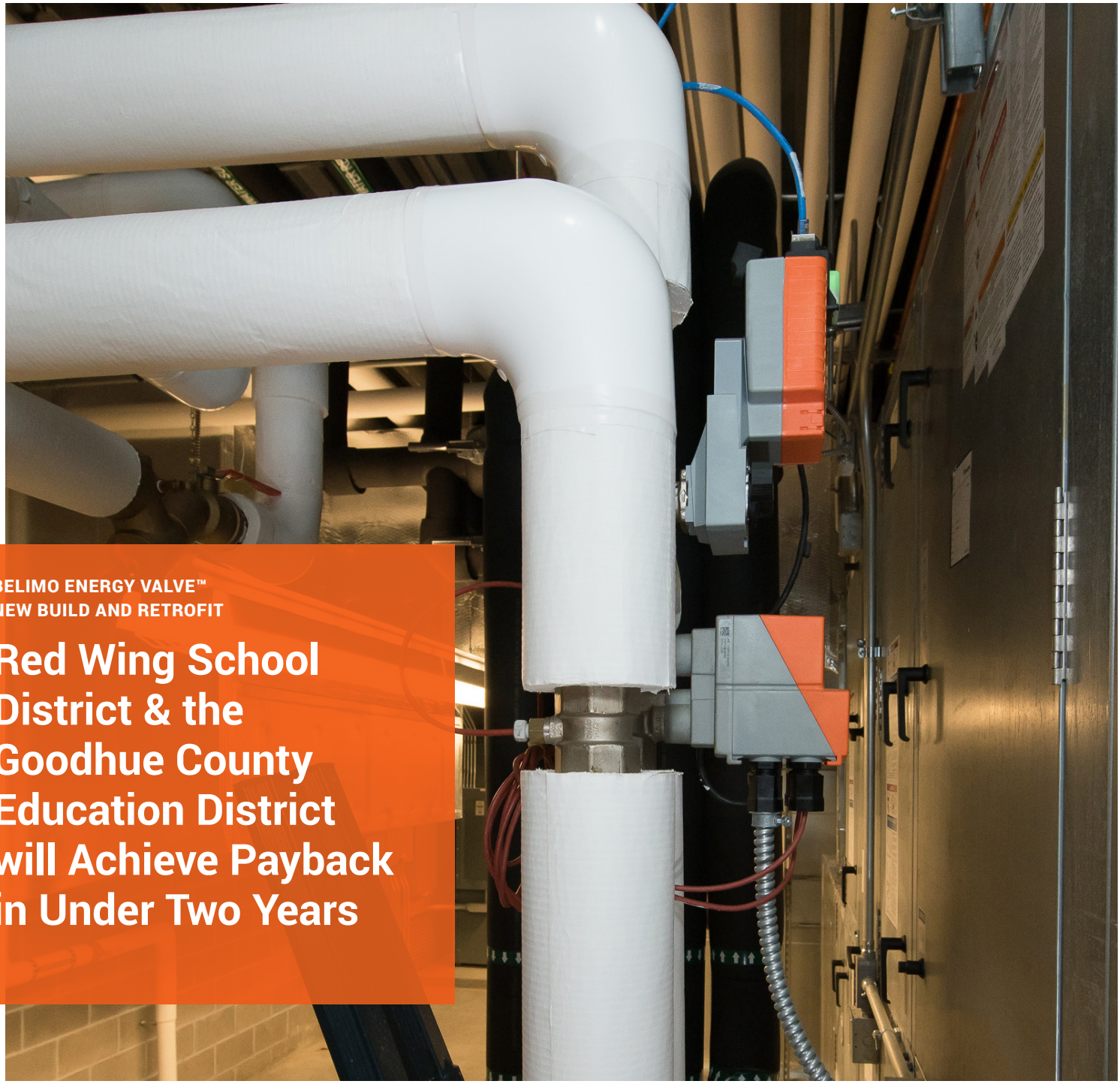


BELIMO ENERGY VALVE™
NEW BUILD AND RETROFIT

Red Wing School District & the Goodhue County Education District will Achieve Payback in Under Two Years

Belimo Energy Valve with Cloud Connectivity Helps Red Wing School District Stay on the Cutting-Edge of Energy Efficiency

Located in Goodhue County, Minnesota, on the western bank of the Mississippi River, the Red Wing Public School District is a model of energy efficiency in the educational sector. Over the last two decades, Red Wing has made a substantial commitment to environmental stewardship and sustainability – leveraging the latest and greatest building technologies to reduce energy consumption and enhance the learning environment for its 2,700+ students. With a total of 109 Energy Valves installed across the district, Belimo has played an essential role in helping Red Wing achieve its sustainability goals. The Energy Valves help facility personnel optimize Delta T and HVAC system water usage, and with cloud-connectivity, the district can capitalize on the many benefits afforded by the Internet of Things (IoT).

TYPE OF BUILDING
Elementary School, High School, and Joint Educational Center

PROJECT
New Build and Retrofit

SECTOR
Education

PRODUCTS
Belimo Energy Valve (cloud connected)

BELIMO

Energy Valve with cloud-connectivity provides efficiency through innovation

Facilities and Project Overview

Red Wing School District has eight buildings for student use totaling over 790,000 square feet (SF), including two elementary schools, a middle school, a high school, a family center, a sports arena, and the Goodhue County Education District, a joint educational center. Of the district's six buildings that qualify for the Environmental Protection Agency's Energy Star® program, five have received the designation and the sixth is anticipated next year after completion of the high school renovation — a testament to the proactive measures Red Wing has taken to improve energy efficiency across its facilities.

Over the last two years, a large part of Red Wing's efforts have focused on optimizing Delta T and water flow across air handlers in building chilled water loops, and hot water loops served by condensing boilers. For this, they have turned to the Belimo Energy Valve.

Red Wing currently has 109 Energy Valves installed across three of its buildings. All of the valves are connected to the Belimo Cloud. Seventy-eight Energy Valves reside in the newly built River Bluff Education Center – a 66,700 SF facility that serves children from preschool through age 21 and provides specialized education services to more than 150 students annually from multiple Goodhue county districts.

Project Requirements

"Every decision we make at Red Wing regarding facilities focuses on reducing costs, improving energy efficiency and occupant comfort, and increasing overall system reliability," said Kevin Johnson, Director of Buildings, Grounds and Technology at Red Wing. Johnson has been at Red Wing for over 19 years and has been one of the driving forces behind the district's energy saving initiatives. "The decision to flat spec the Energy Valve at River Bluff was based on previous experience with the product, and also on the superior level of service Belimo has provided the district over the years. We brought in multiple engineering firms to crunch the numbers for the facility, and with the custom rebate provided by Xcel Energy, which partially covered the controls, VFDs, and the valves themselves, the payback period for installing all 78 Energy Valves worked out to be less than two years. It really was a no-brainer."

"Savings are always difficult to quantify for new buildings; however, at River Bluff, we are pumping approximately 50% less water than that of a similar sized building in our district," he said. "This equates to substantial pump cost savings over the long-term and represents an improvement over traditional valves, which often deliver far more GPM than needed to maintain temperature set points."

Kevin Johnson, Director of Buildings, Grounds and Technology, Red Wing School District

Energy Savings Solution

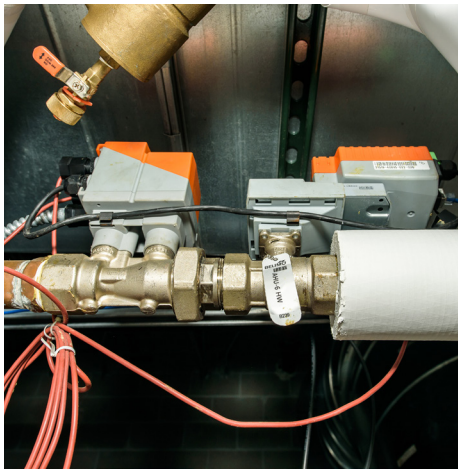
Energy savings from the Energy Valve are derived mainly from reducing water flow across coils – a benefit that is made possible by the valve's patented Belimo Delta T Manager™, which monitors coil performance and optimizes the available energy of the coil by maintaining Delta T.

IoT and Belimo Energy Valve

Since its market launch in 2012, the Belimo Energy Valve has won 20 industry awards and helped organizations worldwide reduce operating costs and energy consumption in facilities by optimizing Delta T. The third generation Energy Valve, builds on that success by incorporating many additional features and capabilities, including cloud connectivity. "With the proliferation of IoT and digitalization, cloud connectivity has become an important feature for organizations looking to get the most out of their industrial equipment and devices," said Scott Reed, Product Manager at Belimo. "Connecting to the Belimo Cloud allows the operation of the valve to be continuously monitored and captured system data analyzed to improve coil and plant performance achieving increased energy savings. Customers also benefit from receiving regular performance reports that include data on trends, energy usage, and key performance indicators (KPIs)."

Tom Daenzer, Digital Business Development Manager at Belimo added: "From a customer standpoint, the primary benefit of connecting to the cloud is visibility and transparency of data. A lot of very useful information is compiled by the Energy Valve to help optimize the heat transfer process. In the majority of facilities, this data is sitting there unused. In the case of the Energy Valves at Red Wing, all of which are now connected to the Belimo Cloud, this valuable data can be easily accessed by the facility manager. We can also help to ensure that the device is setup properly, provide remote assistance, and offer automated Delta T setpoint analysis and optimization at the request of the user."

Another added feature of the third-generation Energy Valve is the patented glycol monitoring functionality. "Glycol monitoring is unique to Energy Valve" added Daenzer. "This feature protects the hydronic system by ensuring sufficient levels of glycol are present. It also makes sure users are not overprotecting, as too much glycol reduces heat transfer, creating a less efficient system."

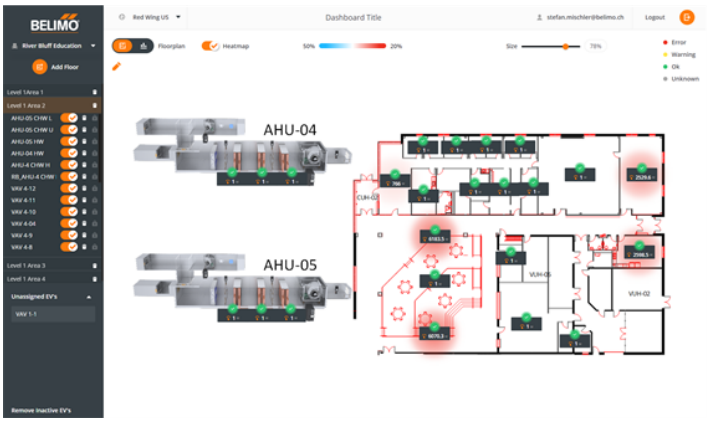


BELIMO ENERGY VALVE FEATURES

The Belimo Energy Valve is an IoT-enabled, cloud-connected pressure independent valve that monitors coil performance and energy consumption while maintaining Delta T. The Energy Valve's core features and benefits include:

- Delta T Management - Belimo Delta T Manager™ algorithm reduces pumping and chiller/boiler operating costs by increasing chilled water loop efficiency and mitigating low Delta T syndrome.
- Cloud Connectivity - Remote cloud connectivity allows Belimo to optimize and monitor customer energy usage and provide advanced system data reporting.
- Energy Monitoring - The Energy Valve's integrated energy meter provides accurate coil performance data. The data is used to verify system performance during commissioning and acts as a baseline standard for system performance over time. This feature helps achieve LEED points through Energy and Atmosphere within credits 1 and 5.
- Glycol Monitoring - The Energy Valve has an exclusive glycol monitoring feature that ensures glycol content meets design needs.

Energy Valve Maintains Comfort in the Classroom



The district is also beta testing an energy flow map feature which Johnson suggested; it is an extension of the Belimo Cloud that provides a visual means of determining energy consumption at different Energy Valve locations. The map and dashboard show all Energy Valves from a particular building. Information including total energy consumption, power, flow, position, Delta T, along with historical data is available. "The energy flow map is a feature we are very excited to use at Red Wing," said Kevin Johnson. "In River Bluff, for example, we have Energy Valves installed on every individual air handler zone. The heat map overlays the location of each Energy Valve on the building floor plan. This will provide us with granular visibility as to what areas are consuming the most energy. It will also help us identify and diagnose potential problems much quicker than we would be able to using traditional methods."

Customer Satisfaction

In the coming years, as new upgrades are warranted, Red Wing has plans to install additional Energy Valves throughout its facilities. "Every dollar we don't spend on utility bills is a dollar that we can put toward improving the learning environment for our students," said Kevin Johnson. "The Energy Valve has played an integral role in helping our district achieve efficiency gains by optimizing Delta T and reducing pumping costs. We look forward to working with Belimo in the coming years to achieve greater energy savings and drive forward with our sustainability and cost reducing initiatives."

CUSTOMER BENEFITS

- **Increased pumping efficiency and reduced energy consumption** - By optimizing Delta T and reducing flow across heating and chilled water coils, Red Wing has been able to reduce pumping requirements and associated costs.
- **Enhanced visibility** - With cloud connectivity, Red Wing School District gains enhanced visibility into the operation of air handlers, chilled water coils, and energy flows across facilities. The Energy Valves can be continuously monitored and compared against other valves operating under similar conditions. Quarterly energy reports provide data on trends, energy, and performance KPIs.
- **Improved occupant comfort** - Glycol monitoring enables facility engineers to maintain the correct glycol concentration; increasing overall heat transfer and pumping efficiency, while reducing operating cost and mitigating the risk of problems that can lead to a loss of comfort.

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