of the coil by maintaining the Delta T. In addition to the standard analog signal and feedback wiring, it communicates its data to the Building Management System (BMS) via BACnet MS/TP or BACnet IP as well as Modbus RTU and Modbus TCP/IP. The built-in web server collects up to 13 months of data that can be downloaded to external tools for further optimization.

"The Energy Valve was sort of the missing piece of the puzzle," said Dykes. "The ability to continuously optimize delta T and eliminate over-pumping is a huge benefit, but for us, the quality of data the Energy Valve provides is equally as valuable. This facility has 20 AHUs with over 800 variable air volume (VAV) boxes with reheat coils. Between those and thousands of sensors, there are a lot of moving parts that can fail or degrade over time. We need to be able to see when something is not performing optimally so we can identify the root cause and remedy it quickly."

In one particular case, the Energy Valves helped identify bad sensors in the vascular center. Using historical pumping data from the previous year (in relation to outside air temperature), the Energy Services team was able to develop a baseline for chilled water flow to individual AHUs in the building. One of the AHUs maxed out at around 130 gpm. So when the flow unexpectedly increased to nearly 400 gpm, it was evident that something in the system was performing poorly. Although a damaged and/or fouled coil was suspected, an inspection revealed that the culprit was actually a malfunctioning discharge air temperature sensor. In total, four bad sensors were identified and replaced.

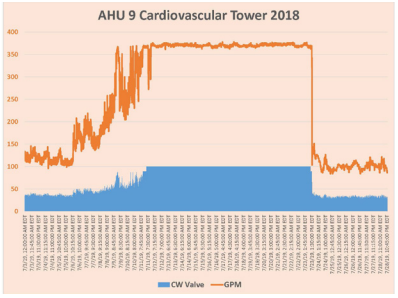
"I'm not sure how long it would have taken for us identify the problem and fix it had we not installed Energy Valves," said Dykes. "Those failing sensors increased overall building delta T by 1°-2°F. The Energy Valve prevented us from pumping a lot of extra chilled water that we didn't need."

Since being commissioned, the Energy Valves have performed as expected, with no major issues reported. Through the built-in delta T optimization capabilities, in combination with double coils, many AHUs have been able to achieve temperature differentials as high as 20° -24°F.



REDUCED ENERGY CONSUMPTION, INCREASED PERFORMANCE

Delta T over time for a single AHU



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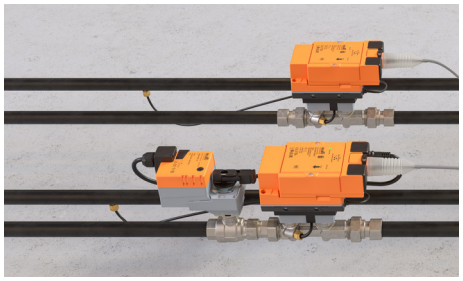
Customer Satisfaction

Having met requirements for data visibility and energy efficiency, the UF Health Energy Services team decided to make Energy Valves the standard for any future projects on the hospital campus going forward.

"The customer service provided by Belimo is top-notch", said James Buckhalter, Control Engineer for the Energy Team at UF health. "They are always available and willing to provide assistance with any issues".

"The Energy Valve is now the spec for all projects," added Dykes. "The possibilities it provides, particularly with regards to data usage, really are endless. Although we were already pretty advanced in terms of building digitalization and automation, the Energy Valve has allowed us to push the envelope even further finding new ways to optimize the way we operate and maintain the building."



BELIMO ENERGY VALVE
The Belimo Energy Valve is an IoT cloud-connected pressure independent valve that monitors coil performance and energy consumption while maintaining Delta T

- Patented Power Control and Delta T Manager logic monitors coil performance and optimizes the available energy of the coil by maintaining the Delta T.
- Glycol monitoring ensures glycol content meets design needs to provide optimum efficiency and safe operation.
- Cloud analytics provide recommended Delta T and flow setpoints with the ability to update remotely.
- Dynamic coil performance illustrates the operation of the coil in real-time, accurately providing transparency of power degradation and other operational issues.
- Expansive communication platform includes Cloud, BACnet MSTP and BACnet IP, Modbus, RTU and TCP/IP, Belimo MP-Bus, and one analog feedback signal for valve flow, power, temperature, or position.

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