JOURNEY TO A SMART SCHOOL

District School Board of Niagara modernizes building automation technologies with help from **Siemens Green Migrations**

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Infusing school buildings with as much potential as the students who learn in them

In Ontario, the District School Board of Niagara (DSBN) has honoured its decades-long commitment to achieving student success with quality public education. They do so with a well-trained, energetic, and empathetic team of more than 3,000 teachers and 1,300 support staff who are dedicated to empowering all learners to reach their full potential.

The buildings in which these students do their learning and growing are tremendously important as well. With approximately 100 buildings that make up DSBN, it's a tremendous undertaking. That's why they've partnered with Siemens Smart Infrastructure for the last 20 years, and most recently on a Green Migrations project to help take a strategic approach to modernizing building automation equipment and technologies with energy efficiency in mind.

"A key goal for us has been to bring our infrastructure up to 21st century learning and facilities standards," says Graeme McKenzie, DSBN's Energy Officer for Facility Services. "We work together with Siemens to improve our specifications for energy efficiency and resource conservation that will help us stay within our budgetary constraints. And we work alongside our academic partners to bring these programs into our curriculum when possible."

Holistic assessment of facility operations with Green Migrations

Partnering with Siemens over the years has meant that McKenzie and others at DSBN have been able to work shoulder-to-shoulder with energy engineers to uncover new ways to bring their infrastructure into today's standards for building operations. Like many other buildings, DSBN schools have evolved since they were first designed and built; there are new requirements for ventilation and efficiency, as two examples, and new automation technologies that can take the guesswork and manual controls out of the equation.

So when Siemens presented DSBN with the Green Migrations approach, McKenzie was intrigued by the idea: "We took a deep dive into our systems, equipment, and software to incorporate new ideas, more energy efficiency, and new ventilation strategies." This approach ensured that the end result was a *true upgrade* to the facilities, not just hardware renewal.

Seven DSBN buildings were selected for first two phases of the Green Migrations program, which ultimately resulted in 27 facility improvement measures being implemented. McKenzie explains that the project had a dual purpose. First to examine the logic and controls behind all of the buildings' mechanical systems and find ways to run them in a smarter way. Secondly, the plan was to carefully assess all the dampers, valves, actuators, and other mechanical equipment and ensure they were functioning 100% correctly. This approach ensured that equipment was not only working but working well.

"This second purpose was largely in response to the COVID-19 pandemic. We needed to be sure we were meeting ventilation standards to protect our students, staff, and faculty. But we also needed to ensure that our software controls matched our hardware," says McKenzie.

Achieving a safer, healthier indoor environment for optimal student learning

And, it turns out, this was a wise approach. McKenzie explains how they found a number of actuators in control of building ventilation that were misaligned with the programming logic. "We were attempting a 20% fresh air percentage, but the physical inspection revealed that we were 0% open. There are lots of reasons this can happen and it's not about pointing fingers; it's about solving problems. And that's what the Green Migrations program has helped us to do," he notes.

In fact, McKenzie credits the Siemens energy conservation team with helping them schedule fresh air requirements in ways that create a healthy indoor environment without sacrificing energy efficiency.

Although McKenzie admits that, absent the pandemic, DSBN's energy savings would have been more impressive, the fact remains that they're still capturing both energy savings and incentives from the local utility. "In the schools where we did the Green Migrations program, we still saw an overall reduction in energy use. It was very beneficial because not only did we achieve energy savings and greenhouse gas reductions, but we're also meeting fresh air ventilation requirements." The combination of annual energy savings and utility incentives represents a significant amount of funds that DSBN says they're reinvesting back into their school facilities.

Project Highlights

Better match equipment operation to building use

Improve control sequence and release overrides to eliminate wasted energy

Identify and repair/ replace failed sensors

Extend asset life through reduced equipment cycling

7
schools upgraded

27
improvement measures

460
t CO_2e saved

"We anticipated as much as a 20% increase in energy use due to COVID requirements for fresh air ventilation. But because of Siemens care, attention to detail, and innovative approach to saving energy, we're able to create these healthy learning environments but still achieve energy savings."

Graeme McKenzie
Energy Officer for Facility Services

In addition, McKenzie notes that he's now able to step back from building automation system management and leave that in the capable hands of each DSBN's maintenance staff. With building systems and equipment functioning properly and requiring a minimum of manual interventions, "It's safe to say they're the best-performing buildings in our whole portfolio."

Siemens partnership creates confidence for DSBN

"The experience of working with Siemens is very good," says McKenzie, who goes on to say that the energy engineers and other team members have a depth of expertise that's made this Green Migrations project so successful. "Everyone has been very knowledgeable and willing to work with us to solve complex problems together. With Siemens, we know we're getting people who know both our software and our hardware, and we only have to deal with one partner, not multiple vendors, to get the work done well."

Over the last five years, McKenzie says DSBN's focus has been on utility savings. But that focus will shift over the next decade, with an enhanced focus on greenhouse gas (GHG) emissions reductions via existing building commissioning, lighting retrofits, and motor/pump efficiency programs. The reason? "We're trying to get ahead of federal carbon tax increases, as well as increases in natural gas and other energy costs that may happen in the future. I'm personally very grateful to be in a position here at the school board where I can have a positive impact on climate change and working with Siemens is helping us inject that awareness into every project so we can work toward our greater goals," McKenzie concludes.

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