

Beloit USD 273

Trane BTU Crew Launches Student-Led Change, Driving Improvements
Customer Story



Challenge

Located in north central Kansas, Beloit Unified School District (USD) wanted the right company to help them launch a unique public-private collaboration to elevate STEM learning and prepare students for future technical careers. The Kansas State Dept. of Education's [Kansas Can School Redesign Project](#), designed to empower and engage students in their own learning, inspired the district's plan.

The district and its 800 students also needed to improve building comfort in its Junior-Senior (Jr.-Sr.) High School building. Although originally designed without interior walls, embracing the then-current open-space teaching approach, the building was now divided into 10 classrooms. However, the heating, ventilation, air conditioning (HVAC), and building infrastructure systems were not correspondingly updated, negatively impacting classroom indoor environmental quality (IEQ).

Based on Trane's successful strategic partnership with the Kansas Board of Regents, district leaders reached out to the building technology and energy solutions company to discuss a collaborative undertaking.

Solution

BTU Crew Program Incorporated

Trane proposed implementing its BTU Crew™ program into the district as part of an upgrade project that would re-align building systems at the Jr.-Sr. High School—and the district agreed.

As the first step to upgrading the 10 classrooms, Trane advised adding wireless, indoor sensors to provide input on CO₂ levels, temperature, and humidity. The district signed off and students "job shadowed" one of Trane's energy consultants to learn how to install the sensors. Once they understood the process, the students worked with their teacher, Christie Fouts, to complete the installation.

Incorporating sensor data from the classrooms into student learning transformed the school into a Virtual Living Learning Lab (VL3)—enthusiastically engaging students while teaching them about potential data analytics-related careers. The sensor input provided actionable data, showing inconsistent temperature and humidity control as well as higher-than-ideal CO₂ levels in the classrooms due to lack of proper ventilation.

Dan Whisler, who serves as the Trane Educator-in-Residence for the school, worked with Beloit teacher Christie Fouts to review the quantitative data with the students. The students independently decided to survey teachers to gather quantifiable classroom data reflecting teacher input using the classrooms. After tallying results, students worked with Whisler to overlay the quantitative sensor data with the classroom floorplan and the qualitative survey responses, demonstrating consistent results using two different survey types.

Building Upgrades Installed

Based on the data and survey input, Trane energy experts recommended infrastructure solutions to improve the learning environment in the designated classrooms. Proposed upgrades included a Tracer® SC+ building automation system to better control comfort and optimize energy efficiency. They also recommended Trane Variable Air Volume boxes with electric reheat coils to resolve the ventilation issues. Proper ventilation would then, in turn, resolve the CO₂, temperature and humidity issues. The district undertook the proposed improvements, and classroom comfort increased, enhancing the learning environment.

The district also added Trane Intelligent Services, including an interval data energy meter that pulls data every 15 minutes and a subscription to a quarterly building data review by Trane energy experts. Trane energy consultants review the data and prepare recommendations regarding any modifications needed which they then present to the district facilities team. Students who are interested in this process sometimes join these meetings, deepening their understanding of data analytics and its decision-making implications.

After the district installed the sensors and other recommended upgrades, students went back and gathered sensor data demonstrating that targeted results were achieved. Students then presented to the Beloit USD School Board, demonstrating how the completed project proved itself with data, including improved building comfort and reduced CO₂ levels.

Trane provided counsel throughout the upgrade process. This included recommending the district's decision to streamline the procurement process and minimize costs by purchasing HVAC solutions through [OMNIA Partners®](#), one of the largest cooperative purchasing organizations for K-12 education.

Following the classroom upgrades, Beloit USD leaders continued to turn to Trane for solutions. As the district prepared to re-open its classrooms after pandemic closures, for example, the district wanted to enhance IAQ. Based on Trane's input, they added a new building automation system to Beloit Elementary School to augment building control. They also installed new HVAC systems to optimize IAQ at the district's Special Education Cooperative, Early Learning Center, Parent Resource Center, and Elementary School.

District leaders also worked with Trane to improve IAQ by installing 141 Synexis™ air-cleaning units in five district buildings. Synexis technology provides an occupant-approved effective and low-maintenance option to improve district-wide IAQ without negatively affecting energy efficiency and operating costs.

Inspired in large part by the success of the seventh- and eighth-grade BTU Crew efforts, the school is now working to offer [Trane NC3 Data Analytic industry-recognized certifications](#) for its high school students, starting in the spring of 2023.

"Understanding energy and data analytics through the BTU Crew helps position our students for high-demand, high-tech and even high-wage careers. We find that the program fully engages our students, enabling them to make real-world connections to STEM as well as to topics like energy and politics, truly fulfilling our school re-design vision."

- **Jeff Travis,**
Beloit USD Superintendent

Results

Successful Public/Private Collaboration

District leaders agreed that the public/private collaboration undertaken with Trane proved to be a successful one, enabling students to leverage resources well beyond the district's typical offerings. Students continue to participate in real-world learning and truly contribute to district energy improvements, while gaining useful data analytics and other STEM capabilities.

Inspired by their BTU Crew experience, some of the program's graduates have even gone on to deepen their understanding of data analytics, ultimately, selecting careers where they can employ these capabilities.

Based on its successful undertaking with Trane, the district was one of six Kansas schools featured in the 2021 PBS documentary, "[Kansas Can School Redesign – Beloit's Journey](#)". Students also have joined school leaders at conferences such as the Kansas Association of School Boards.

In addition to elevating STEM education, the district also improved its district's IEQ, upgrading building infrastructure systems, improving IAQ and optimizing student well-being. An ongoing service agreement with Trane, reviewed quarterly by a Trane energy consultant, helps ensure that the district's buildings continue to run optimally.

Trane, district leaders and BTU Crew students are currently working on a forthcoming project that will improve building comfort and IAQ in the Jr.-Sr. High School by replacing end-of-life rooftop HVAC units with new higher efficiency solutions.



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