BELIMO ENERGY VALVE™

Milano e Torino Complex in São Paulo Reduces Energy Cost by 40% and Improves Occupant Comfort

Improvement to Chilled Water Delta T

The Milano e Torino business complex is located in the Água Branca neighborhood, in the West Zone of São Paulo, Brazil. At the time of its construction in 1999, Milano e Torino represented a landmark in its geography, undergoing an intense urban revitalization process. The buildings within the complex stands out among commercial enterprises for their highly sustainable design. In recent years, several advanced technologies have been incorporated, which have allowed the owner, Bank of Brasil Employees' Pension Fund (PREVI), to increase energy efficiency, improve occupant comfort, and stay at the forefront of building innovation.

TYPE OF BUILDING
Class A Office Building

PROJECT
Retrofit

SECTOR
Corporate Office

PRODUCTS
Belimo Energy Valve™

BELIMO

Chiller Plant Retrofit Saves Millions

Project Overview / Initial Situation

The Milano e Torino complex includes four towers, each with 20 floors and 18 thousand square meters of usable space. The towers have their own respective chilled water plants with four 160-ton air condensing chillers (640 tons of capacity).

Before installing the Belimo Energy Valve, the hydronic system's control was achieved with pressure dependent globe valves and proportional thermostats. This setup, which was considered old by current technological standards, lead to inefficient pumping, low delta T syndrome, and excessive energy consumption. Along with the inability to satisfy cooling loads across the different areas and floors of the buildings. All of which was evident by the frequent complaints from tenants regarding comfort. The facility management team's initial study pointed to an alleged deficiency in the chilled water plants of around 200 tons in each tower. One potential solution would be to replace the chillers. However, this would require a large capital investment of approximately $2.1 million US [R$11 million].

Energy Valves Help Solve Low Delta T Syndrome

PREVI then turned to the HVAC engineering consultancy Froes Engenharia for another solution. After an audit process, the company found that there were issues with how the hydronic system was installed and operated, and in fact, there was no deficit in chilling capacity. Instead, a thermal surplus of around 160 - 250 tons in each tower.

The facility management team evaluated the proposal that involved the unification of the chilled water plants into a single pumping system to address the issue. This would enable the buildings to provide chilled water by staging the number of operating chillers based on load requirements. It would require balancing the buildings' cooling load, which the current system was unable to do.

"After the success of this retrofit project, we will be looking at other opportunities to create savings and improve efficiency through the application of innovative building solutions. For this, we will continue to rely on Belimo."

Cilene Magalhães, Building Manager of the Milano and Torino Buildings

Solution and Savings

After evaluating several products from various suppliers, the answer was clear - the Belimo Energy Valve. The pressure independent performance of the Energy Valve and the Delta T Manager functionality were key benefits.

In total, 172 Energy Valves were supplied for the project.

- 120 - 1 ½" [DN 40] for office AHU's (2 per floor)
- 40 - 1 ½" [DN 40] for small AHU's in common areas, such as meeting rooms, bars, restaurants, reception, and other areas
- 4 - 4" [DN 100] for enthalpy AHU's (1 per tower)
- 8 - 5" [DN 120] to monitor chiller flow and energy consumption

The installation of the Energy Valves (in combination with other building upgrades made to the automation system and cooling water pumps) increased chilled water Delta T within the four buildings from 6.5°F [3.6°C] to 11.7°F [6.5°C]. This resulted in a nearly 40% reduction in energy consumption of the air conditioning system.

"By balancing the temperature Delta T, and analyzing and measuring the flow and energy consumption with the Energy Valve, we were able to significantly increase the coefficient of performance (COP) of the equipment," said João Froes, a consultant for PREVI. "Our utility bill remained the same as the two previous years, despite the red tariff flag's entire period. Additionally, tenant complaints were eliminated."

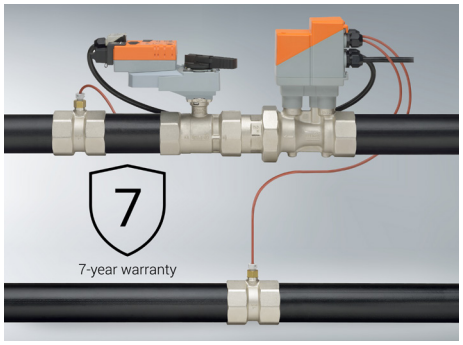
In addition to the energy savings and improvement in tenants' comfort, the installation of Energy Valves allowed PREVI to avoid costly overhaul/replacement of the chiller plants.

"The installation has enabled us to improve pumping efficiency with better flow control and the management of Delta T. We can also monitor the energy consumption and performance of individual AHUs to assess how energy is flowing throughout the building."

Gilmar Amaral, Facility Manager for the Milano e Torino Business Complex

Customer Satisfaction

"Overall, the project was a huge success. The positive impact the Energy Valve provides both on the building's performance and our tenants' comfort exceeded my expectations," said Gilmar Amaral, Facility Manager for the Milano e Torino business complex. "The installation improves our pumping efficiency through better flow control and management of Delta T. We can now monitor the energy consumption and performance of individual AHU's to assess how energy is flowing throughout the building. Belimo supported us throughout the installation and commissioning process of the project. The technical support they provided our operations and maintenance team was key to making the project go as smoothly as it did."



BELIMO ENERGY VALVE

The Energy Valve is a pressure independent valve that monitors coil performance and energy consumption while maintaining Delta T. The Energy Valve's core features and benefits include:

- Belimo Delta T Manager™ algorithm reduces pumping and chiller operating costs by increasing chilled water loop efficiency and mitigating low Delta T Syndrome.
- Dynamic Balancing with pressure independent valves precisely control the water flow required by the coil and are not affected by pressure fluctuations in the system.
- Key performance indicators are graphically illustrated with the built-in web server showing current and historical flow rates, energy usage, Delta T, and other points of interest.
- Energy monitoring with the integrated energy meter provides accurate coil performance data. The data helps to verify system performance during commissioning and acts as a baseline standard for system performance over time.

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