

WHEN IT COMES TO NEW BUILDINGS, SUSTAINABILITY PAYS

By Franklin Holtforster, P.Eng., and Ralf Nielsen

THE ENVIRONMENTAL, ECONOMIC and social benefits of sustainable buildings can no longer be denied. Being “green” is no longer a simple social statement—it is an imperative to success in today’s economic landscape.

Sustainability is having far-reaching impacts on building standards, codes and specifications; it’s a principle now common to municipal bylaws and zoning. (Most municipalities choose LEED as a green building standard.) For Canada’s Building Owners and Managers Association (BOMA) International, a facility must be sustainable to qualify as Class A office space—by definition the “most prestigious buildings competing for premier office users with rents above average for the area.”

Sustainability’s reach and acceptance as the new standard of operations will only continue to grow as businesses recognize and reap the economic benefits of its inclusion.

WHY SUSTAINABILITY IS CRITICAL

Owners, developers, investors and building operators are well aware that costs are rising and revenue isn’t. Energy, water, wastewater, insurance and maintenance costs are among the factors driving the cost increases. At the same time, the clock is ticking on climate change, cheap oil and clean water. As professionals in the industry, we know that excluding sustainability from the criteria for a building’s success ignores:

- the life-cycle cost of heating, cooling, water and wastewater;
- the impact that indoor air quality and natural light can have on the well-being of occupants; and
- the opportunity to dramatically reduce the waste generated in the construction and operation of buildings.

THE PATH FORWARD

The benefits of sustainably designed buildings or facilities can generally be categorized as environmental, economic or social.

Environmental

The environmental benefits are multi-dimensional and can span the entire life cycle of a building or facility from the resource and raw material extraction stages through product manufacturing, construction, operation and decommissioning.

Sustainable building design seeks to reduce environmental impacts associated with greenhouse gas emissions, resource use, water use, air pollution, toxins and hazardous materials and wastes.



THE ARCHITECTURE, DESIGN AND ENGINEERING COMMUNITIES UNDERSTAND SUSTAINABLE DESIGN CAN MEAN LOWER ANNUAL COSTS FOR ENERGY, WATER, REPAIR AND OTHER EXPENSES RELATED TO MANAGING AND MAINTAINING A BUILDING OR FACILITY.

The benefits mostly accrue to society through clean air and water and healthy, productive soil.

Economic

The positive environmental impacts also often lead to lower operating costs. The architecture, design and engineering communities understand sustainable design can mean lower annual costs for energy, water, repair and other expenses related to managing and maintaining a building or facility.

These savings come mostly from more energy-efficient heating, cooling and ventilation systems. While they have a higher initial cost, the payback period for the incremental investment is often short, and the life-cycle cost is typically lower than that of more traditional buildings.

The building community also knows that using an integrated design approach can reduce initial costs by optimizing site orientation, using space-efficient design, eliminating unnecessary materials

and components, avoiding structural and systems over-design and by reducing construction waste.

Social

The social benefits of sustainable design are related to improvements in the quality of life, health and well-being, primarily for building occupants. A building environment can have both negative and positive impacts on quality of life. Negative impacts include illness, absenteeism, fatigue, discomfort, stress and distractions resulting from poor indoor air quality, thermal conditioning, lighting and specific aspects of interior space design (e.g. materials selection, furnishings and personnel densities).

Reducing these factors often improves health and well-being and should be considered just plain common sense and good design practice. As well, the softer side of sustainable design can include measures to create positive psychological and social experiences for occupants and the broader community.

PRODUCTIVITY AND RETENTION

This is an additional economic benefit realized through sustainability. While energy costs are in the realm of \$2 to \$3 a square foot, rent can be between \$10 and \$20 a square foot, and productivity \$200 a square foot. We know that the primary cost of doing business is salaries. If the average private sector compensation is \$50,000, a 1 per cent increase in productivity yields \$500 for each employee in a year. Is there justification for a \$500 investment in the quality of an employee's workspace? Productivity benefits have been demonstrated and are well documented (Carnegie Mellon University)—with some putting the estimated impact of better-performing buildings at more than 10 per cent (Leaman, 2001). Another study estimated an annual cost saving of \$25,000 for 100 employees as the result of a one-time investment in better ventilation systems of \$8,000 (Milton, 2002).

People spend 90 per cent of their time indoors. We also know that indoor pollutant levels are higher than outdoors. Sustainable buildings can promote better health, comfort and well-being for occupants. This, in turn, reduces levels of illness and absenteeism and, in the case of work spaces, can better attract and retain employees. It has been estimated that the total cost of turnover for one employee in the United States is more than \$25,000 (Fitz-Enz, 2000). But can we make a direct link between turnover and high performance, sustainable design and employee retention? Clearly, we need to provide better examples, or conduct more research to build this case.

VALUATION

Investors commonly use the capitalization (CAP) rate as a measure of an asset's performance. The CAP rate is the net operating income of a property divided by the assessed total asset value, and an indirect measure of how fast an investment will pay for itself. For example, real estate appraisals use net operating income to determine potential CAP rates.

If efficiency improvements are made to enhance the operating income or gain higher rents, the CAP rate will be higher (more desirable). One US study (Royal Institution of Chartered Surveyors, 2009) estimated that converting an average non-green office building to a green one resulted in a 16 per cent increase in market value. The same authors found that among their entire sample (9998 buildings; 893 either Energy Star- or LEED-certified), the premium gained in rent, adjusted for building occupancy levels, was more than 6 per cent.

Taking it a step further, their analysis also showed that a \$1 saving in energy costs from increased thermal efficiency yields a return of roughly \$18 in increased valuation for an Energy Star-certified building. As far as we are aware, no such studies have been conducted in Canada. But perhaps with the increased base of LEED, BOMA BESt and Green Up, data sets in Canada will produce similar findings.

Beyond net operating income, increasing asset value is another vehicle to drive up return on investment. For example, consider contaminated sites, where the growth and innovation in remediation techniques drive down their cost, benefiting savvy developers and investors who can apply these ahead of their competition to the benefit of the community, the environment and local government.

RISK

Building sustainable facilities has even more advantages for owners, operators and investors. Take worker health and safety—improved indoor environmental quality will lead, for example, to lower workers' compensation costs and lower absenteeism. Some insurance companies are making the connection between sustainable design and reduced risk, offering premium discounts for owners implementing particular energy-saving strategies, such as onsite renewable electricity generation that reduces the risk associated

[POLICY ENGAGEMENT]

with regional blackouts or severe weather affecting a company's operations (i.e. reduction in premiums associated with catastrophic/emergency loss).

As well, the insurance industry is paying attention to our changing climate. According to a report by a coalition of investors, environmental groups and other public-interest organizations: "Insurers have begun to embrace a more sophisticated approach to climate change, increasingly recognizing the issue as one of 'enterprise risk management,' which cuts across the domains of underwriting, asset management, and corporate governance" (Ceres, 2009).

Some property insurance companies are undertaking such activities as changing their terms and conditions, promoting loss prevention, and promoting awareness of the pending problems of climate change. Such actions are intended to have companies assess their liability and risk associated with a changing climate and how it impacts their buildings and infrastructure, and perhaps choose such preventive measures as building envelope improvements, precipitation and water management, water-efficient landscaping, and structural improvements to accept greater snow loads.

The means already exist for property owners, developers and operators to understand the impact of climate change on their assets 20, 50 or 80 years into the future and put measures in place to adapt (Engineers Canada, 2008). Furthermore, the design and engineering community is well suited to lead into a new area of practice—climate change adaptation—as we come to terms with unprecedented changes that are already having an impact on buildings, infrastructure and facilities.

CARBON

Energy=carbon=money.

Unfortunately, placing a price on carbon can be fraught with complexity and misinformation. However, building owners, particularly those with larger portfolios, should at least be preparing themselves by understanding the applicable standards, such as ISO 14064 and BSI-PAS 2060 (World Resources Institute), tracking the provincial and national regulations, measuring and monitoring their energy and carbon emissions, and training their facility and portfolio on energy and carbon management. At most, owners should be developing an energy-management strategy and program that integrates

carbon considerations into their long-term, capital-planning processes. Understanding possible planning and zoning restrictions, municipal bylaws and the selection of the best possible renewable energy technologies to suit the owner, location and building type could be part of such a strategy and program.

QUALITY

Forty years ago, when Philip Crosby wrote his ground-breaking book *Quality is Free*, things looked grim for North American car manufacturers. Crosby suggested a new approach. He argued that quality didn't increase costs; it decreased them. He concluded that "quality is free."

He showed that ignoring quality in the profit equation also ignores the cost of returns, rework, disaffected clients, loss of corporate reputation, increased operating costs, reduced sales, reduced profitability and reduced competitiveness. Investing in quality, said Crosby, paid back richly with dividends of lower cost, higher profit and increased competitiveness.

The same can be said for sustainable buildings. We can show that making these investments will also pay back with higher profit, increased competitiveness, reduced risk and enhanced asset value.

As a result, sustainable practices are increasingly being included in developing private and public sector policies—a trend that will continue into the future.

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