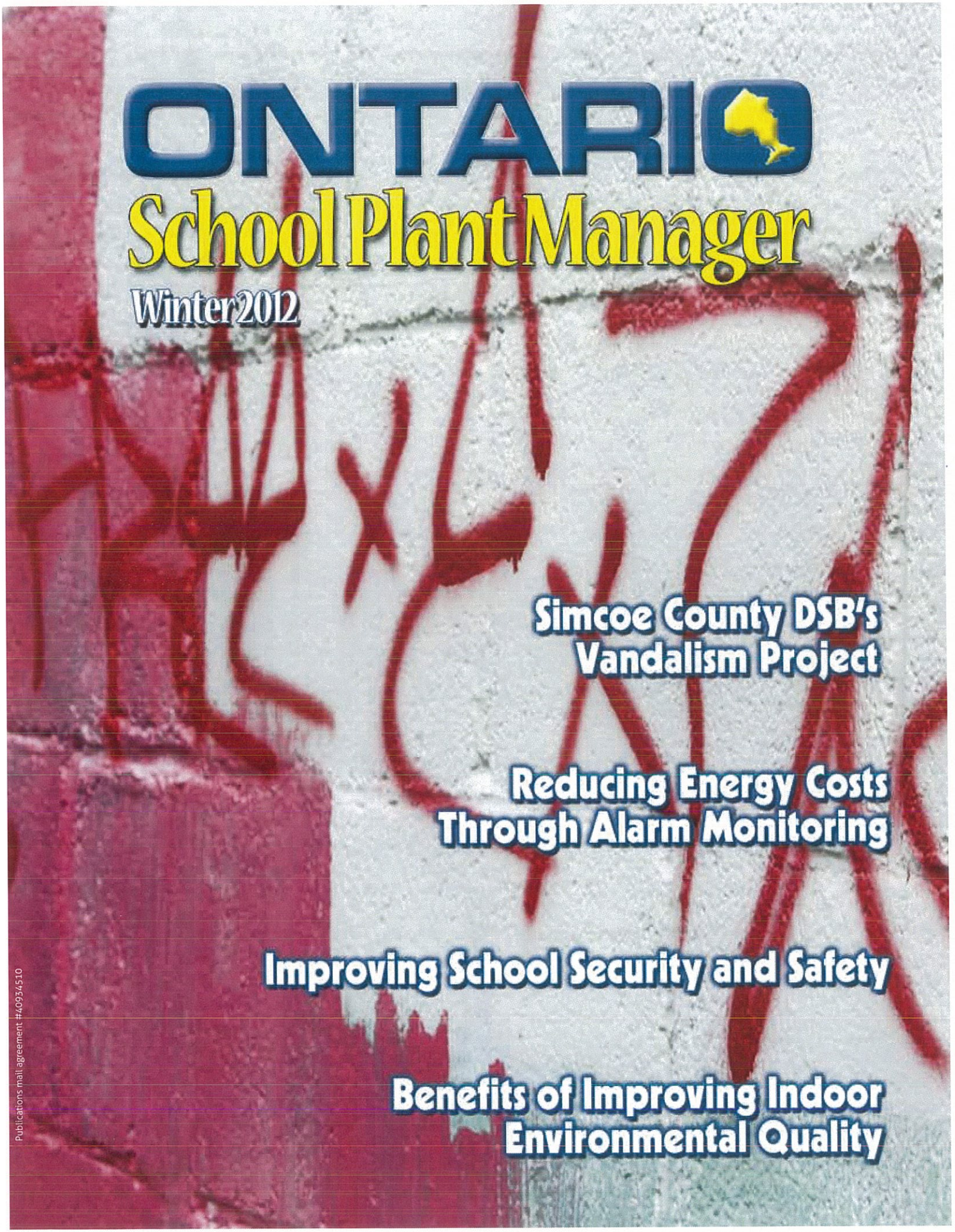

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Reducing Energy Costs Through an Alarm Monitoring System

By Margaret Manetta

York Region District School Board is the third largest school district in the province, operating 215 schools and education centres. The school board has identified environmental initiatives and goals that articulate a healthy and sustainable future is the right of each student and that environmental education is a shared responsibility of staff, students, parents and the community. This system priority is reinforced in annual plans, an environmental policy, and the Board's commitment to promoting change in organizational practices that will result in reducing our ecological footprint. These principles influence the work of the Plant Services Department and open the doors to divergent thinking.

The implementation of the Carma Submetering System, which measures and evaluates electrical demand and consumption in "real-time" 15-minute intervals, is now evident in all York Region public schools. With the first system installed in 2000, the 13-year partnership between the Board and Carma Industries has evolved over the years so that Carma is now an active participant in the Board's environmental efforts. The system was initially adopted by the Plant Services department to troubleshoot, refine seasonal operations, and adjust mechanical systems based on the data. Through the collaboration between Carma Industries expertise and technology and the Board's existing infrastructure and experience, Plant Services has been able to advance its business and environmental goals and investigate how this technology can be used beyond its initial intent. Currently this entails expanding to site-based gas meter monitoring.

Fig. 1: nighttime electricity load exceeding the set threshold.

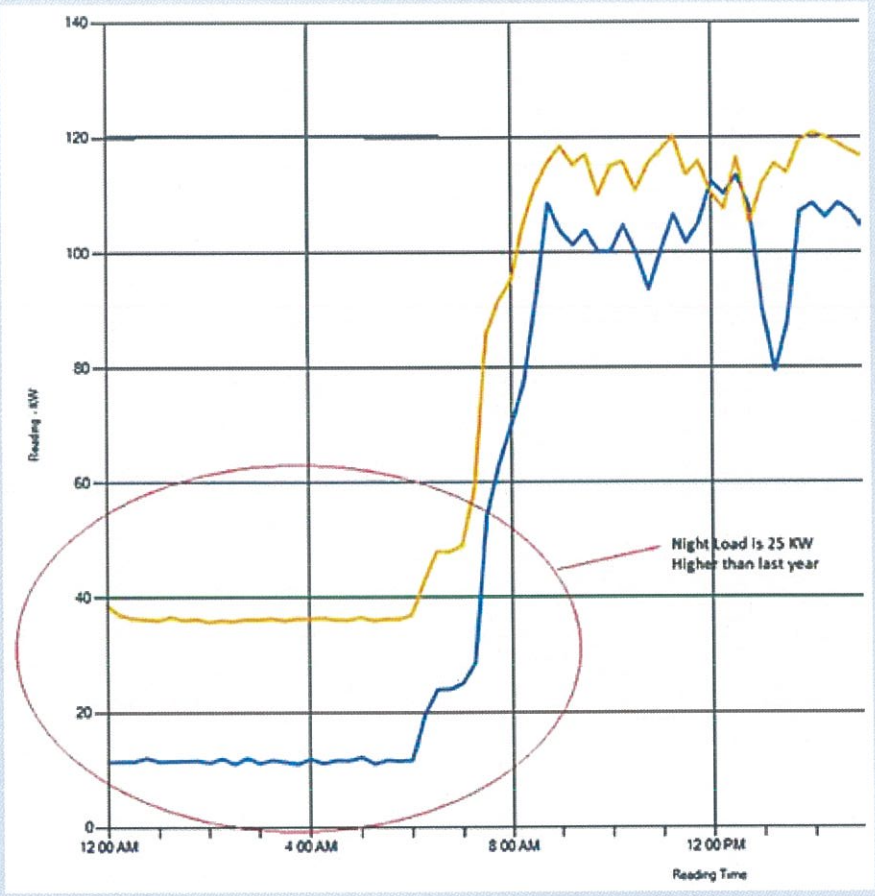
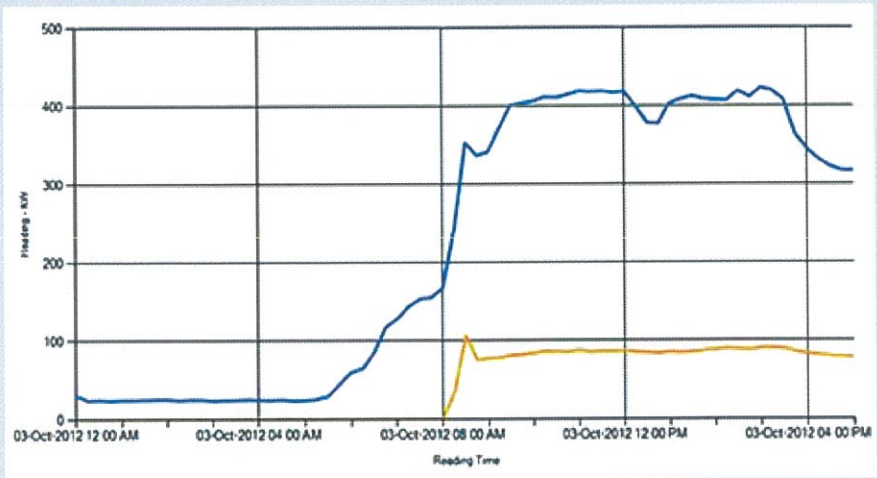


Fig. 2: Carma Alarming package illustrating a chiller running when it should not be operating.



Real-time data tracking is significant to ensure Plant operations staff and caretakers can effectively monitor the conditions within their schools. Unique to the York Region District School Board is the incorporation of additional submeters within the schools to monitor major critical subloads (i.e. chillers, lighting panels). The addition of an alarming package was a natural extension to the monitoring program, to further assist in reducing energy costs and promoting efficient facility operations. It is a Windows-based software application that allows energy managers and facility operators to receive notification of critical problem areas through a series of alarms and email alerts.

"This alarm feature will allow us to continue our efforts to reduce unnecessary energy consumption and flag system failures," says Robert Selvazzo, Manager of Energy and Environmental Services. Being alerted to when equipment is running outside of scheduled times, the department can provide targeted learning, streamline operations to maximize energy conservation, and further align with the Board's environmental intentions.

The alarming system typically has three main screen displays available to users: a main screen allows users to set up demand and consumption limits, holiday schedules and program schedules; the demand schedule graphing screen allows users to set thresholds as they pertain to expected loading within the facility; and the Min/Max Investigator screen allows the user to select and preview meter data before generating summary reports.

Once thresholds are entered, the system automatically alarms when a meter has exceeded its user defined limits and an email is automatically generated and sent to the building operator notifying that the specified limit has been exceeded.

The monitoring system uses a colour-coded system for easy identification of critical meters: green for standard alarms, yellow for elevated, blue for consumption and red for critical. Only critical (or red) alarms generate emails to end users, eliminating unnecessary emails being sent to operators and increasing operational efficiencies.

One of the main benefits of the Carma alarming software is its capability to create two different schedules per week. This allows an operator to distinguish between weekday and weekend usage patterns which are uniquely different within a school board environment. Within the daily schedule setup, the user is able to create thresholds based on time of day, which is necessary within the normal operation of a school and its unique occupancy profile. For example, an evening threshold can be set to accommodate in-school community activities occurring during non-traditional school hours and shoulder periods can be programmed for mornings and evenings.

Energy usage can be further reduced by using the "Save Date Exception" button feature which gives operators the ability to add specific dates or holidays to either a weekday or weekend schedule. York Region DSB has used this feature to compare holiday energy consumption to a proto typical school day; for example, Thanksgiving Monday to a typical Monday school day.

The ability to establish two seasons is most useful in school environments where power usage during the summer is typically at minimal levels. York Region DSB has successfully implemented this feature to set seasonal thresholds for its main chillers, tracking when chillers are operating unnecessarily. It's a strategy that not only saves energy, but can also assist in reducing costs and usage.

Plant Services also designed an interface and website for teaching staff and students to access the data, track real-time energy consumption and witness first-hand the impact of their conservation efforts. Focusing on environmental learning, this website encourages engagement by fostering participation and cultivating an understanding of the students' direct connection to energy consumption and how they can collectively make a positive difference through behavioural change. Superintendent of Plant Services Margaret Roberts notes, "The website is an opportunity to work and learn with the students who challenge the Board to improve our practices and find new ways to reduce utility consumption."