

It's Electric!

Forward-thinking electrical engineers are elevating home control and communication systems to a new level

by STACEY MCLACHLAN

If you think of the walls, ceilings, staircases and floors as the bones of a home or office space, it's the electrical and communication systems that are the heart. Though this important element can languish behind the scenes, builders and architects know the importance of these complex systems.

Efficiency and connectivity have always been key components of great electrical and communication systems, but in this age of smart homes and tech disruption, today's home tools seriously up the ante.

Knowledge about the value of energy efficient choices has never been higher, so it's no surprise that the quest for extreme energy efficiency is at the heart of almost all electrical engineering developments right now. "The biggest area of focus is on energy efficiency," says Ben Rajewski, engineer at Williams Engineering Canada. "Green alternatives and using less power are key at this point in time."

One other aspect that sophisticated owners are requesting on their large electrical systems is digital metering. "Owners are not satisfied with just the level of information a utility meter can provide," says Rajewski. "Instead, they are requesting that we meter, in some cases, every panel in the building and split load classes so that the lighting can be separately measured from the power load or the mechanical load." By metering all of the systems separately, owners are able to gain a large amount of data on how their building is actually operating, and where they are consuming the most power – and use that knowledge to better run things in the future. "Seeing these results they are able to add efficiencies into their system using timeclocks, the BMS, and checking to see why there may be large power draws," Rajewski says.

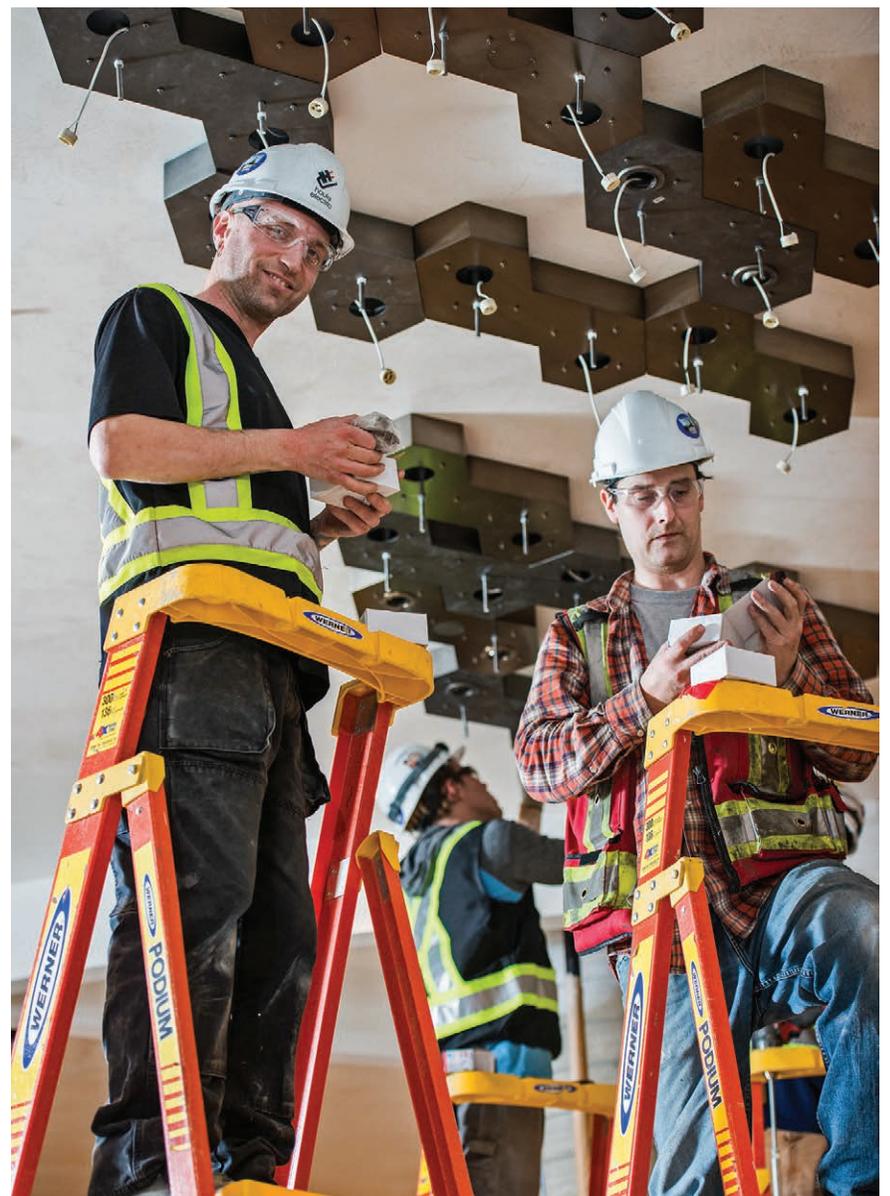
With those projects under the control of municipalities or government bodies, buildings are now being designed and future-proofed more often with solar panels, but private developers are following suit, even voluntarily doing energy audits on buildings to ensure maximum efficiency from their electrical systems. Of course, it's not necessarily an altruistic move: "They're trying to figure out new ways to save money. There's a lot of looking at existing buildings to see what could be done better," explains Rajewski. "People are trying to get buildings close to net zero."

While it's a choice for those wanting to save both the earth and a few bucks now, in the future it's likely that solar panelling won't be a choice, Rajewski predicts. Instead, bylaws or building codes may require builders to add solar panels on their buildings right away. For now, however, forward-thinking decision-makers are the ones leading the way and showing that it's a beneficial choice overall.

IN CONTROL

Solar panels aren't the only thing that the future is likely to bring to the world of electrical and communication systems. Lighting control is well on its way to becoming wireless, suggests Rajewski. "There's kind of this big networking happening, where, for instance, you can walk into a grocery store and connect your phone and it can tell you where the cereal is and what cereal is on sale," explains Rajewski. "We'll be seeing more stuff like that, where everything is kind of connected via the Internet of Things, and you'll be able to use lights to power that. With your phone and lights and communication systems everything can be integrated together. That's where things are going."

Duane Besse, president at Bridge Electric, predicts that lighting control in general (wires or no wires) will be the next big thing in the world of electrical engineering: the catchall term for a "smart" networked system of devices that includes occupancy sensors, photocells, relays, touchscreens and signals from other building systems.



Unique lighting installation at PARQ, Vancouver, B.C.

But lighting isn't the only thing technology can improve; direct digital control systems (DDC) are an incredibly popular option for communication technologies for buildings. These computers monitor sensors that report on the building's safety and energy statuses – from airflow and access to smoke alarms – and respond to that collected data by adjusting the premises' systems. More responsive than analog mechanical systems, they also interface well with devices outside the building to provide accurate and efficient reporting on all aspects of a property.

When Houle Electric recently upgraded Capital Park in Victoria (a property they've been working on regularly since 1988), they installed LED lighting with DDC controls, along with a mass-notification fire alarm system, high and low voltage distribution and a Cat6A data installation, access control and CCTV systems. Houle's Travino Living project in Saanich, meanwhile, features door access controls monitored by the Houle Operations Centre using a Hatrix server for alarms, to keep residents safe and secure.

SOUND OFF

The user experience of someone in a building can be improved in even more ways by technology. Take, for instance, the acoustic qualities of a building; though building materials, textures and room layout can impact how sound bounces around a space, high-tech solutions like sound masking can add a more precise layer of control to the aural experience.

Even though Vibra-Sonic Control is not a company of electrical engineers, its work with sound masking brings the team into contact with plenty of electrical and communication systems. "The sound masking we do is an electrical system. Typically we install it in offices for increased privacy," explains Danielle Macey, project coordinator for Vibra-Sonic. "Sound masking basically raises the ambient level in an office so that people can have more speech privacy." The latest Vibra-Sonic sound masking systems offer an option to increase privacy; hit a button when you're in a meeting by raising the sound masking for people in the adjacent area.

Done electronically with speakers distributed throughout the space, it creates an even sound throughout the office. "It sounds a lot like HVAC," says Macey. "What it's doing is raising the level of the ambient sound in a room, so that people in an open office have more privacy." As open-concept designs increase in popularity, sound solutions like this one are increasingly necessary to preserve privacy and intimacy.

BETTER TOGETHER

All of these factors are increasingly able to be controlled in harmony. In the past, buildings would typically have standalone electrical and communication systems, but today, these essential elements are easily integrated. A single platform that maintenance staff can operate in one place (sometimes even with text message or email auto updates) makes for a cohesive caretaking experience, and one that can save operators money not just from energy reduction, but from manpower



Sound masking system installation from Vibra-Sonic Control.

and time in the long run. One core system that controls all the essentials makes for a simplified operational experience and can also eliminate communication issues like crosstalk between different units.

Though individual choices and grassroots green movements can make a huge difference to normalize energy efficient products and choices, ultimately top-down pressure from government programs and building codes can make a lasting impact too. Alexandra Campbell, spokesperson for the Independent

Electricity System Operator (IESO), points out that initiatives and programs like Ontario's Save on Energy encourage residents to adopt new energy-efficient technology for their home. The growing culture of conservation should in turn be shaping the decisions of architects and builders. Rebates for smart thermostats and for installing air-source heat pumps, as well as other Save on Energy incentives alongside changes in the building code, are expected to impact electrical design into the future.

One other successful example of government programs helping manage energy consumption is the Government of Ontario's recently launched new agency called the Green Ontario Fund, a not-for-profit provincial agency tasked with helping people and businesses reduce greenhouse gas emissions and use cleaner technology in their homes and workplaces. Demand for the Green Ontario Fund's first program, which provided no-cost smart thermostats and in-home energy reviews to anyone who signed up, was extremely high, showing how motivated home and business owners are to both conserve energy and save money.

Over on the West Coast, Houle Electric recently opened the Lionel Houle Electrical Shop at Camosun College, an upgraded electrical-training shop for the electrical leaders of tomorrow. Who knows what this new generation of talent will bring to the industry? It's incredible how far electrical and communication systems have come even over the past few years, offering users a world of control over their environment with just the press of a button or tap on their smart phone. **A**

IBI GROUP ARCHITECTS
ARCHITECTS OF LIVMORE
AT BAY & GERRARD TORONTO

IBI Defining the cities of tomorrow
ibigroup.com Tel: (416) 596-1930