

Saving energy raises comfort, productivity



An artist's rendition of a city with energy-efficient buildings

AFP/Getty Images

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Shaken to their foundations by the oil crisis of the 1970s, European policymakers and urban planners retooled in the 1980s and changed all of their fundamental delivery methods for building construction, design and city planning. In fact, a typical North American building would not get a building permit in Berlin, where an energy audit covering everything from design, to how the building is oriented, to the type of glass being used takes place before ground can be broken.

In effect, Europeans started constructing smart buildings that interact with their environment to manage energy consumption. Similar buildings are now popping up across North America. Winnipeg's Manitoba Hydro Place is an example. It is fitting that the smartest, most energy-efficient and sustainable building in North America is the headquarters of a utility in one of the most extreme climates in the country.

Perhaps the smartest aspect of the building is its climatically responsive design. It lives and breathes and has the technologies in place to allow it to take advantage of the climatic conditions. Onsite weather stations and a digital management system operating much like a brain, with more than 30,000 control points, tell systems what to do throughout the 700,000 sq. ft., 22-storey space. For example, there are 4,500 lights in the building and each one has its own intelligence and can react with the system or individually by the occupant's control. The building management system also maximizes the performance of its double-wall system by automatically closing or opening the vents based on the outside temperature. Every three hours, the building corrects itself.

"In many ways, we've come back to the future, but with more knowledge, more insight about how things work and better technologies," says Bruce Kuwabara, founding partner of Kuwabara Payne McKenna Blumberg Architects, the firm behind the award-winning design of Manitoba Hydro Place. "For example, at Manitoba Hydro Place we have windows that open but they are tied back to the computerized building management system, which determines whether or not it's a good day to open your window based on what's going on outside. The point is you want to invest responsibility in the individuals inhabiting the building. Employees are part of the solution and have to think about what's going on around them and how they are impacting their environment. The big breakthrough in Europe was that with sustainability comes responsibility.

"They place a lot of emphasis on the ability of individuals to act and control their own environment."

And that is one aspect of smart that often gets overlooked, says Ian Jarvis, president of Toronto-based Enerlife Consulting, an energy and environment performance consulting firm to property owners and managers. "For a long time, energy efficiency and sustainability have been equated to technology alone. All the evidence shows it has a lot more to do with organizational effectiveness. When the organization is trained and built around managing well, then that's the sweet spot. Without the intelligent organization, it is harder to make good use of the technology."

The Real Property Association of Canada (REALpac) has placed a specific target tied to that sweet spot: It wants to see a reduction of up to one-half of today's energy use in Canadian office buildings. Achieving the target will lead to estimated energy cost savings of \$1.85-billion a year, and a greenhouse gas emissions reduction of 7.5 megatonnes a year.

Manitoba Hydro Place is a benchmark of what is possible. A typical office tower in Canada uses almost 500 kilowatt hours a square metre a year for energy. An "energy-efficient" office tower uses anywhere from 225 to 250 kilowatt hours per square metre a year. Manitoba Hydro Place uses less than 88 kilowatt hours per square metre a year. In terms of dollars and cents, a building of similar size would have an annual energy bill of about \$1.3-million. Manitoba Hydro Place spends about \$350,000 a year on energy.

That said, from where he sits, Tom Akerstream, manager corporate facilities, Manitoba Hydro and energy advisor on the design of Manitoba Hydro Place, cost saving is just one benefit of a smart building. He also points to the added value in comfort, improved productivity and convenience. "In our building we have natural light 80% of the time, 100% fresh air exchange three to four times an hour, 24/7 thermal comfort, so there are no cold or hot spots. By improving that comfort, I reduce absenteeism and increase productivity. The energy savings are a bonus and pay for the product. I don't like to call it conservation. I call it demand-side

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