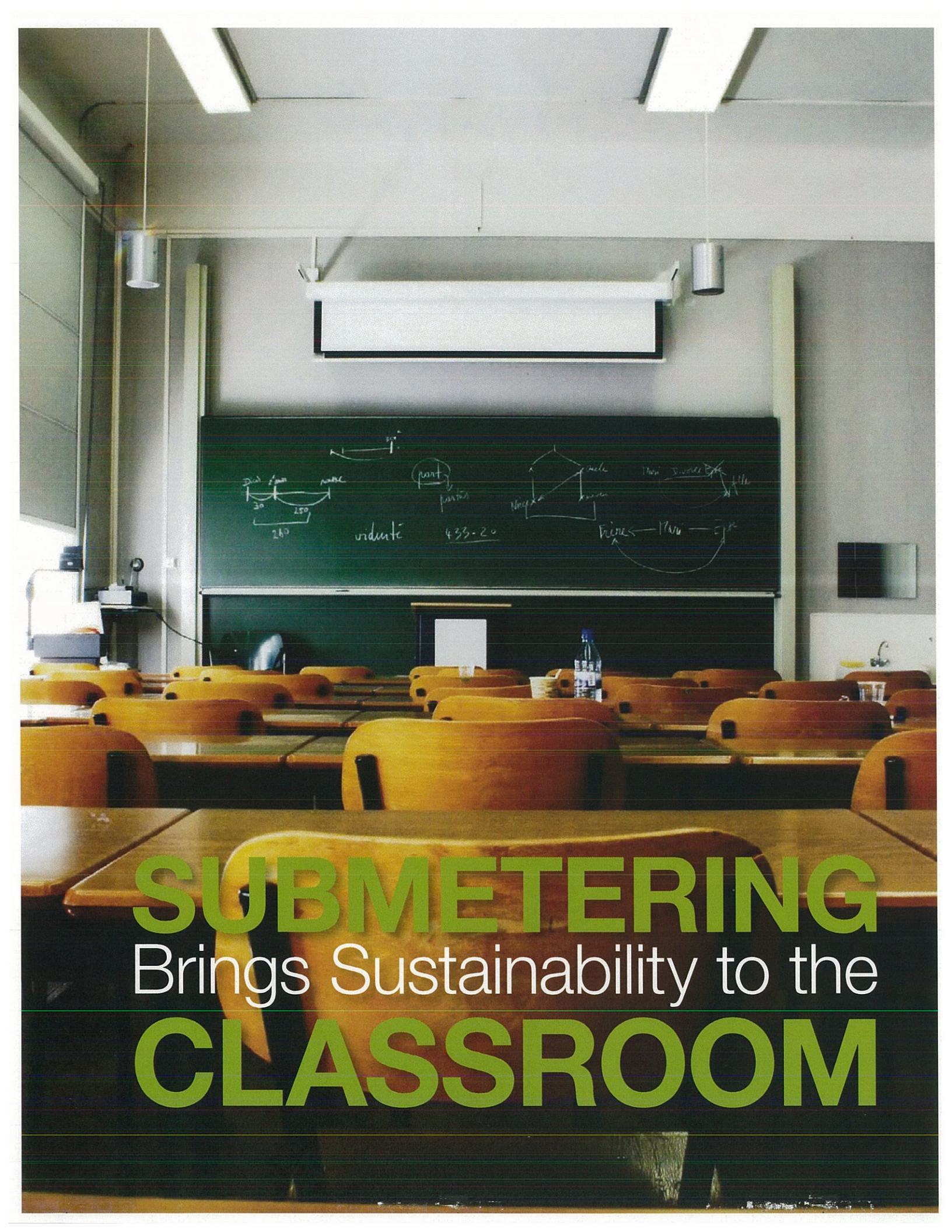




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Continuing Education: collaborating for a cause



SUBMETERING

Brings Sustainability to the

CLASSROOM

With electricity rates expected to increase by 45 per cent over the next 5 years in Ontario, school boards are constantly looking for ways to control their energy costs in the face of shrinking budgets. More and more, managers and facility operators are seeing the connection between controlling utility costs and maintaining environmentally sustainable schools. Gone are the days when “being green” was viewed as an additional cost. Today school boards recognize the need for energy management systems that can identify inefficient facilities and allow managers to take corrective action. One way for schools to monitor and manage their energy is through the use of a submetering system. While these systems might be more recognizable in multi-residential and commercial applications, they are also playing an important role in many schools across the country.

SUBMETERING, THE DIRECT measurement of utilities in a building, is a key element in any school board's energy management program. Typically, meters are installed for all the main subservices, usually 6 to 8, within the main switchboard supplying the school. Some of the subservices that can be captured include lighting, motor control centres, main 120V power (receptacle power), roof-top units, air handling units and chillers. While monitoring the main incoming service is critical, true isolation of performance elements cannot be obtained without the actual monitoring of the main subservices. While it is less common, gas services can also be measured, particularly where a school encounters exceptional energy usage, such as summer boilers for pools and major services for arenas, daycares or theatres.

Many school boards concentrate initially on the three main utility services - electricity, gas and water. There is a natural upgrade path to extend the initial metering to include critical subservices such as chillers and motor control centres. High utility users, secondary schools for example, are a primary target for the implementation of true submetering of main subservers. Without the data provided by these services, it is difficult for energy managers to pinpoint the cause of critical conditions as they pertain to the overall usage of the building.

School boards typically engage in a submetering program by working with their architects and design engineers. Both are acutely aware of the benefits of energy monitoring, especially as it pertains to LEED sponsored construction projects. A key element of LEED specification, these programs provide a full point in obtaining successful LEED certification for a new facility. More and more, it is becoming a critical part of the commissioning of new school construction, as all building automation systems can be metered.

Generally, these programs can be installed and contained within the main electrical room; where the metering of the main incoming service plus the major subservices is also done. Combined with a Pulse totalizer, the system can also pick up natural pulse output loads such as the main gas and water meter. By providing a local area network (LAN) connection within the electrical room, the school board can have all their metering data connected to a central server. The software implemented at the central server can then be made available to any user group, from plant operation staff to students within classrooms.

A typical submetering installation showing the main switchboard and metering of the main submeters.



Depending upon the supplier, the system may never become obsolete. It can also be easily upgraded to include metering of critical subservices, if a school board is interested in furthering assessing where critical energy loss is occurring.

Of course, one of the main benefits of a submetering system is the school board's ability to reduce their energy usage and the resulting savings. "We typically see an average 10 per cent reduction in utility consumption in schools. With the savings derived from lower energy consumption, a submetering system can have a payback period within 3 years of installation, says Ross Pilkey, Vice President of Research and Development for Carma Industries. When York Region District School Board, the third largest board in Ontario, chose to implement a system in 170 of their 200 schools, in a four year period, they saw a board-wide reduction in electricity consumption from 8 kWh/sq. ft. to just under 6.5 kWh/sq. ft. Seeing the value of an energy management system, the Board has decided to move forward with gas monitoring for all of its schools by the end of 2014.

One of the key elements to reducing a school's energy consumption is engaging the building occupants in energy conservation. A submetering system can be a valuable tool in demonstrating to students when they are using the most energy and the effect of simple conservation practices. Web access software allows students to login to a site and view their electricity usage in real-time. When students engage in turning off lights at lunch and recess, they are able to see the effects of their energy conservation. Additionally, students and visitors are able to view their school's energy information on television monitors that are mounted in hallways. The monitors display real-time utility

profiles and can as well be customized to include energy conservation tips and information.

Information provided by the system can also be used as an educational tool to enhance school curriculum. Teachers and students can view their school's utility data online as well as produce graphs about how their school is using electricity, gas and water. It becomes an in-classroom tool for increasing student awareness of how energy is used.

Submetering can play a pivotal role in how schools are constructed by school boards and architects. For school boards, the information from a metering system can influence the design of efficient facilities, such as establishing benchmarks, designing mechanical systems and upgrading to maximize savings. Metering can be a natural complement to new green building design, such as solar PV, solar hot water and geothermal systems, as well as monitoring of new advanced lighting systems. Often green initiatives are criticized for being solely qualitative; this type of program used as an energy management tool, allows architects and energy managers to quantify the overall effectiveness of these projects.

All too often, submetering is an invisible tool tucked away in electrical rooms and school basements. Today it informs all participants in building sustainability – from architects and school board officials to students and even parents – it takes effort to manage energy. To improve energy performance and user comfort wherever possible, school boards are demonstrating firsthand that by having an active energy measurement program they are contributing to the greening of our school systems for generations to come. **GBD**

By Margaret Manetta, Marketing Coordinator for Carma Industries Inc.

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