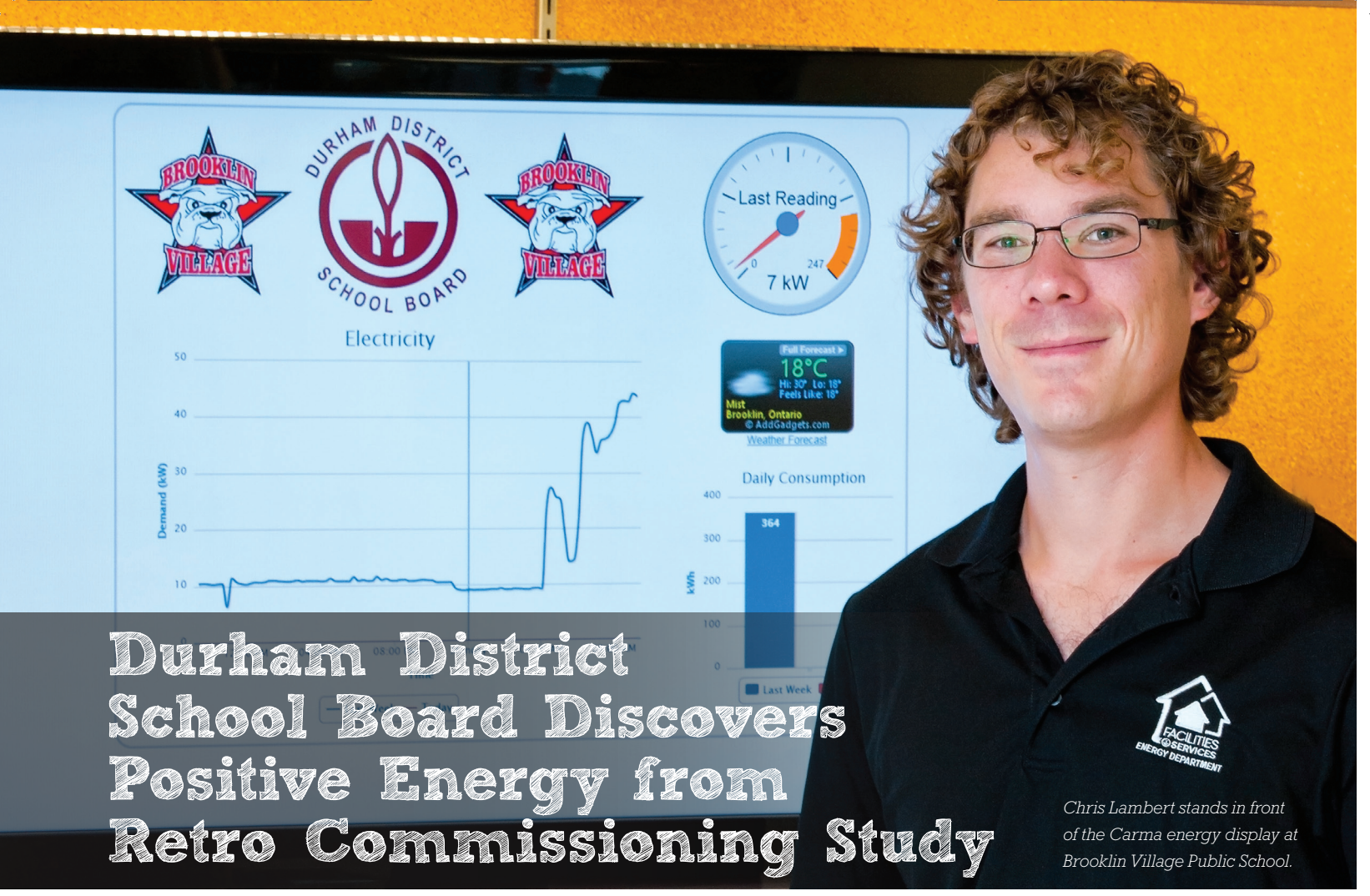

Durham District School Board Discovers Positive Energy from Retro Commissioning Study

Chris Lambert stands in front of the Carma energy display at Brooklin Village Public School.

By Margaret Manetta, Carma Industries, with Chris Lambert, Durham District School Board

Recently, the Durham District School Board was named one of the top ten most energy efficient school boards in Ontario by Sustainable Schools, a program sponsored by Toronto and Region Conservation that promotes building knowledge and identifying potential energy conservation opportunities within schools.

The desire to optimize energy savings is evident at the Durham District School Board, where they identified a source of energy waste at one of their high schools. While re-programming the air-handling units, as part of a retro-commissioning initiative, they discovered the fan-powered boxes were not operating according to normal standards. The fan-powered boxes were running during holiday periods when the school was not occupied and were running 24 hours a day, seven days a week.

Empowered with this knowledge, Christopher Lambert, Energy Analyst for the board, directed the retro-commissioning project at Pickering High School to pinpoint the cause and resolve the fan-powered boxes issue. To begin, after Lambert uploaded a program and examined the programming logic, he observed that part of the program had not been scheduled properly, resulting in the continuous operation of the fan-powered boxes. If any additional evidence was needed, he could also hear the fans running.

Recognizing the importance of his discovery, and driven by curiosity, Lambert wanted to look at the before and after results to learn how much energy was being used unnecessarily and to measure and calculate the energy and cost savings. To do this, he turned to the Carma energy-monitoring system, which the Facilities Department had been utilizing since 2006. The Carma system enabled Lambert to establish an average energy-usage number pre-commissioning, as the baseline for comparison.

With a clear mandate in front of him, Lambert set out to reprogram 45 fan-powered boxes. While it was a time-consuming process, he completed the modifications to all units in one week. The results in electrical consumption was substantial. The average baseline usage before the changes was 70.49 KW, and the usage after the changes was 51.44 KW, a difference of 19.5 KW. From this data, Lambert was able to calculate that the fan-powered boxes used a total of 17.18 KW while they were running 24/7. The avoidable energy used by the fan powered boxes totaled 1,104,445.67 kWh and the total cost of this usage was $111,691.49.

The energy-monitoring system played an integral role in confirming the pre

and post modifications were successful. Specifically, the Carma system was used to look at the post-data during occupied periods and compare the same period with the pre-modification information. ''The advantage of having an energy-monitoring system is the numbers are not theoretical; the data is real,'' says Lambert. ''This allows you to accurately measure real data, calculate and then project energy and cost savings.''

The study looked at the unoccupied periods of the school, including nighttime, weekends, holidays and summertime, and Lambert noted the energy saved overnight is just as cost-effective as daytime energy saved because the board is charged regardless of time-of-use.

As a result of the Retro Commissioning project and taking advantage of the energy-monitoring system in place, Lambert intends to investigate other schools within the board where they know there are issues and examine the fan-powered boxes for possible modifications, as well as mechanical, air and lighting systems for possible adjustments. Lambert emphasizes it is important to first look at the schools where the greatest benefit can be derived. For example, with the help of the monitoring system's ranking capabilities, a list of high-energy-usage schools can be compiled and a priority plan can be developed and implemented by the board.

In the future, Lambert, who has been with the DDSB for over four years, would like to make modifications to other mechanical equipment and conduct a post-report, similar to the fan-powered boxes study. Additionally, as the cost of water and gas increases, Chris sees value in exploring water and gas to diagnose and address inefficiencies that may exist.

One of the biggest eye openers was the myth of new equipment operating more efficiently. ''Just because mechanical equipment is brand new and state-of-the-art doesn't mean it is operating as efficiently as it should be. If equipment is not being controlled or commissioned correctly, it can be as inefficient as equipment found in older schools,'' Lambert explains. ''It's important as renovations and additions are built onto schools to conduct retro-commissioning to ensure equipment is operating as efficiently as possible.''

Working on his first retro-commissioning study, Lambert sees the building information derived from the report as a stepping stone for facilities and the board. ''I really enjoyed working on this project. You can't argue with numbers, and data doesn't lie,'' he says.

The data from the energy monitoring system along with the retro-commissioning study can be viewed from the perspective of the board's Ignite Learning strategic plan. One of the key objectives is to increase student awareness and achievement and well-being. Facilities has a critical role in helping to achieve this key strategic goal through optimizing occupant comfort and integrating energy information into school curriculum. ◆

Special thanks to Chris Lambert for sharing his expertise.