

MARKET COLLABORATION:
APPLYING NEW STRATEGIES IN
HEALTHCARE FACILITY DESIGN





EXECUTIVE SUMMARY

Healthcare sector buildings account for nearly 10% of all the CO₂ emissions in North America. These facilities, many of which are outdated, are being confronted by rising energy costs, poor indoor air quality, and outdated technologies. Solutions to these and other growing issues must be addressed, or the implications to society could extend far beyond short term economic issues. Potential consequences would impact the institution, the shareholders, employees, community and the end user – the patient. The healthcare industry is aware of these implications and has begun to embrace energy efficiency as a viable cost-effective path to improve operational margins, but we must prepare to go far beyond these measures to ensure our infrastructure is able to support the growing demands on our healthcare system and the environment.

The DCL Design Charrette and Workshop, on January 25th 2012, brought together cleantech leaders and senior executives from across Ontario's healthcare sector to support the development of the most advanced healthcare facility in Ontario. The purpose of the event was to review the next evolution in medical facility design, green materials and processes, energy efficiency, and advanced technologies to discover opportunities for sustainable innovation.

This Report will provide a synopsis of the main issues raised by industry leaders at the DCL Design Charrette and Workshop. These issues will be addressed in a two-part format, first leading with an Opportunity for market development, then followed by a Response to deliver a suitable approach to the matter. There are Perspectives distributed between these Opportunities and Responses to highlight significant markers of the green healthcare movement. The Report will also include case studies to reference as we consider strategies for implementing sustainable technologies and to promote awareness of green innovation.

Hospitals exist to benefit our communities, but they also consume and pollute. Not only do we need to provide optimal patient care but we also need to minimize the detrimental effect hospitals have on the environment.

DR. JOHN HOWARD, MD, CHAIR OF THE CANADIAN ASSOCIATION OF PHYSICIANS FOR THE ENVIRONMENT

Key Terms

The following terms and acronyms are used throughout this report. These definitions provide context for how they are used in this document.

BIM Building Information Modeling (BIM) is a digital process used to generate and manage the physical and functional characteristics of a facility, used as a decision-making resource during the conceptual, design, and construction stages of development.

BREEAM A global environmental assessment method and rating system for buildings, setting some of the highest standards for best practice in sustainable building design, construction and operation since first launched in 1990.

Charrette A design charrette is a collaborative session involving experts and users in a structured experience, used to open creativity and discussion through consulting among individuals of various disciplines.

eQuest A digital building analysis instrument used for detail examinations of energy use in state-of-the-art building design technologies, generating results in the form of graphics and simulation programs.

FIT Feed-In Tariff (TIF) is also known as the advanced renewable energy tariff, a policy created to finance and increase investments in renewable energy technologies by offering continuing contracts to renewable energy producers.

Hemcrete A carbon-neutral construction material made from a mixture of hemp hurds

and lime, less dense than concrete, and effective as an insulator and moisture regulator for buildings.

IDP Integrated Design Process (IDP) is a multidisciplinary process used for designing buildings, involving the collaboration of industry experts and stakeholders to identify strategies for attaining desired results.

LED A Light-Emitting Diode (LED) is a semiconductor light source with low energy consumption, longer lifetime use, and an efficient and cost-effective option for sustainable lighting.

MNECB The Model National Energy Code for Buildings (MNCEB) is a document that contains cost-effective minimum requirements for energy efficiency systems in commercial, institutional, and government buildings across Canada.

Net-Zero A Net-Zero Energy Building (NZEB) describes a building with an annual consumption of zero net energy and zero carbon emissions, using a combination of energy producing technologies to reduce the overall use of energy.

We have a burgeoning need and demand for healthcare facilities across North America. . . now we must make an effort to design and engineer them as healthy and sustainable as we would like ourselves to be.

FRANK DELUCA, CEO, DCL EQUITY PARTNERS INC.

The old expression, “You never get a second chance to make a good first impression” could not be more significant than when applied to healthcare facilities. The dire state of our current medical buildings presents a significant opportunity for the healthcare sector to be a leader in pushing the green, sustainability envelope.

In North America, the healthcare industry is second only to fast food restaurants in its energy use. Hospitals have a higher concentration of hazardous materials than any other common place of employment. Most medical office buildings are mechanically outdated, offering poor air quality, inadequate lighting technologies, and ineffective energy methods. In short, these buildings are as plain and basic as can be, creating an even less desirable working environment. These negative realities are offset by my belief in the incredible opportunity that hospitals and healthcare facilities have to become community “healthcare hubs”, proving that green and sustainable initiatives can have resounding effects on the environment. Green initiatives can produce a solid return on investment – the key is to prove it.

By setting a clear objective to design, engineer, and build a better sustainable healthcare model, we can combat the current association of healthcare facilities as dull and depressing buildings with labyrinthine corridor mazes, in favor of spaces with natural light, great ventilation, and patient-centred interior design.

Building a better sustainable healthcare model is not just about dimming the lights, installing better HVAC systems, or low E curtain glass walls; it is about us taking a holistic approach to the entire project without simply isolating the “green” elements. It is about integrating a group of initiatives into design, engineering, and operations to maximize the efficiency and reduce carbon emissions without the end user knowing that we did it.

A DCL facility must convey a message to all patients, visitors, volunteers, vendors, staff and the community about our organization’s commitment to the environment and the medical care being provided there. The DCL Stouffville Medical Centre is a landmark development for the town of Stouffville and a leader in future sustainable healthcare projects across the country – a true “first-in-class” and “best-in-class” model of the opportunities available in thinking green all around.

Sincerely,



Frank Deluca
CEO of DCL Equity Partners Inc.

DCL STOUFFVILLE MEDICAL CENTRE

Canada’s first sustainable healthcare centre, the DCL Stouffville Medical Centre, is a leader in demonstrating the possibilities of sustainable technology in a state-of-the-art medical facility. The building is located in Stouffville, Ontario, one of the top ten fastest growing communities in Ontario, situated in the northeast region of the Greater Toronto Area. The centre promises to use the most innovative sustainable technology to deliver a healthy structure with an internally healthy purpose. The four-storey, 40 000 sq. ft. structure will serve as a community healthcare hub for the town of Stouffville and surrounding area. The centre will house a diverse organization of medical services that include general practitioners, dentists, a compound pharmacist, walk-in-clinic, opticians, varied specialists and laboratory and ultrasound facilities.

DCL Equity Partners plan to use a combination of green technology systems to confront the challenge of reducing both the building’s cost and carbon footprint. This will be a facility that is environmentally and economically sustainable to the core.

The Stouffville Medical Centre is set to open by Fall 2013 and is the first medical facility in Ontario to demonstrate the advancement of sustainable systems and strategies, a true benchmark for future healthcare developments across Canada.

We shape our buildings and afterwards
our buildings shape us...

WINSTON CHURCHILL (MAY 10, 1941)



The DCL Stouffville Medical Centre is one of the biggest projects we’ve ever had in our municipality involving green, sustainable buildings... It’s exciting for our municipality and it’s going to be a very big benefit for our residents. The more buildings that do this, the better off we’ll be and the better it will be for future generations.

MAYOR WAYNE EMMERSON, TOWN OF STOUFFVILLE

TABLE OF CONTENTS

About DCL Stouffville Medical Centre	3	Conclusions	32
Introduction	7	List of Workshop Participants	34
Healthcare Demographics	8	Footnotes	36
The Rising Demand for Healthcare Facilities	10	About DCL Equity Partners Inc.	37
Driving Innovation	12	About Bowerbank & Associates	37
Integrated Energy Modeling	14	About Sustainable Buildings Canada	39
About BREEAM	16	About Enbridge Gas Distribution Inc.	39
Environmental and Overall Performance	18	Acknowledgements	40
Adapting to Local Environment	20		
Interdisciplinary Decision Making	22		
SMART Buildings	24		
Energy Efficiency	26		
Renewable Technology	28		





INTRODUCTION

In 2008, The Ontario Medical Association (OMA) published a report titled “Illness Cost of Air Pollution”. The report concluded that air pollution was a contributing factor in almost 9,500 premature deaths per year and that smog was responsible for over 16,000 hospital admissions in 2005. The financial burden to the healthcare system due to smog related issues was estimated to be \$4.4 billion a year. The time had come for actions to speak louder than words, so as a result of the report and the leadership of the OMA, the Province of Ontario established the Green Energy and Economy Act. Since the Act was introduced in 2009, Ontario has brought more than 9,000 megawatts of new and refurbished clean energy online - enough to power cities the size of Ottawa and Toronto². The total number of annual “smog days” has declined from 53 in 2005 to only 9 in 2011³. The Province is also on track to shut down all coal-fired energy generators in the Province including the Nanticoke Generating Station, North America’s largest coal-fired power plant.

The clean energy accomplishments achieved by the province of Ontario over the past few years can be attributed to the foresight and leadership of our healthcare professionals. If the healthcare sector is capable of driving change in energy generation, what can be accomplished if the same focus is applied to buildings and infrastructure? Urban and suburban populations spend 90% of their time indoors. Whether it’s sleeping, eating, working, or playing, we are doing so inside a building. We take this fact for granted but imagine if we could create a “common perspective” based on our relationship to buildings. What if we all began to talk to each other about our built environments? We would begin to realize how traditional building practices are making us sick and affecting our productivity levels. We would learn how much we are psychologically and emotionally affected by our surroundings. This is especially true of our healthcare centres.

People suffering from injury and illness deserve healthy indoor environments that provide fresh air, natural lighting, and pleasing décor; medical professionals deserve smarter buildings that support the latest technologies; facility owners and managers deserve high performance buildings that dramati-

cally save on operating costs. These benefits can all be achieved through green building design strategies. If professionals in the healthcare sector had the opportunity to work inside green medical buildings, they could better understand these benefits, share their experiences with their colleagues, and encourage others to support green building developments across the healthcare sector and beyond.

You might say supporting the development of green medical facilities is all well and good but the healthcare sector today is already struggling with so many issues including budget management issues, a growing and aging population, and much more; how can we expect medical leaders to champion the benefits of green buildings if they themselves cannot afford the time or money required to build green? The answer lies in establishing partnerships with private sector developers. This market report demonstrates how DCL Equity Partners is striving to be the first developer in Canada to build medical facilities to the highest possible level of green building design. Once built, tenants and patients will benefit from clean, high performance buildings that will set the standard for others to follow. The question now is, how will DCL accomplish this goal? This report outlines the collaborative efforts of leaders across Ontario that came together on January 25th, 2012 to answer this very question. Supported by industry leaders including Sustainable Buildings Canada, BRE Global, Enbridge Gas, BASF, Groundheat, Philips Canlyte, Hydro One, Planit Measuring, and more, the DCL Stouffville project is well on its way to showcase what is possible in green healthcare building design.

Andrew Bowerbank
President, Bowerbank & Associates

Special Advisor, Magna Closures
Special Advisor, DCL Equity Partners
Special Advisor, Enbridge Gas Distribution
GMF Council Member, Federation of Canadian Municipalities
Dean’s Advisory Council, Humber College



PERSPECTIVE

HEALTHCARE DEMOGRAPHICS

The world's population is growing by 200,000 people a day. In the next 35 years, 2.5 billion people will be added to the current population of 6 billion⁴. In 2050, the world population will reach 9.1 billion⁵.

In owing to the ageing baby-boomers' population and strong immigration, Canada's population has been growing at an increasing rate; the country could reach 42.5 million inhabitants by 2056. Canada also faces significant aging of its population as the proportion of seniors increases more rapidly than all other age groups. In 2005, life expectancy at birth of Canadians was 82.7 years⁶.

With a population of more than 13 million, Ontario is home to about one in three Canadians. The number of seniors aged 65 and over is projected to more than double from 1.8 million, or 13.9 per cent of the population, in 2010 to 4.1 million, or 23.4 per cent, by 2036. The growth in the share and number of seniors will accelerate over the 2011–2031 period as baby boomers begin to turn 65 years of age⁷.

It is an opportunity to celebrate the enormous gains in longevity witnessed in the past century and to anticipate the challenges for the coming years. One of the major challenges will be meeting increasing demands for healthcare in a sustainable and efficient manner without compromising the quality of the healthcare experience.

The increasing population and the subsequent rise in demand for healthcare will result in the expansion of facilities and increased maintenance for the existing infrastructure and high-energy consumption, leading to higher financial and environmental costs. Healthcare facilities operate around the clock and need to conform to high levels of standards to maintain their indoor air quality and medical characteristics. Consider the energy consumption of hospitals: hospitals are required to heat, cool and power their facilities 24 hours a day, 7 days a week, 365 days a year. Energy consumption makes up a significant portion of a hospital's footprint. For instance, the size of the London Health Sciences Centre's ecological footprint is bigger than the area of the city of London⁸. This presents an opportunity for hospitals to make major reductions to their environmental impact by changing operating practices. By adopting sustainable operating practices, hospitals can save money, help prevent greenhouse gas emissions, improve air quality and support their commitment to public health.



OPPORTUNITY 1: SUSTAINABLY MANAGING THE RISING DEMAND FOR HEALTHCARE FACILITIES

Canada has one of the costliest health care systems in the world, which may surprise people who are too accustomed to comparing Canada's record only to that of the United States. Canada spent almost \$193 billion on health care in 2010, or 11.9 per cent of GDP. According to the Drummond Report 2012, Ontario's health care budget in 2010-11 was \$44.77 billion or 40.3 per cent of everything the provincial government spends on programs⁹. These bold statistics clearly demonstrate the rising demand and pressure for healthcare facilities to continuously achieve high levels of performance. The wealth of science and research that goes into advancing medical practices is indisputably increasing in recognition; so why should the facilities in which these practices occur be any different? To sustainably address concerns for the rising demand for healthcare facilities, we need to achieve higher performance levels, and understand market needs in designing for the future. As important as the medical procedures, medicine and equipment are, the business and clinical processes of healthcare facilities can be greatly influenced by the structures and facility design. The physical environment can limit performance, or it can support a sustainable improvement over time¹⁰.

RESPONSE 1: SETTING A STANDARD IN HEALTHCARE FACILITY DESIGN

The DCL Green Healthcare Centre in Stouffville will set a standard in healthcare facility design and construction that balances the increasing pressure on healthcare facilities with the needs of the environment.

The centre hopes to achieve efficiency levels up to 75% better than the current Ontario Building Code (OBC). The centre's sustainable design strategy addresses all areas: Health and Well-Being (lighting, acoustic performance, ventilation, outdoor space), Energy (reduction of CO₂ emissions, low or zero carbon technologies, energy efficient equipment), Transport (bicycle facilities, public transport), Water (conservation, recycling), Materials (responsible sourcing, designed for robustness), Waste (recycling, composting), Land use and ecology (mitigation of impacts) and Pollution (refrigerants, NO_x, flood risk, light pollution)¹¹.

By incorporating energy and resource efficiency, the DCL Stouffville Medical Centre will improve its social and environmental performance while reducing its operating costs, which can be ploughed back to further improve the healthcare experience.

CASE STUDY

Health Study Catalyzed Ontario's Plan to Phase Out Coal

Ontario's commitment to phase out coal by 2014 can be largely attributed to the Ontario Medical Association's (OMA) study on the detrimental health, financial and societal impact of air pollution. The OMA's 2005 report titled "The Illness Cost of Air Pollution" attributes more than 29 million minor illnesses, 59,000 emergency room visits, 16,000 hospital admissions over 5,800 premature deaths and more than \$9.9 billion per year in health care costs, lost work time and other quantifiable expenses to smog and air pollution¹². The provincial government developed its phase out coal plan which paved the way for the Green Energy Act.

OPPORTUNITY 2: DRIVING INNOVATION BY ESTABLISHING NEW BENCHMARKS FOR SUSTAINABLE BUILDINGS IN CANADA

Have you wondered what invention or innovative idea will mark the next turn in human history? Our future lies in sustainably built environments. It can be difficult to imagine this seemingly radical change becoming common place in our society, but consider the pace of technology: it took television 13 years to reach 50 million people, the same task took 4 years for the internet, all of which was surpassed by the 100 million people who joined Facebook in a mere 9 months. Market transformation is possible; in fact it is inevitable because of the globalization of our knowledge and technologies. We have the opportunity to adopt sustainable building models to Canadian needs and in turn, improve upon existing sustainability standards and raise the bar for other nations.

Is there a need for creating sustainably built environments? These economic times demand cost effective solutions to continuing development and growth. There is a demand for innovative design and our planet will not adjust to the present exploitation of natural resources. Cost saving, long term solutions to building designs are a step towards supporting further investment in sustainable initiatives. Support for sustainable buildings between industries and nations are vital for adapting to the constantly changing climate and economy. Creating new benchmarks for sustainable buildings will provide objective, reliable information that can be compared and exchanged between industries and all levels of government. The diverse obstacles to building sustainably can be addressed in relation to one another to gain greater confidence and support in solutions. Benchmarking requirements of sustainable buildings creates concrete targets in energy efficiency and emissions reduction while also providing a framework to track the building design progress.

RESPONSE 2: BRINGING BREEAM TO CANADA

BRE Environmental Assessment Method (BREEAM) was launched in 1990 to provide an environmental rating system for buildings worldwide. It has since become a leader in the marketplace with 20, 000 buildings holding certified BREEAM ratings and over a million currently registered for assessment.

BREEAM benchmarking takes into account the diverse range of energy and ecology factors for rating buildings, from water use to management processes, to produce a unified energy performance model. BREEAM benchmarks are comprehensive templates because of their ability to adapt to the distinct needs of local communities and nations. They act as networking mediums to create accountability, communication of roles and responsibilities and setting standards for sustainability.

Creating a sustainably built environment involves addressing climate change action beyond energy efficiency. BREEAM adds value to the local natural environment by recognizing the life and energy that flows through buildings; a successful building must engage and be able to adapt to its environment.

We are capable of transforming the market to support building sustainably and BREEAM provides solutions to our economic and climate change problems, but is this transformation desirable? Does the individual benefit from being within a sustainable building? Consider when a person is overwhelmed, stressed and not able to work to their best potential, most would choose to retreat from the city by vacationing someplace exotic. The purpose of a vacation is to place yourself in an environment that will better your mindset for returning to your daily routine; what if peace and serenity didn't have to be an escape from our lives? This state of mind can be built into our daily lives and surroundings, into a space where we spend most of our time anyway – our buildings.



CASE STUDY

Innovation Parks

BRE Innovation Park is a projection of our future as we embrace sustainably built environments and strive to create a community supporting the wellbeing of themselves and our planet. Since opening in 2005, the park includes eight of the world's most sustainable homes, built according to the Code of Sustainable Homes, a health centre, art community landscape design and 400 various construction projects, all unique in their innovative design and incorporation of emerging technologies.

Among the advanced technologies present, the Renewable House demonstrates the use of hemp in timber frame walls, a crop that is able to absorb CO₂ while growing. The Osborne Affordable Home and Kingspan Lighthouse are example of the success of BRE Innovation Park in meeting emissions reduction goals; Osborne Affordable Home requires one third of the heating and cooling of a home constructed to previous building regulations and Kingspan Lighthouse is the first net-zero carbon home in

the UK, with 50% reduction in water costs.

BRE Innovation Park is partners with the Modern Built Environment, KTN (MBE KTN), a network for sharing knowledge in the built environment. Together they aim to given civil society and all persons supportive of sustainably built environments, an opportunity to learn from designers and developers and create a community that is self sustaining. The key focuses of MBE KTN are:

- Energy Efficiency
- Adaptability of Space
- Intelligent Buildings and Infrastructure
- Climate Change Impact
- Life Extension of Structures

With new initiatives underway, BRE has taken the lead in advancing both the capabilities of renewable technologies and our awareness of what a sustainable future should be.

OPPORTUNITY 3: ENERGY SAVINGS THROUGH INTEGRATED ENERGY MODELING

Designing an energy efficient medical facility often requires higher levels of effort compared to other institution types. Health care facilities not only represent an area for significant energy reductions, but are also spaces that require comfortable light and temperature levels to suit the needs of patients. This is why it is important to create models that illustrate methods of reducing energy and provision of comfortable spaces.

Energy Modeling

Energy modeling helps achieve an optimal design solution. Since each building is situated in a different location, its design needs to take into consideration local environmental characteristics. One of the purposes of buildings is to create interactive spaces for people, making it necessary to understand the demands of the building user at a vernacular level. This is why it is important to use local science and knowledge to consider the opinions of regional groups. More specifically, the local climate, regulation and culture, needs to be understood to develop proper building standards.

Building specialists often say that the most important issue to consider when developing a building, is the construction of a good envelope. Designing a good building envelope is a process that would greatly benefit from the integration of energy modeling systems.

Reducing Costs of Building Operation and Maintenance

Ontario’s former Chief Energy Conservation Officer indicated that “since 2007, progressively more Ontarians continue to cite cost savings and reducing impacts on the environment as the main drivers for electricity conservation behaviours”¹³.

Studies show that green buildings cost little more than buildings using conventional construction practices. In fact, many say that green buildings should only cost marginally more to design and construct. This is because green buildings can often use fewer or smaller systems as a result of better designs.

A study by the Canada Green Building Council in 2005 concluded that the operational benefits of green buildings outweigh their higher capital costs. These higher costs occur because of longer design time and usage of non-standard materials and systems¹⁴. Using energy modeling tools such as BIM (building information modeling) during the building design process have proven in other jurisdictions to produce a rapid return on investment.

Innovative modeling tools such as BIM are truly revolutionizing the design of healthcare facilities by pinpointing opportunities for energy reduction, while formulating more comfortable living and treatment spaces. BIM would become the user’s manual for the life cycle of the facility.

MICHAEL LAURIE, P.ENG AND PRESIDENT OF PLANIT MEASURING

RESPONSE 3: FUNDING AND RECOGNITION OF ENERGY MODELING TOOLS

Energy modeling tools are attracting much attention, driving government organizations to provide funding to advance their use during the building design process. BIM is now used in over 40% of projects in Canada¹⁵. The Ontario Power Authority for example, found the BIM energy audit approach to be useful and has qualified this method for funding incentives¹⁶.

Building Information Modeling (BIM)

A BIM energy analysis surveys a building to construct an accurate three-dimensional virtual model¹⁷. This analysis, which predicts the performance of a building before it is built, is important to avoid errors and minimize risk that can often be costly to repair once a mistake is found that can compromising the project’s financial goals.

Essentially, BIM is a central database that outputs the project’s information in order to meet certain standards. It helps stakeholders remain at the core of the project and enables them to visualize a working model by inputting necessary information and characteristics revolving around the design. For example a model can illustrate how the sun interacts with a building and its affect by using specified insulation, building material, thickness of walls and so on.

eQuest

eQuest is an hourly energy simulation tool based on DOE-2.2 calculations. It calculates hourly internal loads, envelope loads and solar loads for each thermal zone and system by using the Toronto “CWEC” Weather (Canadian Weather for Energy Calculations). A preliminary eQuest design of a building allows it to determine the “what if” calculations and analyze how energy is used throughout.

CASE STUDY

BIM in Ontario – Woodstock General Hospital

Energy modeling using BIM has allowed the new Woodstock General Hospital, opened in August 26, 2011, to reach high standards for sustainability by being one of Canada’s first LEED-accredited hospitals. Annual visits are set to increase from 29,000 to 40,000 in the next decade¹⁸. Using energy modeling tools has allowed the building to accommodate the increases in visits while achieving a sustainable design without compromising the patients’ medical experience.

BIM Case Study in USA

BIM is now required to be used on every new federal building project by the United States General Services Administration (GSA). This is a government agency that is responsible for all federal facilities. According to Michael Laurie, President of PLANIT Measuring, one of the pilot projects for GSA, which used BIM, produced cost savings greater than the value of the entire program for the nine projects it was initially performed on¹⁹.

PERSPECTIVE

REACHING SUSTAINABLE STANDARDS THROUGH GLOBAL MEASURES

I was delighted to have recently visited Canada with the objective of exploring how BRE Global can support the market and key organizations with BREEAM, through an education/training or assessments programme.

MARTIN TOWNSEND, DIRECTOR, BREEAM

This is an exciting time for BREEAM, striving to continue research on sustainably built environments while committing to expanding the number of stakeholders involved in the future development of BREEAM. The importance of the Canadian market becomes crucial as BREEAM begins to serve as a vehicle for design support as well as assessment, across all life cycle stages of buildings and infrastructure. The BRE Environmental Assessment Method is a movement for sustainable development, with local schemes, processes, sciences and governance cooperating internationally under an overarching framework defined by core standards and core science.

The DCL Project is the first in North America to experience the bespoke assessment. Through this, BREEAM's initiative is to further the adaptation of BREEAM for the Canadian market. They have recently simplified and accelerated the process for developing a Scheme for any country compliant with BREEAM standards. Their goal is to support local experts in developing their own Scheme, appropriate to local culture and practices for whichever sector of the built environment is the highest priority. BREEAM offers a range of collaborative services and developmental support for countries that do not have extensive local expertise. For countries already equipped with the necessary expertise, BREEAM would simply perform an efficient review and approval of the process; this provides flexibility and the opportunity to follow their own approach without having to strictly follow scheme documents.

Streamlining the process for adaptation into current markets is a major stride and priority for BREEAM. There has been a considerable interest in this approach from a global standpoint, and would contribute significant changes in the Canadian market. BREEAM is also encouraging their partners to integrate their own In-Use standards into their work and involvement with the International Sustainability Alliance (ISA).

The ISA was launched at Expo Real in Munich and is now attracting new members from across the property industry. The ISA system generates KPIs for its members against an agreed KPI set and provides access to the BREEAM In-Use methodology, either at an international level or by country, using the new online system. ISA therefore provides BREEAM Scheme Operators, who have developed their own national BREEAM In-Use assessment method, with direct access to ISA members seeking assessment and certification. The current ISA membership already represents some 150 billion Euros of real estate ownership and management.

OPPORTUNITY 4: MERGING ENVIRONMENTAL PERFORMANCE WITH OVERALL PERFORMANCE

“It pays to be green”, is a common saying that one may come across when interacting with the business and sustainability crowd. This small sentence has found its way into the boardrooms of many sectors of industry and is now commonly thought of as tried, tested and true when it comes to overall firm performance. It may not be complete, but the understanding of the depth of the relationship between business and society has grown²⁰. Academics and experts of various backgrounds have contributed to a growing set of literature and studies on the economic merit of superior environmental performance. This growing archipelago of information seems to predominantly preach the same message; the bottom line is positively impacted when better environmental performance is achieved. Marrying economic growth and environmental quality is less abstract than ever, opening the door to new waves of innovation, creativity and accountability.

As an investor, you may be looking for companies who emphasize the so-called triple bottom line, which presents a new set of challenges to the CEO of the 21st century, or, if you’re a glass-half-full kind of person or simply an environmentalist at heart, a new set of opportunities. The Dow Jones, FTSE4GOOD, KLD, etc., are some of the major stock exchange forums for green investors, demonstrating that green investment has been highly formalized and integrated into the global economy. Their emergence in the stock market shows an increasing presence of ethically-oriented investors. Sustainability, therefore, has real market value and if applied appropriately, this can be a win-win-win scenario for the firm, the investor, and the environment. Not only that, this is an opportunity for new projects and firms to maximize their performance by integrating sustainability into the core of their operations.

With these progressions in mind, harnessing and bestowing this notion to shareholders may be a more manageable task than ever. Elements such as the sustainability indexes listed above and the emergence of various reporting and certification schemes is proof that shareholders are demonstrating increasing interest in this side of companies’ activities. With additional profits to be had, it is no wonder that this trend has grown to be such a substantial part of business practices.



RESPONSE 4: INVESTING IN SUSTAINABLE SOLUTIONS UPFRONT

One of the best ways to merge the environmental performance with the overall performance of a project is by investing in sustainable solutions upfront. This will ensure proper vertical integration of sustainability strategies throughout the project’s execution and beyond. One way of doing this is by choosing the right program that can help guide your initiative in the right direction. Enbridge’s Savings by Design (SBD) program is one of these. Launched on January 1st, 2012, in collaboration with Sustainable Buildings Canada, the SBD program is Enbridge’s newest and most innovative tool for commercial builders looking to design and construct high performance buildings with superior environmental capabilities. The SBD program boasts a sophisticated Integrated Design Process (IDP) that works to help builders maximize energy efficiency without sacrificing style, service or comfort. Enbridge’s SBD program offers a wealth of resources including access to experts in the energy field, incentive programs and step by step guidance to ensure that your vision is fulfilled.

CASE STUDY

Enbridge Savings by Design Initiative

The Savings by Design (SBD) program works through all three crucial phases of building design. Through the Integrated Design Process (IDP), the building owners and their design team work together to identify the optimal mix of design elements and technologies to maximize environmental performance. In this phase, energy modeling experts are enlisted to estimate the potential natural gas and electricity savings available to you. Following the IDP, financial assistance is offered to encourage energy conservation through the Project Development phase of building. This helps to defray the costs of using energy efficient components in the building, ensuring consistency throughout. Finally, in the Commissioning phase, Enbridge provides a post-construction evaluation to ensure that all systems and technologies are working as they were intended to and the building is performing just as well, if not better than planned.

The goal of this program is to make achieving energy efficiency in commercial buildings more accessible by offering incentives and providing guidance through the entire building process. By committing to the program, proponents are offered two workshops, funded by Enbridge, to determine the intended energy and environmental performance of the project. A highly qualified team of technical experts is devised to help achieve the goals set out and to help identify cost-effective incentives. The benefits of this program are many. For the builder, it is the ability to design and construct a building that reaches their energy efficiency goals in a cost-effective manner, working with qualified professionals in the field. In addition, Enbridge provides a risk-free environment to explore new concepts, technologies and construction methods supported by the latest research. And, on top of the many financial incentives, the SBD program offers builders the opportunity to market the green features of their building, further contributing to their bottom line. The final outcome of the design process is to work with the building as a system, taking energy to the next level of performance and creating new buildings that not only meet, but exceed the Ontario Building Code.

“Enbridge is excited about bringing everyone together through the SBD program, which strives to maximize the energy efficiency of buildings by helping to facilitate an alternative design approach that seeks to highlight the simple outcomes that are often overlooked.” – Mary Harinck, Program Marketing Manager in Residential and Commercial New Construction for Enbridge

OPPORTUNITY 5: ADAPTING THE BUILDING AND ITS OCCUPANTS TO THE LOCAL ENVIRONMENT

There is a strong interest in integrating the DCL medical facility with the outdoor environment in order to uphold the integrity of the building, its occupants and the Town of Stouffville. To achieve this objective, questions need to be answered including: what are the demands of the building? how can this building effectively manage and treat storm water run-off? what kind of lighting and materials are suitable for the aging environment or what are the lighting requirements for medical equipments such as MRI machines?

From the perspective of its occupants, this is a heavy use building with specific demands and requirements. From the perspective of the environment, the Community of Stouffville is located on the Oak Ridges Moraine and the Rouge River watershed where there is a flood plain that will require specific considerations. The site will also require an enhanced level of water quality, as noted by the Toronto & Region Conservation Authority (TRCA). Most importantly, the DCL medical facility will be built within a Community. This will be a people centric culture with the principles of the building surrounding people in the context of healthcare. It is essential to pay attention to the surrounding environment, which features a creek, as well as the indoor environment (acoustics, air, energy). The challenge presented is to create the outside, inside – making healthy statements inside and outside.

RESPONSE 5: UTILIZING LOCAL VERNACULAR TO ENHANCE BUILDING PERFORMANCE

Since 2005, Stouffville has seen an increase in population growth, due to the connection to a large scale new sewage system and water pipe known as the “Big Pipe”, which connects to Lake Ontario. Since 2005, the population of Stouffville has increased by 58% and the population is estimated to reach 55, 800 by 2021. The Community of Stouffville has created a set of sustainable development guidelines, which state that, “any change in the Community of Stouffville should be undertaken in a manner which is sustainable and which will preserve and enhance the integrity of the natural environment of the community”²¹. In this plan, the town encourages development designs to:

- create liveable, healthy and efficient environments.
- reduce the consumption of energy, land and other non-renewable resources including support for energy efficient building and opportunities for co-generation.
- minimize the waste of materials, water and other limited resources.
- employ ecological practices and consider the needs of future generations.

The goal of the Vernacular is to promote a sense of sustainability that will not exhaust the local resources. There is a growing need to invest in greener infrastructure in order to ensure watershed protection and the preservation of the Moraine. DCL plans on implementing rainwater harvesting for toilets and outdoor irrigation. There will be a storm water facility (a pond) and DCL has outlined that the first 5 mm of any single rainfall event must be re-used on-site.

One of the key priorities is to ensure the water gets back into the ground²². Options involving a green roof, permeable pavement and open soil bedding to allow water to penetrate are also being explored. There is also a creek located behind the medical facility site that DCL is planning to clean up, as well as an un-used trail that leads to a new condo development that will eventually be rejuvenated. This trail runs around the town of Stouffville and could be used to promote an active lifestyle within the community, such as walking, cycling, etc



CASE STUDY

BASF: The Chemistry of Sustainable Construction

There is significant opportunity to improve the ways we design and construct buildings as well as the sites on which they are constructed. With commercial and institutional buildings accounting for 17% of secondary energy use and 13% of greenhouse gas emissions innovative construction materials offer easy-to-use solutions to these challenges.

For a number of years BASF has produced insulation/air barrier systems, such as WALLTITE® Eco which not only improve the efficiency of the building envelope, but also help control vapour movement. In doing so, it reduces the risk of condensation, mold moisture, ice damming, and other effects which can lead to the premature deterioration of building materials. Additionally, this technology makes significant contributions to a comfortable indoor environment; this results in creating a draft free building envelope and preventing the infiltration of pollutants, toxins, and allergens.

Stormwater runoff can cause pollution in our lakes, rivers and oceans. Pervious paving materials can help address this challenge. Elastopave® polyurethane is a two component polyurethane binder for pervious paving applications. When combined with local aggregates, it creates a strong, durable composite that can be used for parking lots, driveways, sidewalks, patios and other surfaces. This same technology can be used with recycled glass as the aggregate. The Presto FilterPave® system offers a highly attractive hard-surfaced porous pavement made from 100% post-consumer recycled glass which can offer architectural aesthetics, design flexibility, and environmental benefits.

As the world's leading chemical company, BASF has significantly contributed to sustainable construction by providing architects, engineers, designers, builders and owners with material choices that can improve a project's performance throughout its entire life-cycle

OPPORTUNITY 6: INTERDISCIPLINARY DECISION MAKING

Planning and designing the construction of a new building has its challenges. There were many initial considerations with regards to the DCL medical facility and the targets being set for achieving a sustainable building within the context of health care. Not only is a medical facility being constructed, but a standard for future sustainable buildings of this quality will be established at the same time.

Creating a high quality and user-friendly indoor environment that exceeded the Ontario Building Code up to 75% for energy efficiency, while taking into consideration the use of specialized medical equipment without forgetting the surrounding environment, were just a few of these considerations. With so many aspects to consider, it would be easy to miss the finer details taking a business as usual approach to design and construction.

The interdisciplinary approach draws together experts from diverse skills that share research or market interests. Engaging through common interests creates a setting that is non-competitive, encourages open communication and brings forward opportunities for further market collaboration. It is important to establish this framework of knowledge so that the sustainable issues at hand can be addressed from all aspects; technology is just as essential as design, and the end-user has just as much precedence as the developer and government association(s) involved.

There is a growing need for environmentally sensitive design and construction practices. The most effective solutions are made within the early design and pre-construction phases of a project and a lack of integration into the design process leads to an overall inefficient process. A comprehensive knowledge is needed in regards to a building’s form, materials, context and technical systems in order to truly assess building performance²³. It is important to understand the relationships between building systems, technical components, occupant interactions, etc.

The DCL Charrette again demonstrated the power of the integrated design process as a way of demonstrating outcomes that both enhance the energy and environmental performance of a building and ensure that the various alternatives are financially sound. By bringing together a wide variety of perspectives in a creative environment, we were able to identify a number of cost effective solutions for the developer that may not have been in the original design.

MICHAEL SINGLETON, SUSTAINABLE BUILDINGS CANADA, EXECUTIVE DIRECTOR

RESPONSE 6: INTEGRATED DESIGN APPROACH AND THE CHARRETTE MODEL

There are many arguments for taking a more interdisciplinary approach to decision making and much to be gained in relation to the field of green buildings. The Integrative Design approach offers a broader sense of experience through broader expertise, which helps create synergistic strategies. By bringing together a broad range of professionals based on a common interest and taking a team-based approach to design, IDP enhances the basis of decision making in order to formulate better responses to the challenges of creating a sustainable atmosphere and in this particular case, the first green medical facility of its kind in Canada²⁴.

It’s all about raising the bar. It’s collaborative, it’s communicative, and it helps to cut costs by helping to catch and avoid costly mistakes – it strives to improve overall building performance.

It has a lot to do with Exposure. There’s less to miss when you have different eyes on various aspects of

a building, and through the direct exchange of ideas and feedback, solutions are quicker to recognize and implement.

It also improves credibility, offering multiple levels of professional and technical expertise.

It’s all about gaining a deeper understanding of systems integration. Breaking the whole picture into parts and then dealing with each part to help facilitate a healthier and more integrated whole.

It’s all about Relationships, the relationship between building systems, technical components, occupant interactions, etc.

By focusing on building envelope and fenestration, and compartmentalizing the atria space in particular, the DCL charrette group was able reduce the carbon footprint of the building by 16%.

CASE STUDY

Sustainable Buildings Canada and the IDP

Sustainable Buildings Canada (SBC) is a non-profit organization on a mission to educate, support, and empower building professionals and policy makers in Canada by promoting and supporting sustainable building concepts. SBC facilitates the transformation of buildings through their acclaimed Design Charrettes, which bring together teams of experts drawn from an extensive network of green building leaders in order to identify ways to significantly increase the energy and resource efficiency of new buildings or retrofits of existing buildings.

SBC uses the Integrated Design Process to create more comprehensive, robust, and environmentally sustainable designs. The IDP is a collaborative process that focuses on the design, construction, operation, and occupancy of a building over its complete life cycle. The IDP allows the client and other stakeholders to develop and realize clearly defined and challenging functional, environmental, and economic objectives, resulting in high performance buildings that contribute to sustainable communities.

PERSPECTIVE

SMART BUILDINGS

Buildings constitute about 40% of our overall energy use and more than half of that is used in urban centres. This makes it important to reduce their energy consumption, while integrating the use of renewable energy sources to achieve carbon neutrality. Smart buildings provide a solution for increasing energy efficiency by facilitating the exchange of information of independent building systems. This communication across systems provides a more effective energy management system that ultimately improves overall energy efficiency levels.

An important feature of smart buildings is their ability to utilize the features of their surrounding environments to reduce their energy consumption. This can be done by optimizing their design based on their topography. Their localized designs allow for example, interaction with the sun to utilize its passive solar energy to provide natural light for the building, avoiding the consumption of electricity. Other methods of utilizing passive solar building designs is by storing and distributing heat in the winter and rejecting it in the summer. Between 50% and 60% of energy used in buildings is for space heating²⁵. Smart buildings can significantly reduce these figures by locking heat inside or outside the building.

These energy saving characteristics of smart buildings, which are the cheapest ways to reduce carbon emissions, serve as a backbone for renewable energy sources. Incorporating renewable energy sources within the designs becomes ideal and complements smart buildings by gearing them towards carbon neutrality or even net-surplus electricity generators. These technologies include solar photovoltaic panels, wind turbines, geothermal systems and local biomass combustion units.

A Smart Building has the flexibility to be any structure, office high-rise, shopping mall, home, or hospital. What they share is the ability of seeing, analyzing, and knowing how to respond to what goes on inside their walls. Consider the daily flow of people in and out of a hospital; Smart Buildings have the ability to read security numbers and adjust ventilation, heating, or lighting systems accordingly. These savings potentials are just the tip of what Smart Buildings can offer in long-term sustainability measures.

OPPORTUNITY 7: ENERGY EFFICIENCY

Between 1990 and 2009, energy use in Canada has almost doubled in the commercial sector alone²⁷. With the highest population growth rate among all G8 countries and increasing economic activity, Canada's rising energy demands will continue along this trend. By striving for energy efficiency we innovate to create better technologies, maximize the use of existing ones and find new ways to collaborate with our peers while lowering costs. We can also provide thousands of jobs for Canadians in the manufacturing, installation, design and sales of this technology²⁸. To date, there are a plethora of tools that can be used by commercial, industrial and residential building designers to help them keep up with this dynamic market. One of these is the Model National Energy Code for Buildings (MNECB).

Since its publication in 1997, the MNECB has been used to bring energy efficiency to the forefront of building design in a manner that is cost effective. As a prescriptive standard for medium sized buildings, the MNECB's primary objective has been to establish a baseline for energy efficient design as a part of the ecoEnergy Efficiency Initiative. Although it is a national building code, it is adaptable to meet provincial and territorial circumstances, allowing for flexibility and best use of available technology and materials. Many government, utility and private sector

programs have used the MNECB to complement their own. Enbridge, for example, has coupled the MNECB with their Design Assistance Program.

The 1997 version of this program was replaced this year with a more up-to-date, relevant version. The new direction for the MNECB will include up-to-date technical requirements which will ensure that the energy efficiency market is meeting goals set out in the previous version. The updated version establishes an overall 25% improvement in energy efficiency through the adoption of better technology and the use of an Integrated Design Process. With over 1,000 building design models having reached a design efficiency of 35% better than the original MNECB standard between 2007 and 2011, there is little doubt that these baselines can be effectively achieved.

Canadian stakeholders have recognized that improving energy efficiency is a necessary forward progression that can bring our country into a position of leadership in the energy industry. The energy efficiency market also gives us the opportunity to innovate and be creative while considering a future where energy is accessible, affordable and productive.

RESPONSE 7: LOWERING ENERGY LOADS

The rising global population and our unsustainable consumptive behaviours are putting pressure on an already-stressed natural environment. Reducing our environmental impact by using less energy is a crucial part of the solution to ensuring that the planet continues to be a live-able space. Rising fuel prices and uncertainty in fossil fuel stocks only add to the urgency with which we must tackle our excessive energy use. For those reasons, optimizing building performance is a primary objective of many designers.

Canada's Model National Energy Code for Buildings (MNECB) sets a platform from which green-building designers can work to achieve superior energy performance. But why stop there? With today's computer modeling, construction materials and techniques and advanced engineering, it is possible to go far beyond these baselines to design buildings that contribute positively to the well being of our environment. With the right combination, builders now have the power to create a product that goes far beyond these benchmarks.

Net Zero Energy (NZE) is a concept wherein the building produces at least as much energy as

it consumes on an annual basis. NZE buildings usually harvest their energy onsite using various renewable energy technologies such as solar, wind and geothermal power and are often independent from the energy grid supply³⁰. By combining these energy producing technologies with energy efficiency, a building can go beyond net zero and actually contribute to energy savings. NZE is a successful response to increasing pressure to cut carbon output while meeting the demands of a growing population.

Reductions in net energy consumption are also achieved by using construction materials and design techniques that allow for lower energy use. The DCL healthcare facility has adopted some of these technologies in the design of their facility with the intentions of surpassing the new MNECB standard by 75%. The Hemcrete wall, for example, has thermal mass which assists in the temperature contour of buildings in both high and low temperatures. It is also a carbon neutral material, facilitating the potential of carbon neutral construction and reducing the use of petro-chemicals³¹. It also provides low maintenance costs, is fire and pest resistant and boasts high sound absorption.

CASE STUDY

What are the benefits of using Hemcrete®?

Innovative building envelope solutions based on Tradical® Hemcrete® and Breathe™ insulation utilize natural breathable materials to create an unbeatable combination of benefits in the realm of occupant health and comfort, environmental sustainability and reduced energy consumption.

How do the natural properties of Hemcrete® work?

Occupant health and comfort is supported through the elimination of VOC off-gassing, passive stabilization of moisture and heat, as well as natural pest and mold deterrence from the integration of lime and hemp in our breathable wall systems. Environmental sustainability is supported by the use of abundant rapidly renewable materials with low embodied energy, specifically hemp and lime that are both durable and compostable which enables us to realize a truly sustainable cradle-to-cradle life cycle. Reduced energy consumption is supported by the combination of insulation, thermal mass, natural phase-change and air-tightness properties unique to Hemcrete®. Phase-change means that Tradical® Hemcrete® performs like a capacitor, storing and releasing energy in response to temperature variations. Monolithic casting of Tradical® Hemcrete® also ensures the inherent air-tightness of our solutions, to ultimately "seal the deal".

OPPORTUNITY 8: RENEWABLE TECHNOLOGY

Renewable energy is energy generated from natural resources that are naturally replenished. These sources include sunlight, wind, and biomass.

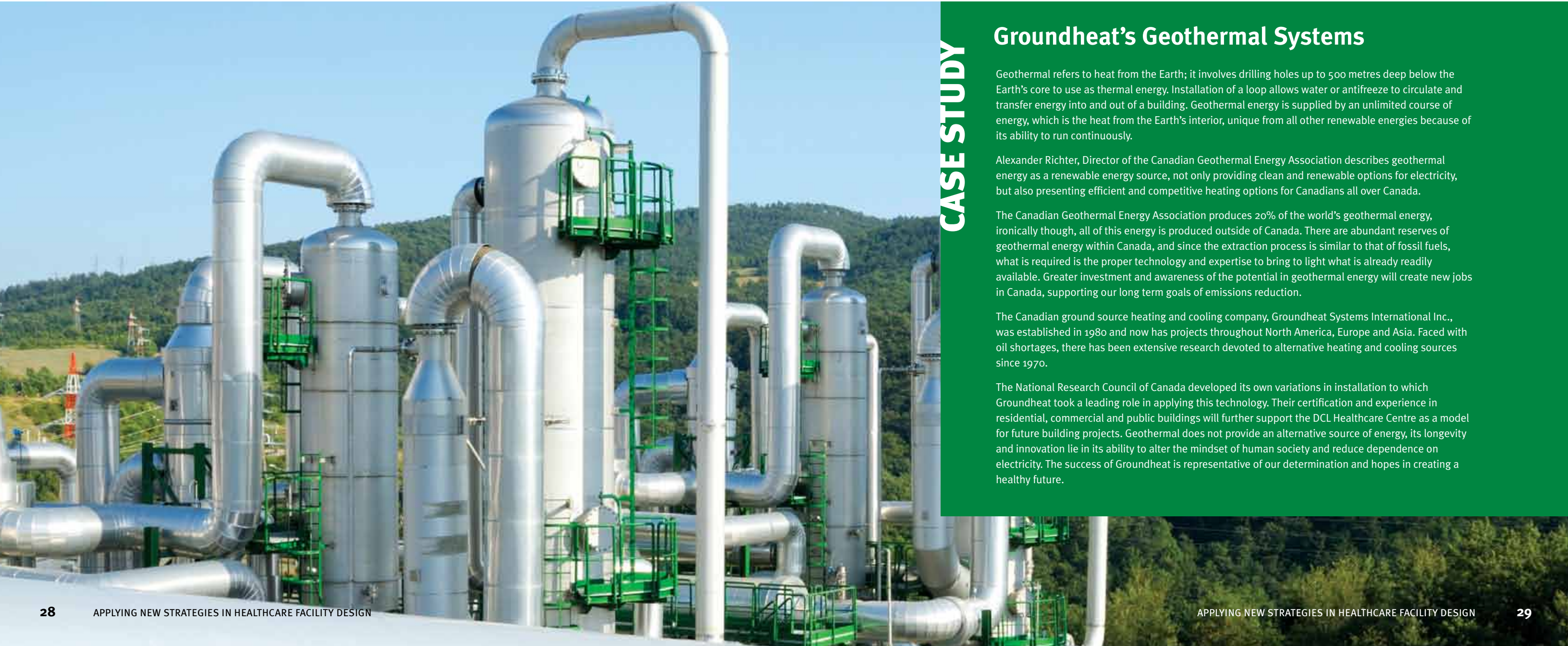
Rising energy costs and tightening regulations on carbon emissions make renewable energy a compelling investment for hospitals. Renewables can help hospitals reduce energy costs and hedge against price increases. Hospitals that utilize renewables stand out among their peers through their commitment to community health, providing leadership in environmental stewardship. Renewables can reduce the impact of hospital operations on power plant emissions and thus have a positive effect on environmental health³². The Ontario Green Energy & Green Economy Act has enabled investment in renewable energy and made it a profitable venture.

RESPONSE 8: THE ONTARIO GREEN ENERGY & GREEN ECONOMY ACT

The Green Energy and Green Economy Act, 2009 was passed to make Ontario a global leader in the development of renewable energy, clean distributed energy and conservation. Since its establishment, the Province has been able to engage communities and build a world-class green industrial sector that protects the environment and mitigates climate change.

The central piece of the Green Energy Act is the feed-in tariff or FIT Program, which is a comprehensive guaranteed pricing structure for renewable electricity production. It offers stable prices under long-term contracts for energy generated from renewable sources, solar, wind, biomass, bio-gas and water power.

The Health sector can participate in the FIT program by installing renewable energy systems, particularly roof mounted PV systems on hospital buildings. Not only would such installations offset the carbon emissions of the building but they will also generate a steady stream of revenue through the long term FIT contracts.



CASE STUDY

Groundheat’s Geothermal Systems

Geothermal refers to heat from the Earth; it involves drilling holes up to 500 metres deep below the Earth’s core to use as thermal energy. Installation of a loop allows water or antifreeze to circulate and transfer energy into and out of a building. Geothermal energy is supplied by an unlimited course of energy, which is the heat from the Earth’s interior, unique from all other renewable energies because of its ability to run continuously.

Alexander Richter, Director of the Canadian Geothermal Energy Association describes geothermal energy as a renewable energy source, not only providing clean and renewable options for electricity, but also presenting efficient and competitive heating options for Canadians all over Canada.

The Canadian Geothermal Energy Association produces 20% of the world’s geothermal energy, ironically though, all of this energy is produced outside of Canada. There are abundant reserves of geothermal energy within Canada, and since the extraction process is similar to that of fossil fuels, what is required is the proper technology and expertise to bring to light what is already readily available. Greater investment and awareness of the potential in geothermal energy will create new jobs in Canada, supporting our long term goals of emissions reduction.

The Canadian ground source heating and cooling company, Groundheat Systems International Inc., was established in 1980 and now has projects throughout North America, Europe and Asia. Faced with oil shortages, there has been extensive research devoted to alternative heating and cooling sources since 1970.

The National Research Council of Canada developed its own variations in installation to which Groundheat took a leading role in applying this technology. Their certification and experience in residential, commercial and public buildings will further support the DCL Healthcare Centre as a model for future building projects. Geothermal does not provide an alternative source of energy, its longevity and innovation lie in its ability to alter the mindset of human society and reduce dependence on electricity. The success of Groundheat is representative of our determination and hopes in creating a healthy future.

The DCL Green Healthcare Centre development is an opportunity to clearly demonstrate that design, construction and building operations can affordably be achieved and do so in balance with the environment. When developments like the DCL Green Healthcare Centre are thought of as integral parts to the broader community, support health and well-being and provide desirable spaces to be in, than this notion of balance becomes a driving force in the development of the project. The DCL team understands the relevance and context of climate and place, how buildings respond to the environment and how the Green Healthcare Centre positively contributes to the greater community and residents to which this centre will serve.

GERRY A. FAUBERT, CET, LEED® AP MANAGING PARTNER AT INTEGRAL GROUP



NEXT STEPS

In summary, the DCL Design Charrette and Workshop was hugely successful, resulting in the first step towards market collaboration aimed at supporting a more sustainable and energy efficient healthcare industry.

The spirited discussions that developed between attendees provided very insightful feedback. In many cases, it was the first time industry leaders from across sectors were able to discuss new technology applications, identify challenges, offer recommendations, and inspire action to build market awareness. Outcomes also accomplished the primary goal of instilling confidence in the project developer that high performance buildings can be achieved on budget and on time.

Through implementing the advanced technologies and opportunities outlined during the Charrette and Workshop, the DCL Medical Facility will establish a landmark facility for the town of Stouffville and lead in the development of sustainable healthcare institutions throughout Ontario. Many unique factors were discussed that could set the stage for a sustainable healthcare revolution over the coming years including:

- By incorporating energy and resource efficiency strategies, the DCL Centre will improve environmental performance while reducing operating costs. By using the world renowned BRE Environmental Assessment Method, we are able to further encourage market transformation of our building and construction sectors towards sustainable design practices while contributing solutions to our current economic and climate change issues.
- The use of energy modeling tools are becoming increasingly more attractive to building developers. The DCL project will demonstrate the effectiveness of next generation tools and showcase “Building Information Modeling” so government and industry associations can consider the application of funding incentives to support wider market adoption.
- Establish the importance of merging environmental performance into the entire building performance targets by investing in sustainable solutions upfront. Programs such as Enbridge’s Savings by Design offer support and expertise to maximize energy efficiency and environmental performance.
- By implementing renewable technologies and lowering energy loads, the overall energy saving levels are improved. The energy efficiency market also gives us the opportunity to innovate and be creative while considering a future where energy is clean, affordable, and distributed through reliable smart-grid strategies

Although there is considerable work ahead, Workshop attendees felt a significant step has been established, paving the way for sustainable healthcare development. Enbridge and Bowerbank & Associates will be working hard in the near future to collaborate with leaders of innovative green technology and support sustainable healthcare developments in Ontario and across Canada.

LIST OF WORKSHOP PARTICIPANTS

AME Corporation	Ontario Ministry of Environment
Ameresco Canada	Osmington Inc.
American Lime Technology	Outside In Design + Build
BASF Canada	Oxford Properties Group
Bowerbank & Associates	Philips Canlyte
BRE Global	Pella Windows & Doors of Ontario
Canadian Mortgage and Housing Corporation	PLANiT Measuring
City of Hamilton	Region of Peel – Energy Office
City of Toronto	Reliance Home Comfort
Cobalt Engineering LLP	Sobeys
DCL Equity Partners Inc.	Stantec
Delcan Corporation	Subaru Canada
Durham Sustainable Energy Association	Sunnybrook Health Sciences Centre
Enbridge Gas Distribution	Sunnybrook Hospital
Energy Profiles Ltd.	Sussex Strategy Group
Evergreen Brickworks	Sustainable Buildings Canada
Foreign Affairs and International Trade Canada	Tactix Government Relations
GE MABE Corporate	Teknion
Green Building & Sustainable Strategies Magazine	The Remington Group
GreenSim	Toronto and Region Conservation Authority
Groundheat Systems International Inc.	Town of East Gwillimbury
Hemp Technology Ltd.	Town of Stouffville
Hydro One	Tridel
IBM	Toronto Waterfront
Innovolve Group	Victory Mechanical Ltd.
InterfaceFLOR	Writer in Residence
London Health Sciences Centre	York Region District School Board
Ontario Ministry of Health	York University
Ontario Energy Matrix	YT Architectural Services Inc.



Transforming markets in Canada towards the use of cleaner technologies and more resource efficient systems takes leadership, foresight and the ability to articulate the issues that affect our social well-being.

ANDREW BOWERBANK, PRESIDENT, BOWERBANK & ASSOCIATES
SPECIAL ADVISOR, DCL EQUITY PARTNERS



FOOTNOTES

Introduction

1 <http://digitaljournal.com/article/298365>, online

2 <http://www.greenenergyact.ca>, online, Oct 1, 2010

3 http://www.airqualityontario.com/press/smog_advisories.php, online, Feb 22, 2012

Healthcare Demographics

4 World Bank Group, Population Growth Rate, <http://www.worldbank.org>, online, Feb 20, 2012

5 UN News Center, World Population to Reach 9.1 billion in 2050, UN Projects, <http://www.un.org>, online, Feb 20, 2012

6 Statistics Canada, Canadian Demographics at a Glance, <http://www.statcan.gc.ca>, online, Feb 20, 2012

7 Ministry of Finance Information Centre, Ontario Population Projections Update, 2010–2036, <http://www.fin.gov.on.ca>, online, Feb 20, 2012

8 Strashok, C., Dale A., Herbert, Y., Foon, R., 2010, Greening Canadian Hospitals, <http://www.sustainabilitysolutions.ca>, online, Feb 20, 2012

9 Drummond, 2012, Public Services for Ontarians: A Path to Sustainability and Excellence, Commission on the Reform of Ontario's Public Services, <http://www.fin.gov.on.ca>, online, Feb 20, 2012

10 Stansfield T., Verner, D., Designing Better Performance, Institute of Industrial Engineers, <http://www.iienet2.org>, online, Feb 2010

Managing the Rising Demand for Healthcare Facilities

11 DCL Equity Partners Inc. by Sustainable Buildings Canada, 2012, Report on the Design Charrette for DCL Green Healthcare Stouffville, Ontario

12 <http://www.oma.org>, online

Integrated Energy Modeling

13 Ontario's Chief Energy Conservation Officer, online, 2008

14 Canadian Green Building Council, "A Business Case for Green Buildings in Canada"

15 Building Strategies & Sustainability, "BIM Raises the Bar: Leading from the Model", online, 2011

16 Marketwire, "PLANiT Measuring Becomes the First and Only Provider of Hydro-Approved BIM-Based Energy Audits", online, 2011

17 Marketwire, "PLANiT Measuring Becomes the First and Only Provider of Hydro-Approved BIM-Based Energy Audits", online, 2011

18 Building & Construction Canada, "Canada's First", 2011

19 Canadian Property Management, "Energy Reduction Made Easy", 2010

Environmental and Overall Performance

20 Russo, M., 1997, "Resource-Based Perspective on Corporate Environmental Performance and Profitability", Academy of Management Journal, 40(3), 534-559.

21 Community of Stouffville Sustainable Development Guidelines, <http://www.townofws.com/pdfs>, online, April 2010

22 <http://www.greenhomebuilding.com/vernacular.htm>, online

Interdisciplinary Decision Making

23 Azhar, S., Brown, J., Rizwan, F., BIM-Based Sustainability Analysis: An Evaluation of Building Performance Analysis Software, <http://ascpro.ascweb.org/chair/paper/CPRT125002009.pdf>, online

24 Building Green: Adding Value through Process, <http://cascadiagbc.org/education/building-green.pdf>, online

SMART Buildings

25 Tom Rand Kicking the Fossil Fuel Habbit

Energy Efficiency

26 <http://www.ec.gc.ca/Publications/7A9oAA8o-8A4B-4335-B9C8-1649D99A2530%5CEnergyEfficiencyInCanadaFinalReport.pdf>, online, Nov 2008

27 <http://www.ec.gc.ca/Publications/7A9oAA8o-8A4B-4335-B9C8-1649D99A2530%5CEnergyEfficiencyInCanadaFinalReport.pdf>, online, Nov 2008

28 <http://oee.nrcan.gc.ca/commercial/4156>, online, Oct 24, 2011

29 http://en.wikipedia.org/wiki/Zero-energy_building, online, Feb 20, 2012

30 http://www.hempcrete.ca/Hemp_House_Benefits.html, online

Renewable Technology

31 US Department of Energy, 2011, Renewables Make a Powerful Case as Hospital Energy Source, http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_renewables_fs.pdf, online, Feb 20, 2012

32 <http://www.sbcanada.org>, online

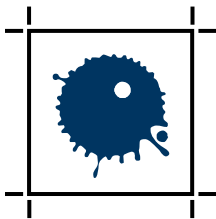
33 Pipeline Newsleter, Volume 33, Number 1, Feb 2012, <http://www.enbridgegas.com/>



ABOUT DCL EQUITY PARTNERS INC.

DCL Equity Partners is a Toronto-based commercial real estate investment firm with a strong focus on the development, construction and management of green sustainable projects. Frank Deluca, CEO, recognized the need for more green healthcare facilities within Canada, and his vision since then has been to design, engineer and build a medical centre that can embrace the kinds of green features that would contribute to health and wellbeing, while also being economically sustainable. This is a continuing journey for Deluca; however, he has already achieved tremendous advancements and support throughout the medical, engineering, and sustainable building communities.

For more information please visit www.dclequitypartners.com



ABOUT BOWERBANK & ASSOCIATES

Over the years, Andrew Bowerbank has successfully led high profile initiatives across Canada and around the world in support of sustainable development, clean technology, energy conservation and resource economics. These experiences prepared him well for his leadership roles in public/private sector relations and international diplomacy. Mr. Bowerbank and his team will now build on these experiences and provide strategic counsel to clients and associates.

Our mission is to help you achieve success in the growing green economy through market development, program design, promotions, and more. We provide consulting services to new initiatives, promote successes to broad audiences, and advance the market adoption of new concepts & technologies in support of a low-carbon economy.

For more information please visit www.bowerbank.co



ABOUT SUSTAINABLE BUILDINGS CANADA

Established in 2002, Sustainable Buildings Canada has a vision to be the leading national agency and coordinating body for buildings and houses with sustainable initiatives. SBC is a non-profit organization aimed to transform the built environment one project at a time. They support providers of training, technologies, programs, tools, and products; as well as various green programs such as those envisaged by Toronto Region Conservation Authority, EnerGuide for houses, and the Federation of Canadian Municipalities.

They promote sustainable building concepts through a number of methods, their most successful being the Design Charrette. SBC has delivered over 40 design charrettes on a variety of projects, including: The SBC Harbourfront Centre charrette, which presented a unique opportunity to engage, educate, and inspire the public in the process. SBC has worked with developers, owners, and managers, providing an instrumental role in changing standard design practices on such elements as in-suite ventilation with heat recovery and greater use of occupant-responsive controls. In some cases the charrette results have caused a paradigm shift in design and operations/maintenance practices.

The Green Building Festival (GBF) is also organized by Sustainable Buildings Canada, bringing the best and brightest in green building innovation under one roof. The event showcases sustainability experts, analyzing green impacts, case studies, product analysis, visionary thinkers, and over 100 exhibitors representing the best technology and expertise for achieving high performance buildings³².

For more information please visit www.sbcanada.org



ABOUT ENBRIDGE GAS DISTRIBUTION INC.

As a leader in energy efficiency, Enbridge Gas Distribution is one of the largest North American gas companies reaching over 1.9 million customers each year. It is through this leadership that Enbridge strives to bring innovative technologies and programs to builders, developers, and owners within the residential and commercial new construction industry.

Recognized as one of the Global 100 Sustainable Corporations, Enbridge focuses on safety, reliability, and best value for its customers. Their mission at Enbridge is to deliver more than the energy people count on, we deliver on our promise to help make communities better places to live³³.

In order to remain a leader in the industry, Enbridge is always developing new programs, supporting research, and implementing state of the art methods in providing more efficient, and cleaner, natural gas technologies. The Savings by Design program, designed for commercial and high-rise buildings, is just one of the initiatives Enbridge is working on to help their customers receive the best value for their energy dollar.

For more information please visit www.enbridge.com

ACKNOWLEDGEMENTS

This report would not have been possible without the dedicated focus of students from York University: Khushpal Brar, Samira Drapeau, Ron Ofer, Nageen Rehman and Tanya Roberts; as well as Mimi Shao of Bowerbank & Associates. The team’s efforts to compile the research referenced in this report, organize the notes from the DCL Design Charrette and Workshop (January 25, 2012), and work with me to coordinate the writing and layout design is very much appreciated.

Thanks to Mary Harinck and her team at Enbridge Gas Distribution, and to Mike Singleton and Bob Bach of Sustainable Buildings Canada for their partnership in hosting the DCL Design Charrette and Workshop.

I would also like to take this opportunity to thank Frank Deluca of DCL Equity Partners. Your vision to provide quality facilities with the latest technologies to the healthcare community in Canada and beyond should be highly commended by all. You came to me with an idea that I knew had an opportunity to make a real impact in the marketplace, it is my pleasure to put all of my resources and experiences behind you. I am proud to be a member of your Board. This is only the beginning!!

Andrew Bowerbank

Copyright © 2012 Bowerbank & Associates

Photo Credits: Workshop Photos: Pricscilla Aguilera, Pablo Godoy; DCL Building Photos: DCL Equity Partners Inc.; Page 12-13 Photo: Earth Rangers Centre at www.ercshowcase.com; All other photos: iStockphoto.com

The York University task force was brought together for the writing of the report:



Khushpal Brar is a 3rd year undergraduate student in the Faculty of Science and Engineering, majoring in Physical Geography at York University. She has worked with the Institute for Research and Innovation in Sustainability (IRIS) and volunteered at the Earth Rangers Foundation on their Habitat Restoration Project.



Samira Drapeau is an MES candidate whose professional and academic experience has revolved around matters of sustainability in Business Improvement Areas across Toronto. As she strives to succeed in a field that never fails to motivate her, she looks to a future career that will be both challenging and reflective of her enthusiasm for planet-conscious conduct.



Ron Ofer is an energy researcher at the Sustainable Energy Initiative and a York University graduate student. His work involves researching methods of integrating thermal energy grids and combined heat and power plants within conventional city planning. He also lectures students on solar fundamentals and provides training for solar site assessments.



Nageen Rehman has experience researching environmental issues ranging from energy efficiency and carbon abatement projects in Pakistan and Kenya to promoting energy development in Canada. She works part time with the TREC Renewable Energy Co-operative and is currently pursuing an MES degree with a diploma from the Schulich School of Business.

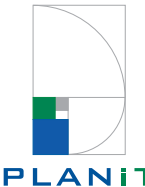


Tanya Roberts is a graduate of the Bachelor of Environmental Studies program. She has worked for the Green Living Show and as a Project Coordinator for York U’s Sustainable Energy Initiative. She has also volunteered for the Design Exchange, Mayor’s Tower Renewal, and is an appointed member of the Town of Ajax Environmental Advisory Committee (EAC) board.



The DCL Design Charrette and Workshop, and this report, were made possible thanks to the generous support of the following organizations:

Sponsored by:

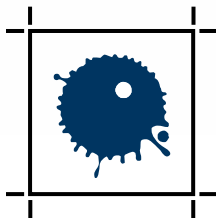


The DCL Workshop was endorsed by:





This report was produced by:



Bowerbank & Associates