

SUSTAINABLE BUILDING

THE GLOBE AND MAIL

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SECTION SB



The LEED (Leadership in Energy and Environmental Design) program has seen enormous uptake in Canada over the last decade. Among the notable LEED Platinum-certified buildings across the country are (clockwise from left) TELUS Garden in Vancouver, B.C., Robinson Place in Peterborough, Ontario, Centennial Place in Calgary, Alberta, and Nova Scotia Power Headquarters in Halifax, Nova Scotia. For more information about the buildings' green features, see globeandmail.com/adv/sustainablebuilding. SUPPLIED

The business case for going green

Much like seat belts in cars, sustainability is now widely recognized as an 'absolute must-have'

Over the past decade, Andrew McAllan has witnessed an increasing number of businesses paying attention to sustainability. One reason is that reducing their environmental footprint is part of their corporate social responsibility commitments, he believes. But an equally powerful driver is the competition to attract and retain top talent. "We've noticed that employees, particularly those under 35, understand the impact of their actions on the environment and want to do what's right for the planet," says the senior vice-president at Oxford Properties Group.

A survey confirms that millennials consider sustainability so important that they make employment decisions based on the environmental performance of their workplace, says Mr. McAllan. "They look at everything from the commute to the amount of natural light, the ability to control heating and air conditioning, recycling programs, the full gambit."

Better understanding their employees' expectations can help organizations choose or design work environments that meet – or exceed – those needs. Mr. McAllan says his company realized early on that it could help employers create "the workplaces of the future."

Today, Oxford Properties would not consider undertaking any office building project of scale that doesn't meet LEED (Leadership in Energy and Environmental Design) standards, says Mr. McAllan, because customers and tenants expect it, and in turn, their employees require it.

It's the new norm, he believes, similar to wearing a seat belt. "Fifty years ago, cars were sold without seat belts, which seems incredulous, since now we have not only seat belts but also airbags, active braking systems, etc.," explains Mr. McAllan, who is also the chair of the board for the Canada Green Building Council (CaGBC). "Today, sustainability is widely recognized as an absolute must-have."

Thomas Mueller, CaGBC president and CEO, agrees. While the initial support for the green building sector mainly came from innovators and

early adopters, there is now buy-in from what he calls the "early majority or a larger segment of the industry."

This is a segment of the industry where leaders and decision-makers want to understand both the risks and rewards before they take action," he explains – and the industry's track record can serve as an encouragement.

"There are proven economic benefits that go beyond energy savings," says Mr. Mueller. On average, energy, water, waste disposal, and operation and maintenance savings in LEED-certified buildings add up to net savings of approximately \$294.31 per square metre over the estimated 33-year economic life of a building. This adds up to hundreds of millions of dollar savings per year.

"It's evident that sustainability is good for business," says Mr. Mueller, adding that companies that embrace the concept see tremendous opportunities, whether they own or manage green properties, locate their businesses in sustainable buildings, or work in construction, design or technology innovation in the space.

According to Mr. McAllan, the benefits include "changed relationships between building owners and occupants," he says. "We see lots of engagement with green teams and people volunteering to undertake everything from tree planting and litter pick-up, to learning about recycling programs."

Mr. Mueller adds that apart from the satisfaction that comes from "doing the right thing for the environment," there are tangible health benefits associated with sustainable buildings that include better cognitive function of their occupants and, if they are places of work, reduced absenteeism and a feeling of enhanced well-being during and after work.

Health and well-being rank high on Canadians' lists of priorities, says Mr.

Mueller. "This appetite for healthy living leads Canadians to consider their homes and places of work. We're surrounded by materials that are made with chemical compounds, some are benign, others not so much. In our program, we take measures to eliminate [harmful] products or mitigate their impact."

Mr. McAllan adds that the LEED certification, which is recognized in North

America as the seal of assurance for the global standard of sustainability, is constantly advancing and introducing more rigour.

Mr. Mueller says that leading Canadian companies – which have made a name for themselves in the green building space – report that they've gained dedicated employees as well as a good reputation with the general public, customers and investors. "We

see many investors who choose to support only buildings with environmental certification," he adds.

It's certainly been good business for Oxford Properties, says Mr. McAllan. "We now save our customers more than \$10-million a year due to energy efficiency and other conservation measures. And at the same time, we help our tenants attract and retain the right employees."

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STRATEGY

Leveraging the clean energy advantage

"Sustainability has changed in the corporate world from being a duty to being a competitive advantage," said Margaret Knowles, senior vice-president of development at Morguard Investments.

Morguard, a real estate company using green energy to help its buildings achieve LEED status, is one of many businesses making renewable energy part of a comprehensive sustainability strategy.

But why are major real estate firms directing resources toward renewable energy in addition to focusing on infrastructure projects,

such as HVAC upgrades and lighting retrofits?

An informal survey of real estate and property management companies supporting renewable energy reveals that in addition to core environmental benefits, another factor stands out: reputation.

Alto Rentals, a new residential rental building in Toronto's Little Portugal, positions its commitment to renewable energy as a differentiator in a competitive rental market. It is the first rental building to include one year's worth of Bullfrog Power's green electricity for all tenant suites. **Green, Page SB 2**

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INNOVATION

The environmental impact of every-day activities



The partnership between Dyson and Science World Vancouver didn't just lead to more efficient washrooms, it also includes a Dyson Airflow wall exhibit. LEFT, SCIENCE WORLD; RIGHT, DYSON



Humankind has taken gigantic leaps forward in sustainable technology with innovations like the electric car or wind turbines that generate electricity. But sometimes it's the simple things in life – like drying your hands – that can have a dramatic impact on the environment and people's understanding of their own carbon footprint.

Engineers at the Wiltshire, U.K.-based Dyson – perhaps best known for its revolutionary vacuum cleaners – introduced the company's Airblade

“We get frustrated by products that don't work properly – we are about intervention and improvement. A century of poor drying methods was our inspiration, and we set out to do something about it.”

Marcus Hartley
is design manager at Dyson

hand-drying technology back in 2006. The technological result has become worthy of a public science exhibit a decade later.

Paper towels have been around in biffies since the early 1900s, with the first electric hand dryer being introduced in the late 1940s, says Dyson design manager Marcus Hartley. But since their origin, innovation in both methods has been scarce, expensive, unhygienic and harmful to the environment.

“At Dyson, we solve problems that others ignore and took on this chal-

lenge, developing Airblade technology,” he says. “We get frustrated by products that don't work properly – we are about intervention and improvement. A century of poor drying methods was our inspiration, and we set out to do something about it.”

Instead of creating a wide jet of heated air, like the traditional hand dryers, Airblade uses a thin layer of unheated air travelling at an impressive rate of 675 kilometres an hour. That airstream acts like a squeegee to remove the water rather than using heat to evaporate it, drying hands in about 12 seconds and using about 80 per cent less energy than the conventional air dryer.

At the heart of Dyson's hand dryer technology is one of the world's smallest integrated 1,400-watt motors that uses digital pulse technology to spin up to three times faster than a conventional motor.

“Our hand dryers also have a lower environmental impact when it comes to carbon emissions. They produce up to 79 per cent less CO₂ than other hand dryers and up to 76 per cent less than paper towels,” says Mr. Hartley. Paper towels are not only expensive, he adds, but also have a high impact on the environment, which becomes pretty obvious when you take a close look at the significant resources consumed to make them.

“From cutting down trees, through chemical processes to disposal, using paper towels has a significant effect on the environment,” says Mr. Hart-

ley. “We haven't directly calculated how many trees are saved, but what we have determined is that you can dry 19 pairs of hands with a Dyson hand dryer for the cost of one sheet of paper.”

“Knowing an average person would use three sheets of paper per dry, the savings are enormous.”

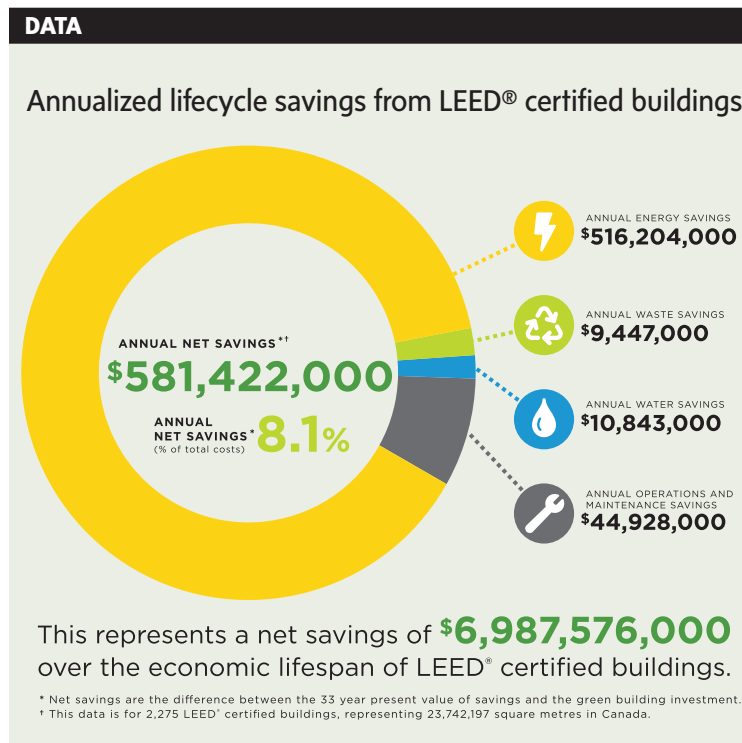
None of this was lost on Science World in Vancouver. In classic educator fashion, it saw a chance to save money and teach and inspire people to practice sustainability themselves.

Science World researched alternatives to paper towels for its False Creek facility, says Brian Raddburn, Science World's vice-president, corporate operations and chief financial officer. After testing many hand dryers, the Dyson Airblade was chosen.

But the possibilities didn't end with drying hands; it also represented a golden opportunity to teach visitors about airflow through the Dyson Airflow wall exhibit within Science World's Eureka! physics gallery.

“We feel that the Airblade has accomplished several things: firstly, it provides guests with dry hands in a short period of time; it is an excellent alternative to using paper towels – it helps save trees and there is no waste.”

“And it provides an opportunity to engage visitors by providing the science behind the dryer that could lead to an ‘a-ha’ moment that sparks an environmental awareness in our visitors,” he adds.



IMPACT

Beyond energy savings

More than half of the world's burgeoning population currently lives in cities. With projections showing that urbanization combined with overall population growth could add another 2.5 billion people to urban areas by 2050, measures for better environmental performance of cities gain critical importance.

Sustainable buildings are an important part of the solution and bring a range of benefits, says Mark Hutchinson, vice-president of green building programs at the Canada Green Building Council.

The impact of Canada's LEED green buildings from 2005 to 2015, for example, translates into a reduction of 1,261,016 tonnes of carbon dioxide equivalent of green-house gas emis-

sions, which is the equivalent of taking 238,377 cars off the road for one year. In addition, 231,608 square metres of green roofs, an area the size of 153 NHL hockey rinks, were installed, which contribute to reducing urban heat.

“Urban heat island effect is an important consideration,” explains Mr. Hutchinson. “All built surfaces collect solar energy during the day, which is either transmitted into the buildings, where it creates demand for cooling, or radiated back into the atmosphere, where it increases overall temperatures.”

As relatively easy steps for addressing urban heat generation on rooftops, Mr. Hutchinson suggests green roofs, solar panels or membranes

that reflect a greater percentage of solar radiation. “At ground level, planting more vegetation and minimizing parking by moving it underground can have a big impact,” he adds.

When people think of green buildings, energy efficiency often comes to mind first, but Mr. Hutchinson says other aspects, such as water, are equally important. “Water use puts a lot of stress on our water and sewer systems, which is an issue in many municipalities,” he says. “It makes sense to use this resource as efficiently as possible.”

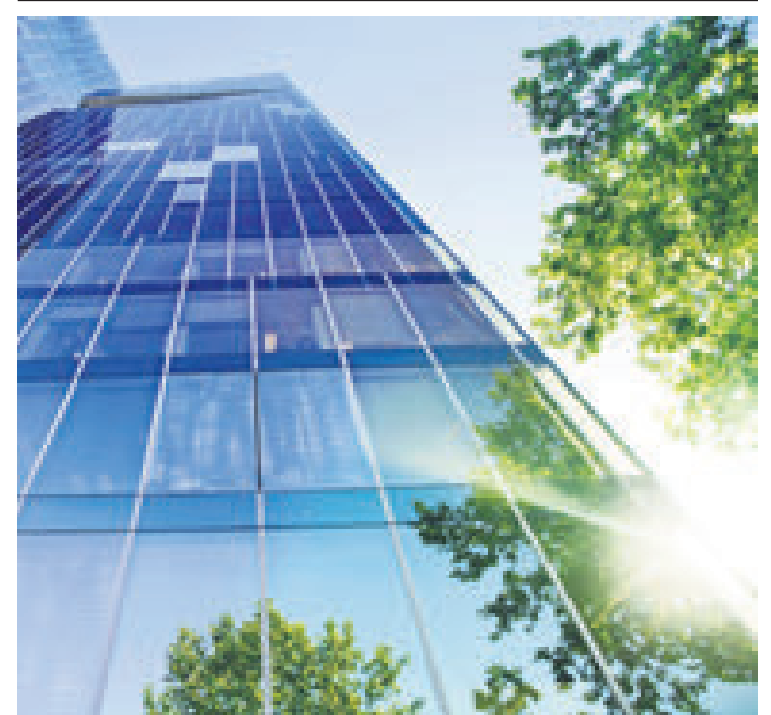
A green building achieves, on average, a 40 per cent reduction compared to a conventional building's water consumption, says Mr. Hutchinson. Strategies can include low-flow fixtures, rain-water harvesting and re-using gray water.

Since rates for water use are comparatively low in Canada, savings don't usually have a big impact on a resident's bottom line, but cities are starting to recalculate their costs, he adds. “Municipalities are trying to recover more of their costs, including capital costs necessary for upgrading water systems and treatment plants, which can be substantial for larger cities with older systems.”

Improved sustainability can also be achieved by recycling construction and demolition waste, says Mr. Hutchinson, who adds that from 2005 to 2015, LEED buildings recycled over 1.6 million tonnes of materials equaling 491,174 garbage truck loads.

“Historically, construction materials have made up a significant proportion of the waste received at landfill, but that doesn't have to be the case. LEED projects divert on average 85 per cent of the material generated during construction,” he says, adding that a growing industry around accepting, sorting and recycling material is supporting this practice.

Reducing landfill can have a big impact on municipalities, says Mr. Hutchinson, who believes this aspect of green building can easily be replicated across all construction projects.



Organizations across Canada increasingly make renewable energy part of their sustainably minded property management. ISTOCKPHOTO.COM

FROM PAGE SB 1

Green: Sustainable choices attracting tenants

“Feedback from residents has been very positive. Our renters have said they like how Alto incorporates sustainability, offers modern features and is integrated with the existing community,” said Scott Bigford, senior vice-president, operations, Realstar.

Ottawa-based KRP Properties, which chooses green energy for its public and common areas, also sees green energy as a competitive advantage, albeit in the commercial rental market.

In an effort to address the typically large carbon footprints of commercial properties, KRP developed a green plan that positions environmental sustainability as a hallmark of a higher standard of care for its tenants.

“We wouldn't be successful in achieving our sustainability goals if it wasn't for the co-operation of our tenants, customers and clients. They are truly the cornerstone to our program,” said Karli Deter, Marketing and Communications, KRP Properties.

For larger firms, renewable energy can be an important part of their sustainability strategy. Ivanhoe Cambridge, a global real estate company for example, uses its position as one

of Canada's most prominent supporters of renewable energy with Bullfrog Power as a proof point to its multiple stakeholders of its commitment to sustainability.

Supporting green energy is one way Munich Reinsurance achieved carbon neutrality globally in 2015.

As Gary Gray, senior vice-president and CFO, Munich Reinsurance Company of Canada, explains, “Corporate responsibility is an essential part of our company's strategy. Our partnership with Crown Property Management in Toronto and the sustainable design of our Vancouver office have facilitated making the best choices for environmental practices.”

In Canada, working with Crown Property Management, Munich Re is choosing Bullfrog Power for the entire building where the company's head office is located: the Munich Re Centre at 390 Bay Street, Toronto. Additionally, Munich Re is choosing Bullfrog Power for its regional office in Vancouver.

As the examples of these organizations suggest, renewable energy is an increasingly important reputational tool for sustainably minded property management.

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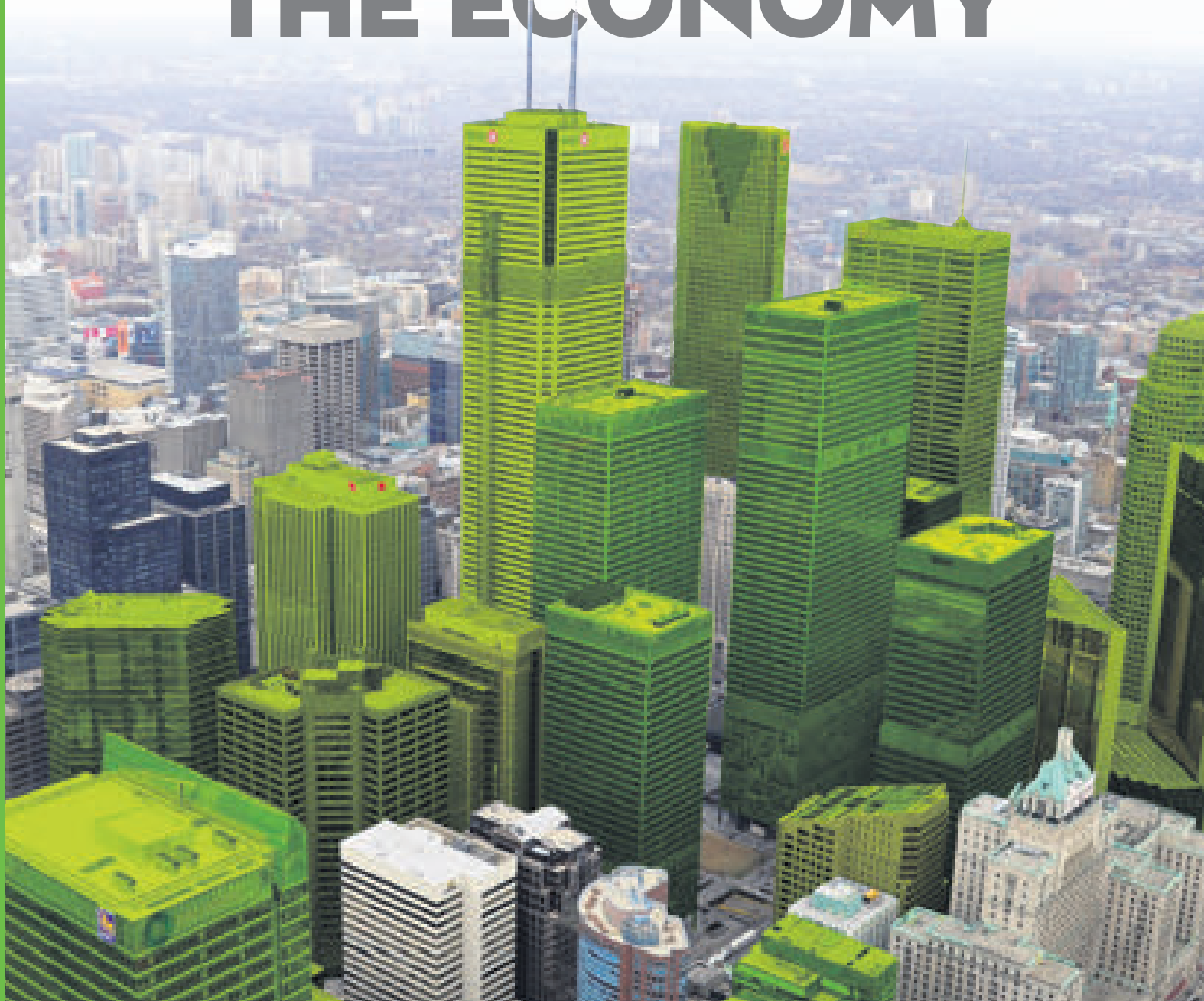
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BY THE NUMBERS

The green building industry generated **\$23.45-billion** in GDP, which represents **297,890** full-time jobs in 2014. This is more jobs than Canada's oil and gas extraction, mining and forestry industries combined, which collectively employed approximately **270,450** workers in 2014.

Source CaGBC

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UPGRADES

Retrofits allow architectural icon to shine

Building practices and technology – especially in the area of green building – are evolving at a rapid pace. While new building projects can be custom-designed with sustainability in mind, upgrading existing buildings is often more challenging. Yet by integrating innovative technology, retrofitting can be done cost-effectively with benefits for owners, tenants and the environment alike.

An example is the iconic Toronto-Dominion (TD) Centre, designed by architect Mies van der Rohe. The centre, which includes six towers, is managed by Cadillac Fairview, a corporation that aims to have all its premier office properties meet LEED (Leadership in Energy and Environmental Design) standards.

To realize this company-wide objective, Cadillac Fairview hires teams for implementing sustainability measures. One such team member is Adrienne Cressman, who acts as embedded energy manager for the TD Centre and co-ordinates “energy opportunities.”

“Our mandate from head office is to reduce yearly energy consumption by 2.5 per cent, and it’s up to the different properties to determine what projects or initiatives to implement,” she explains. “The LEED Platinum-certified TD Centre, which was designed in 1968, is essentially competing with new buildings with up-to-date energy-efficient features.”

While it can be a bit more costly to upgrade existing buildings for improved environmental performance, Ms. Cressman believes it is essential. “We need to be competitive for our

tenants and ensure sustainability for the community,” she says.

Among the different means for increasing energy efficiency are capital upgrades that may include more efficient equipment or operational changes that rely on more efficient controls. Additional energy savings can be realized through behavioural changes of tenants and by training building operators, says Ms. Cressman.

An upgrade measure with a considerable impact – realizing yearly savings of approximately 2,500,000 kWh (or \$250,000) – was replacing fluorescent lighting with approximately 55,000 energy-saving and long-life SYLVANIA SUBTUBE LED T8 tubes.

Ms. Cressman says extensive research into lighting options led to awarding the contract to partners OSRAM SYLVANIA and Gerrie Electric.

Elaine Gerrie, co-president and CEO of Gerrie Electric, believes the project was one of the largest LED lighting retrofits in North America. “People are increasingly identifying LEDs as best choice for their facilities – they realize that a significant energy reduction can come with improvements in lighting levels and quality,” she says. “And it’s no secret that productivity goes up when a work environment is brighter and cleanly lit.”

Tony Valentini, who oversaw the TD Centre project for Gerrie Electric, says that other benefits include a long lifetime of the lights, which, in turn, reduces replacement and maintenance costs. “And eliminating fluorescents means you no longer have to worry about mercury going into the environ-



The iconic Toronto-Dominion (TD) Centre, is an example of existing buildings that have achieved LEED Platinum certification due to implementing sustainability measures, including a recent LED lighting retrofit with partners OSRAM SYLVANIA and Gerrie Electric. TD CENTRE TORONTO

ment,” he adds.

Mr. Valentini believes choosing a partner like OSRAM SYLVANIA, which offers quality assurances and extended warranty, is a smart move. Ms. Gerrie agrees, “It’s important to look for solutions from a leading brand, where you know that the

company will still be around for the next decade.”

New technology makes the present an exciting time to be in the lighting business, says Ms. Gerrie. “With improved lighting, reduction in energy consumption and reduced carbon footprint, it’s a win all around.”

Ms. Cressman adds that TD Centre tenants not only see the benefits on their electricity bills, which are based on individual energy use, but also feel the positive impact of the new lights. “Along with sustainability, health and well-being are top priorities for our tenants,” she adds.

POLICY

Improving environmental performance for existing buildings

Buildings currently generate over 30 per cent of Canada’s greenhouse gas (GHG) emissions through fossil fuels used in heating, cooling and lighting, and an additional 10 to 15 per cent is embodied in building materials and products. As Canada is committing to tackling

ambitious climate change challenges, reducing the environmental impact of buildings has to be part of the plan, says Thomas Mueller, president and CEO of the Canada Green Building Council.

He adds that sustainable buildings have gained traction across the

country, with data showing their considerable success in reducing energy consumption and GHG emissions, water use and waste disposal, as well as creating healthier indoor environments.

“It’s a bit of a misconception that green buildings are much more

expensive,” says Mr. Mueller. “Ten years ago, that was true, but the industry has gone through a significant learning curve and can now deliver LEED-certified buildings at a very reasonable cost.”

Sustainable options are not limited to new projects but include upgrading existing buildings, which make up the majority of building stock, says Mr. Mueller, adding that investments for green retrofits and operational improvements can typically be recouped in less than 10 years. The key is to pursue timely opportunities and choose the best green options when upgrades are needed due to age or market demand, he suggests.

While the business case for retrofitting buildings for better energy performance is already clear, Mr. Mueller believes interest will only

continue to grow. “We already have a price on carbon in Ontario, Alberta, B.C. and Quebec, and in all likelihood, there will be a price on carbon across Canada in the future,” he says. “This would be an added incentive for building portfolio owners to make new and existing buildings more carbon-efficient.”

All three levels of governments are already taking action on making their properties more sustainable, and the federal government recently committed to retrofit its buildings in the national capital region to be greener.

Mr. Mueller believes more can be done. He says government incentives and policies and investment in research and development could play a larger role in encouraging the move toward greater sustainability and innovation.



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BY THE NUMBERS

Calculated cumulatively between 2005 and the end of 2015, green buildings have benefited Canadians with:

ENERGY SAVINGS

Energy savings of 6,503,647 MWh, which is enough to power 220,702 homes in Canada for a full year.

REDUCTION IN GREENHOUSE GASES

A 1,261,016 CO₂e tonne reduction in greenhouse gas emissions, which equates to taking 238,377 cars off the road for a year.

WATER SAVINGS

Water savings totalling 12.8 billion litres, the equivalent of 5,131 Olympic-sized swimming pools.

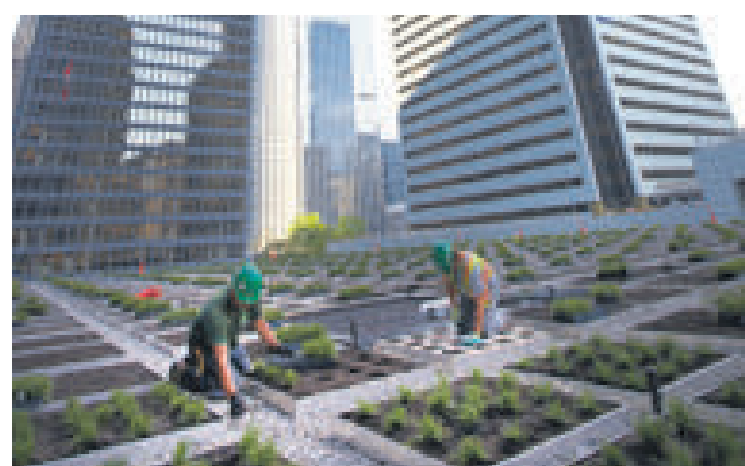
RECYCLING GARBAGE

Recycling over 1.6 million tonnes of construction/demolition waste, which represents 491,174 garbage truck loads.

REDUCING URBAN HEAT

Installing 231,608 square metres of green roofs, or an area the size of 153 NHL hockey rinks, to reduce the urban heat island effect and mitigate storm water flows in urban areas.

Source: CaGBC



Green roofs contribute to reducing the urban heat island effect and mitigate storm water flows in urban areas. TD CENTRE TORONTO

DATA

Technology tools for optimized energy use

According to the U.S. Department of Energy, 30 per cent of the energy that goes into commercial buildings and industrial facilities is wasted. The problem is that operators and managers don’t know where and when it’s occurring. They now have a way of finding out thanks to CircuitMeter Inc., a Toronto company that has developed an economically feasible way to measure and analyze energy usage at the circuit level, thereby making it possible to plug leaks and reduce energy costs.

According to company president Paul Mertes, wastage typically occurs in two ways, sometimes simultaneously: systems and equipment operating when they shouldn’t, and/or systems and equipment that should be operating, doing so inefficiently. Common examples include heating, cooling or lighting systems left running due to control system error or occupant neglect.

“For example, we’ve found heating systems operating in the summer, cooling systems operating in the winter, and groups of rooftop equipment that appeared to be working fine, but in fact had one unit using

40 per cent more energy than the others because it needed a minor repair,” says Mr. Mertes.

CircuitMeter combines the most powerful metering technology with circuit level real-time data, essentially providing a communications tool that measures electrical usage across a circuit panel or a motor control centre and turns the volts and amps it scans into data before sending it to the cloud where it can be analyzed. Ultimately users receive information they can use to fix mistakes, address inefficiencies or simply turn off the switch.

One of the key selling features is affordability. “The cost of our system is at the level of two to four per cent of industrial-grade meters currently on the market,” says Mr. Mertes. “This is important because with this level of cost reduction facility owners can now meter at the circuit level and get access to the detailed data that gives them real insight into their operations and energy use.” He adds that analyses suggest a large building spending \$2.5-million on electricity annually could recoup the investment in a CircuitMeter system in as little as 12 months.

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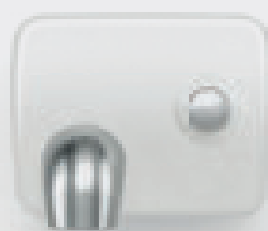
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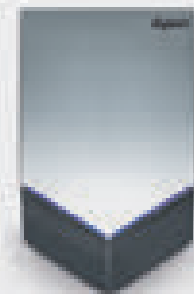
CO₂ per dry²

15.6g

CO₂ per dry²

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3.4g

CO₂ per dry²

3.6g

CO₂ per dry²

4.0g

CO₂ per dry²

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¹Dry time measured using Dyson test method 769 based on NSF P335 using a measurement of 0.1g residual moisture.

²Calculated using PE International GaBi software and method developed with Carbon Trust based on 5 years use and dry times measured using Dyson test method 769 based on NSF P335 with a measurement of 0.1g residual moisture.