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Shop Class Saves Electricity

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KPU's welding booths use an integrated system that shuts off both the lighting and exhaust fans when not in use. **(Kwantlen Polytechnic University)**

Energy is no longer being wasted by lights left on at the **Kwantlen College Polytechnic University**'s Cloverdale campus (BC, Canada) thanks to a simple, yet effective tool: the light switch. The **LEED Gold building** that houses student welding booths features a ton of green features, not least of which are the individual lighting controls in the 42 booths.
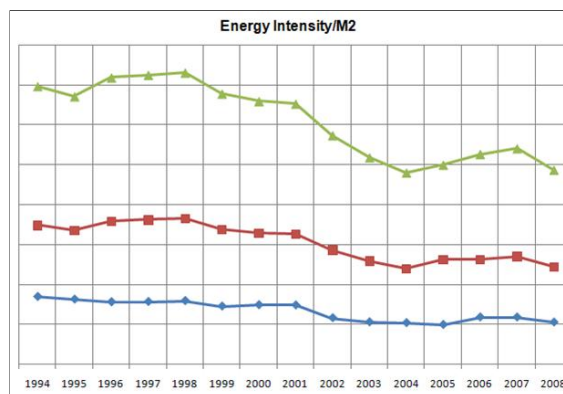
"Students turn off the lights in individual booths when they finish working," explains Dan Brown, Kwantlen's physical plant and facilities manager. "What makes this unique is that the light switch also turns off the exhaust system serving the booth. When a light switch is turned off, an air pressure sensor in the exhaust air ducting senses less load on the exhaust system and slows down the exhaust fan. When the exhaust fan slows down the building automation system also slows down the supply fan system which heats the shop by the same amount of air volume."

It's a highly-integrated system that saves Kwantlen electrical energy for running the lights and the fan systems, and natural gas heating energy by exhausting less warm air from the shop. Though Kwantlen currently lacks a formal energy reduction strategy, it monitors and compares energy consumption to benchmarks and looks for opportunities for increasing energy savings whenever possible.

"The work we have performed on energy conservation has been very effective," comments Brown. Yet the individual controls are only as good as the users, since they run the risk of being left on by absent-minded individuals.

Not surprisingly, this is a common problem on most campuses with individual lighting

A graph of the college's institutional energy intensity over time demonstrates a consistent decreasing trend of energy consumption. **(Kwantlen Polytechnic University)**

controls. According to Michael Kaptik, director of student housing services at the **University of Hawaii at Manoa** (UHM), "Education plays a key role in making individual lighting controls as efficient as possible."

He's talking about their experience with the individual lighting controls installed in student residences and staff offices in their new **Frear Hall**, which opened in August 2008. "We try to help people understand how to reduce energy costs by doing things like turning out the lights," says Kaptik.

Constructing better buildings is part of UHM's efforts to **decrease electrical energy consumption**. UHM is an ENERGY STAR campus and achieved a **7 percent reduction** in annual electricity consumption by the end of fiscal year 2009.

According to LEED certification guidelines, buildings with personal lighting controls will result in modest energy savings, as Kwantlen has discovered, as well as an increase in employee satisfaction levels. But what makes personal lighting controls even more efficient is the ability of individuals to adjust light levels in increments with multilevel switching. Giving individuals the power to adjust artificial light levels to balance daylighting can drive lighting costs down by as much as **22 percent** (more when occupancy sensors are also in place).

This is perhaps the key to **Indiana University Purdue University Indianapolis'** (IUPUI) lighting energy savings in its new **Campus Center**. With individual lighting controls installed in meeting rooms, lecture halls, and ball rooms throughout the center, campus staff are diligent about having lights on only when needed, at just the right level.

"When someone comes to the information desk to set up a meeting," explains Dan Maxwell, director of the Campus Center, "they are directed to their meeting room and then met there by a student staffer who, only then, turns on the lights and AV equipment necessary." The light switches are programmed with four levels so that they can be adjusted to provide only as much illumination as needed. Everything is then switched off once the meeting is over.

The Campus Center is a busy place, hosting over 6,000 meetings in their first year in the building, which opened in January 2008. But like most institutions, lighting energy use is not metered separately from other electricity uses. That said, IUPUI staff can confirm that to date, the electrical usage in the Campus Center averaged 1.10 kWh/square foot/month, which was almost 30 percent lower than the 1.54 kWh/square foot/month used by buildings of similar use and size on the IUPUI campus.

Though individual lighting controls aren't a panacea for energy overconsumption, it is hoped that with public awareness they can be part of a building's energy efficiency package. Though it's hard to determine exactly how much energy they save with individual lighting controls through these case studies because of the lack of lighting-level energy monitoring, logic would have it that when personally-controlled lights are controlled efficiently (i.e. shut off when no longer required), they will cut energy costs. As Brown puts it, "The general challenge is getting people to turn the lights off."

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