How Long Term Care Homes can go Green

The concept of 'going green' is becoming increasingly popular as developers and companies realize the financial benefits and marketing opportunities associated with using less energy and contributing to the health of our environment. Sustainable design is particularly relevant for long term care homes, where the quality of the indoor environment and cost-saving strategies are of prime importance.

What is LEED?

LEED (Leadership in Energy and Environmental Design) is the premier green building certification system, administered by the Canada Green Building Council (CaGBC). To attain LEED certification, a building must achieve 26 of 70 possible credits. There four levels of certification—Certified, Silver, Gold and Platinum—awarded according to the number of credits acquired. LEED credits address five environmental impacts: site development, energy efficiency, water efficiency, material selection and indoor environmental quality. While LEED-NC (New Construction) certification is the most popular, there are other types of certification, including LEED-EBOM (Existing Buildings: Operations and Maintenance).

Given the increasing focus on human environmental impacts, it is not surprising that the LEED movement is picking up steam. According to the United Nations, the built environment uses:

- 65 per cent of electricity generated;
- 40 per cent of raw materials;
- 36 per cent of all energy;
- 25 per cent of wood harvested; and
- 12 per cent of potable water.

by Troy Greene

Troy Greene, LEED AP, is a project principal with the Green Buildings Division of Enermodal Engineering, which is working on more than 180 buildings pursuing LEED across North America and is responsible for more than 85 per cent of LEED-certified buildings in Ontario. Mr. Greene has seven years' experience in sustainable building design and LEED certification, with particular emphasis on long term care and health care facilities.

Benefits of going green

LEED buildings offer a number of benefits. They use less energy, water and resources, last longer and provide better indoor air quality than traditional buildings.

In a study of 40 LEED-certified projects by Enermodal Engineering, it was determined that these buildings use 41 per cent less energy than comparable buildings meeting minimum code requirements. In actual numbers, a typical Ontario office building uses more than 700 ekWh/m^2 annually. Enermodal's LEED-certified buildings use an average of 413 ekWh/m^2. This represents a huge decrease in annual energy costs—an operational consideration that will become even more important as energy prices continue to rise—while also decreasing the building's environmental footprint.

In addition to energy savings, Enermodal's LEED buildings achieve between 25 and 85 per cent water savings and 10 and 40 per cent raw materials savings, while diverting a substantial percentage of construction waste from landfill sites.

External studies of LEED buildings have found the indoor air quality is improved through a variety of strategies, including the use of low-VOC (volatile organic compound) paint, urea-formaldehyde-free composite wood products, GREENGUARD-certified furniture and improved construction methods (such as flushing out the building with fresh air to expel chemicals from off-gassing materials before building occupation). According to a Rocky Mountain Institute Study, this improved indoor environment has been shown to increase occupant health and comfort.

With benefits like energy savings and improved health on the table, an increasing number of people are interested in working or living in a LEED-certified building. In fact, a recent CoStar study found that LEED buildings outperform their peers in terms of marketplace demand, occupancy rates, rental rates and sale prices. A survey conducted by Edelman Public Relations revealed that 'global warming and the environment' was among the top three issues the public wants companies to address; and employees ranked 'demonstrating corporate responsibility' as the second most important action for a company seeking to earn their trust.

Making LEED buildings even more attractive is the future direction of government and industry regulations, which will likely require buildings to be more energy efficient and sustainable. LEED buildings keep owners ahead of the legislative curve.

LEED Rating	Certified	Silver	Gold	Platinum
LEED points	26–32	33–38	39–51	52–70
Energy savings	25–35%	35–50%	50–60%	>60%
Annual utility savings	$0.75/ft^2	$1.00/ft^2	$1.25/ft^2	$1.50/ft^2
Typical time to payback	<3 yrs	3–5 yrs	5–10 yrs	>10 years

The LEED process

The design and construction process for a LEED building is very similar to that of a traditional building, but there are some differences—and some new design team players. One difference that is immediately apparent is how members of the design team—usually made up of the owner, architect, engineers and contractors—interact

with one another and approach the project.

LEED takes an integrated approach to project delivery. All members of the team meet before the design process begins to go over project goals, particularly with regard to sustainability and energy efficiency. The team meets several times throughout the design and construction process to share information, raise questions and address challenges. In contrast, a traditional design group does not work as a team to nearly this extent. With traditional design, individual players do their part but do not really consider the ways in which each of these parts fits together to achieve the most efficient and functional building possible.

Several key players on the design team are vital to the achievement of LEED certification.

Owner

It is not an overstatement to say that the full commitment of the owner to going green (and to any initial associated expenses) is one of the most important indicators of success, both in attaining energy-saving goals and achieving certification. The owner's support of the LEED consultant (even when other members of the design team are reluctant to embrace innovative suggestions) is critical in making sure the integrated design approach works effectively.

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Architect

The architect needs to strike a balance between his or her beautiful, creative vision and the incorporation of efficient, complex building components and systems.

Contractor

The importance of a good contractor is often overlooked in the establishment of the design team. While a building can be perfectly designed for maximum sustainability, it will all come to nothing if the contractor does not know or care how to properly execute the design. The contractor on a LEED project needs to be open to innovative designs and understand that a LEED building is not just 'business as usual.' For example, if the design calls for only FSC (Forest Stewardship Council)-certified wood to be used in construction, the contractor must be trusted not to substitute a more easily acquired product for the sake of expediency or cost effectiveness. Substitutions like these can lead to the loss of LEED credits and, ultimately, certification.

Commissioning authority

Commissioning authorities (individuals who make sure all building systems are operating as intended) are not uncommon in traditional

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buildings, but LEED requires fundamental commissioning and gives an extra credit for completing best practice commissioning. This is because building commissioning increases building efficiency and occupant comfort while decreasing operating costs. Best practice commissioning—which must be conducted by someone outside the design team—catches problems early in the design and shop-drawing stages and is the most cost effective way to ensure a building will function properly upon completion.

Mechanical/electrical engineer

Engineers, individually or working in teams, design building systems such as HVAC (heating, ventilation and air conditioning) and lighting. It is critical that the engineers have an understanding of energy-efficient design concepts and are open to alternative solutions presented by other members of the design team.

Measurement and verification specialist

Many project teams will also include a measurement and verification specialist. This person is responsible for monitoring the mechanical and electrical systems of the building in the first year or two after it opens and looking for areas in which efficiency can be improved.

LEED consultant

Besides having an owner who throws his or her support wholeheartedly behind green standards, bringing a qualified LEED consultant on board is the best way to achieve LEED certification—perhaps even at the Gold or Platinum level. The LEED consultant leads the integrated design team meetings and offers advice to all members on how to stay on track for certification. He or she also makes visits to the construction site to ensure the proper procedures are being followed and documented. When construction is completed, the LEED consultant compiles and submits all the relevant documentation to the CaGBC and answers any clarifying questions.

There are literally thousands of people who have taken the CaGBC test to become a LEED AP (Accredited Professional), but there are only slightly more than 100 LEED-Canada-certified buildings. The truth is that many projects are targeted for LEED certification but fail for various reasons. One common cause for failure is the hiring of an inexperienced LEED consultant. Before deciding on a consulting firm, the LEED team should make sure the company under consideration has several *certified* (not registered) projects under its belt, and preferably some that are similar to the current project. Hiring a consulting firm with a strong energy-modeling background is a good way to ensure that the desired energy savings are achieved. This is an important consideration, since energy savings provide one of the greatest returns on the upfront investment and are listed as one of the LEED categories with the highest number of credits available.

LEED energy efficiencies

Many LEED design and building techniques

offer specific associated benefits to long term care facilities that decide to go green.

Rainwater

Rainwater can be harvested for uses such as toilet flushing, landscape irrigation, fire protection and make-up water for mechanical cooling equipment. Typically, rainwater is collected from the roof of the building and stored in a cistern tank, then pumped through a filter and distributed where needed. The potable municipal/well water savings can be significant, especially if residents are still relatively independent. Although this is an old technology, there are still some code officials and designers who are unfamiliar with it. While there are some technical details that must be addressed in the system design, the building code does allow for the use of these systems.

As with any other system or piece of equipment, the design team should evaluate the technical and economic feasibility of rainwater harvesting for the building, taking into consideration such factors as expected water use, annual rainfall for the building location, roof area available for rain collection and cistern sizing.

HVAC

Conditioning ventilation air in a long term care home accounts for a significant portion of the building's heating and cooling loads. To reduce heating and cooling loads, reduce fan energy and provide improved indoor air quality and infection control, consideration should be given to incorporating exhaust air heat recovery in a 100 per cent fresh-air system. Good design will practically eliminate recirculation and crossover contamination, reduce the total quantity of air supplied to the building and recover 75 to 85 per cent of the thermal energy that would otherwise be exhausted from the building.

Radiant heating and cooling

Thermal comfort is a key priority in the design of a building's mechanical systems. As people age, they become less active and more sensitive to temperature. Consequently, residents living in long term care often prefer warmer temperatures. Respecting the desire for higher temperatures can be accomplished in an energy-efficient manner by incorporating radiant heating and cooling. Whether delivered via in-floor piping or ceiling panels, providing heating and cooling in this manner—as opposed to heating and cooling with air—will reduce energy use and provide for a more comfortable building environment.

Whether long term care homes are looking to improve their energy efficiency, reduce their environmental footprint or improve the indoor air quality of the building to keep their staff and residents comfortable and healthy, LEED certification is one way to get the most out of going green. **LTC**