

BELIMO ENERGY VALVES

Ransom Everglades School Experiences Significant Energy and Monetary Savings

Energy Valve Helps Maximize Performance of New Chiller Plant

Founded in 1903, Ransom Everglades is a premier independent school for grades 6 - 12 located on two campuses in Coconut Grove in the south of Florida. The institution combines rigorous college preparation with a long tradition of experiential learning and a commitment to educated graduates to leave the world better than they found it.

As part of the mission, Ransom Everglades has made a concerted effort to promote environmental sustainability by continually seeking out opportunities for energy conservation measures across its facilities. Over the years, the school has worked closely with its controls contractor, Smart Building Solutions (SBS), to update aging systems and deploy cutting-edge solutions to improve energy efficiency. One technology that played a critical role in its most recent capital project was the Belimo Energy Valve.

TYPE OF BUILDING

School

PROJECT

Retrofit

SECTOR

Education

PRODUCTS

Belimo Energy Valves



Project Overview

In 2019, Ransom Everglades performed a complete rebuild of its central chiller plant. The primary motivation for the project was to update aging equipment and convert the plant from constant to variable volume flow. Doing so would reduce energy consumption by enabling a more efficient distribution of chilled water to meet campus cooling demands.

Although the project was a success, a review of the hydronic system's performance by teams at Ransom Everglades and SBS revealed ongoing issues with under- and over-flowing, particularly with buildings located furthest away from the chiller plant. A great deal of energy was being wasted in the form of pumping due to chilled water being bypassed back to the chiller plant. After looking at several possible root causes, it was determined that the existing 3-way valves in buildings were the primary culprit.

"The 3-way valves worked well in the old constant volume pumping system, but they are not ideal for variable volume systems because they have limited flow modulating capabilities," said Juan Carlos Suarez, President at SBS. "Without replacing them, the school wouldn't be able to solve the water flow and balancing issues and take full advantage of the new chiller plant, thus limiting the potential for energy savings."

Another issue was visibility. While SBS could see chilled water consumption at each building via flow meters, other essential data was unavailable, such as Delta T across individual coils. This made troubleshooting system performance issues a painstaking task. In many cases, manual inspections were the only means of identifying damaged and/or failing components.



"Prior to the installation, the plant was running with 7-8 degree delta T; now it is operating between 12-13 degree delta T. Today, we can meet that same cooling load with one pump running at 70-80% - a significant energy and monetary savings for the school going forward."

**Juan Carlos Suarez, President,
Smart Building Solutions**

Solution and Benefits

To address these issues, SBS and Ransom Everglades decided to replace all existing 3-way valves across the campus with Belimo Energy Valves. In total, 30 Energy Valves were installed.

The Energy Valve is an IoT-enabled, pressure independent valve that measures and manages coil energy using an embedded ultrasonic flow meter and supply and return water temperature sensors. Key to the valve is its built-in Power Control and Belimo Delta T Manager™ logics, which monitors coil performance and optimizes the available energy of the coil by maintaining Delta T.

With the Energy Valve, the Delta T setpoint can be matched to the design Delta T of the coil. As the temperature sensors start to realize a lower differential temperature across the coil, the valve begins to close, and flow decreases, allowing for more efficient heat exchange and elimination of overflow. When Delta T starts to stabilize, the valve increases flow back through the coil, thus maintaining optimal heat transfer.

“The Energy Valves have only been installed for a few months, but we have already seen an immediate impact on chiller plant performance,” said Suarez. “Prior to their installation, the plant was running with 7-8 degree delta T; now it is operating between 12-13 degree delta T. Meeting cooling demand on most days used to require two pumps in the plant to be running at 100%. Today, we can meet that same cooling load with one pump running at 70-80%. This will result in significant energy and monetary savings for the school going forward.”

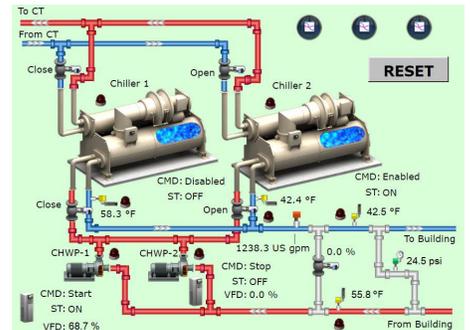
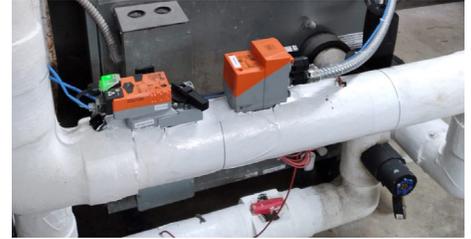
A real case here is that using the Belimo Cloud, we have been able to identify problems in three buildings (Auditorium, Math & Sci, and the Library) via the reports from the Cloud. And the problems were reported and fixed by the AC mechanics.

The Energy Valves also solved the visibility issue by enabling SBS and Ransom Everglades to view the performance of individual coils and air handlers. The 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 commissions for optimal performance. 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.



“Having all of the Energy Valves connected to the Belimo Cloud has been a huge benefit,” added Suarez. “Via the reports from the Cloud, we have been able to identify problems in three of our buildings, including a damaged 3-way manual valve and fouled coils. These problems were quickly reported and fixed by technicians.”

Overall, through capabilities, such as trending, automatic alarming, and fault detection, the Belimo cloud has enabled Ransom Everglades and SBS to take a much more pre-emptive approach to maintenance and ensure that each and every air handler is performing as it should.”



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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