BELIMO ENERGY VALVES

Passeio 42 building achieves a 47% reduction in HVAC Energy Consumption

Belimo's Energy Valve brings zone temperature control and enhances chilled water efficiency.

Designed by the French architect Henri Sajous, the Passeio 42 building is an architectonic landmark in downtown Rio de Janeiro. With its Art Deco style and an imposing 330 feet tall clock tower, the Passeio building emblazoned the marvelous city's urban backdrop.

Situated on 'Rua do Passeio' (lit. Passeio Street), the Passeio 42 building is itself inserted in the Special Zone of the so-called Cultural Corridor of the Rio Downtown Landscape and Environmental Preservation area. With ample floors 100% serviced by emergency generators, the Passeio building offers its occupants comfort, efficiency, and safety.

In addition to its superb location, the Passeio 42 building offers its occupants one of the most stunning visages of the city, such as Marina da Glória, the Guanabara Bay, and the iconic Sugarloaf Mountain.

TYPE OF BUILDING
Office

PROJECT
Retrofit

SECTOR
Commercial

PRODUCTS
Belimo Energy Valves

BELIMO

Project Overview

The Passeio 42 building is 12 stories. Every floor is 12 thousand square feet, entirely serviced by a central Chilled Water Plant (CWP) with four air-condensed Chillers of 150 refrigeration tons supplying chilled water to fifty Air-Handling-Units (AHU) distributed through the floors. Every floor is individually controlled by a simple thermostat and pressure-dependent valve accompanied by a static balancing valve.

Chiller Plant Energy Efficiency Solution

In 2021, Yield Control Energy Efficiency Solutions S.A was hired to retrofit the building's CWP, modernize the AHU chilled water control, and install a new Building Automation Control System (BAS) specifically designed for the HVAC system.

The retrofit involved replacing the CWP equipment with two new 280-ton chillers, new primary-loop pumps, and fifty new AHU control valves, all integrated into the BAS, capable of managing room temperature through AHU temperature differential.

Energy Valve: One Optimized Solution

In addition to the Low-Delta-T-Syndrome related issues, the condominium and building administration staff looked for a solution to optimize the building energy costs while providing a better way to monitor the HVAC parameters. Because of the variety in occupancy types, there was an interest in an energy-metering function to charge owners for their HVAC consumption.

"The installation allowed us to enhance the efficiency of the new CWP through the flow control and temperature differential management. We can now monitor energy consumption and AHU performance and carry out diagnostics based on each unit's performance."

Bruno Fernandez,
Innovation Facilities Manager

Benefits and Savings

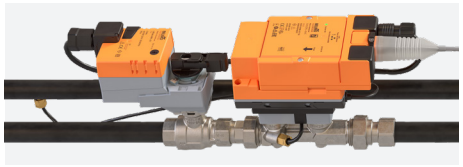
Before the retrofit, the CWP operated with a 44°F nominal setpoint, with manual pump rotation control to supply the building with chilled water. With balancing and control problems that occurred with the AHUs, the temperature differential in the plant seldom reached above 5°F. Energy consumption costs were distributed among the joint owners, regardless of the number of occupants, days, or hours occupied on each floor.

Occasional AHU problems were remedied inadequately by changing the CWP parameters. Most often, this was achieved by increasing pump rotation speed or lowering the chilled water setpoint even further. During the retrofit construction, Belimo's Energy Valves illustrated energy efficiency. The direct Ethernet connection became a valuable tool for installing and commissioning which would otherwise amount to many installation hours and costs.

There was an immediate change in pump flow modulation due to the Energy Valve's performance. The temperature differential immediately rose to at least 10°F, keeping the nominal differential constant. The CWP energy consumption dropped from an estimated average of 1500 MWh/yr. to an estimated average of 800 MWh/yr., a 47% reduction. Only the valve's excesses-limiting function allowed a full reduction to be achieved. The benefits of the Energy Valve go beyond that. It soon became evident during its first weeks in operation that the myriad of data the valve provides allows for precise and assertive troubleshooting of issues that inevitably arise during building startup and commissioning. As a result, the data can help to ensure that local inefficiencies do not propagate to the CWP while providing accurate diagnostics that prevent quarrels and liability issues. With the energy metering function, the system's operational costs are now proportional to how much chilled water each tenant uses rather than how much the building uses.

"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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