



**Classified campus**  
Greening CSEC's headquarters



**Soaring standards**  
Manitoba's striking new look

**MEDIA PLANET**

September 2011

# ENGINEERING & INFRASTRUCTURE

**3**  
ELEMENTS  
THAT WILL LEAD TO A SUSTAINABLE FUTURE



## CANADA'S URBAN LANDSCAPE

Celebrating the ingenuity of our nation's architectural gems and the minds that create them

PHOTOS: TOP: TOM ARBAN, BOTTOM: CICADA DESIGN

MONTREAL'S NEW ACOUSTIC CONCERT HALL  
**OUR WORLD-CLASS COMPOSITION OF DESIGN, BUILD, FINANCING AND OPERATIONAL EXPERTISE**

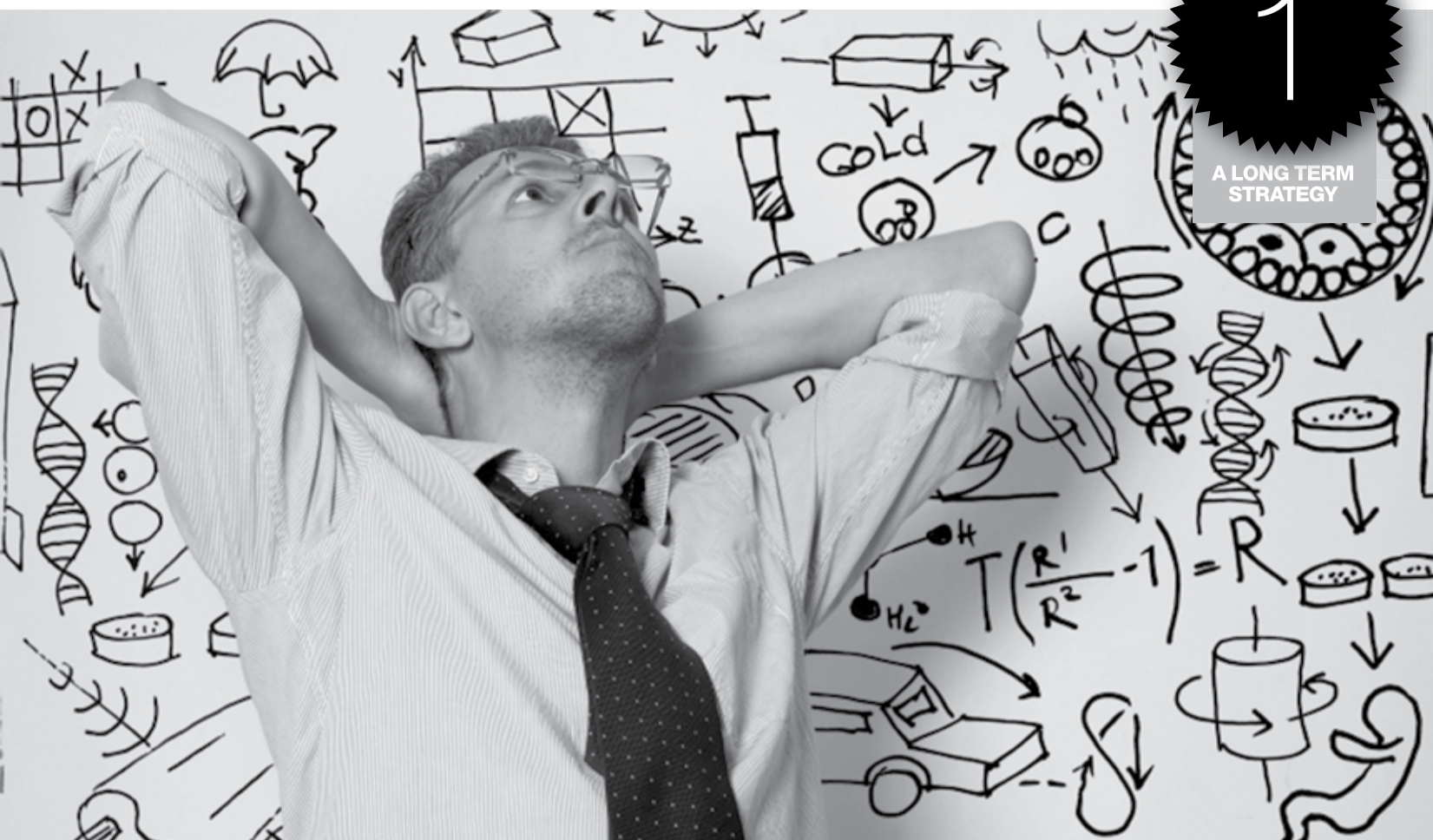


**SNC • LAVALIN**

[www.snclavalin.com](http://www.snclavalin.com)



# CHALLENGES



**ELEMENT**  
**1**  
**A LONG TERM STRATEGY**

**When beauty is married with functionality, sustainability and safety, a space can become a masterpiece.** And it takes the ingenuity and brilliance of Canada's engineering workforce to make a conceptual dream a reality.

## Strategic action is needed for Canada's infrastructure

**T**here is no denying that public infrastructure is a top-of-mind issue for Canadians. Recent structural collapses in various parts of the country have demonstrated what happens in the absence of a long-term infrastructure plan and continued investment. The result: Canadians are questioning the integrity of our infrastructure.

### Have a strategic approach to infrastructure funding

Engineers Canada and its constituent associations have long called for a strategic approach to sustainable infrastructure funding that will help improve quality of life and restore public trust. Engineering work is central to the design, construction and maintenance of all facets of public infrastructure—the buildings, roads, bridges, water treatment and wastewater facilities, power grids and other structures necessary to support the public's well-being and ensure a prosperous future for our country. A strategic funding approach is required to keep our public infrastructure safe and reliable.

Despite recent funding through the Building Canada Plan, if there is

no further coordinated action across all levels of government, the deteriorating condition of our aging infrastructure will continue to threaten the public's health, safety and the environment and impede our capacity to continue enjoying economic growth.

### Have a long-term vision

Not only does infrastructure funding need to be strategic, it must be long-term. It is time to determine our current and future infrastructure needs based on comprehensive assessment and analysis that can ultimately save taxpayer dollars. Accurate planning, monitoring and technical infrastructure performance measures that consider social, economic, environmental and safety implications will help reduce emergency repair costs.

A long-term vision also includes ensuring we have the right people doing the job. Canada needs a diverse and highly skilled workforce to meet the challenges ahead. We must continue to graduate highly-qualified students who will go on to participate in the engineering profession and associated industries. Professional engineers are one part of the team responsible for designing, building and maintaining public infrastructure and we must ensure we have adequate human resources across the



**“Not only does infrastructure funding need to be strategic, it must be long term.”**

**Chantal Guay, ing., P.Eng., M.Env.**  
Chief Executive Officer, Engineers Canada

infrastructure sector.

### Demonstrate leadership

Accomplishing all of this takes innovation, leadership and coordination between various stakeholders, something Engineers Canada has already been doing through its collaboration with government, the profession and industry.

Leadership means assessing situations, anticipating risks and putting plans in place to move forward. There are many variables to consider in order to achieve sustainable infrastructure, including population growth, understanding how people work and live, and their needs, and the vulnerability of infrastructure to climate change.

Engineers Canada is committed to continuing its work with government, practitioners, and other stakeholders to show leadership, provide expert advice and share best practices to ensure we have the safe, reliable, well-planned and well-maintained infrastructure Canadians deserve and need to envision a prosperous future.

*Engineers Canada is the national organization of the 12 provincial and territorial associations that regulate the practice of engineering in Canada and license the country's more than 234,000 professional engineers.*

## The benefits of a growing female engineering workforce

**As a teenager in Timmins, Ontario, Amanda LeDuc wasn't sure what her future held, but she knew one thing: she wanted to help people. Now a student in the University of Waterloo's Management Engineering program, Amanda has gained insight as to why girls are often hesitant to apply for engineering studies.**

"I was leaning heavily toward science, but my dad encouraged me to go in to engineering," she recalls. "I'm glad he did, and I think it would have been an easier decision if I had a better understanding of the profession. Most girls don't know how much engineers do to improve the world and help people. Engineering is much more than buildings, machines, and computers, but

that's not evident a lot of the time."

In North America, many young women have the grades to get into engineering programs and the aptitude to excel, but often don't understand the widespread impact that engineers have on the world. Female engineers have made significant contributions to changing the way we view the environment, healthcare, and manufacturing processes, for example.

### A balanced team

Women and men often bring different approaches to creativity, critical thinking, and collaboration, and the best solutions grow out of that greater perspective. Employers who appreciate the need for diverse viewpoints are looking to balance their teams, and groups such as the Canadian Com-

mittee on Women in Engineering and Waterloo's Women in Engineering Committee are working to get that message out. Programs such as Go ENG Girl are one step in this direction, as are summer camps offered by many universities for students in elementary and high school.

### Guiding tomorrow's leaders

However, the people who can make the biggest impact are the parents and teachers who provide guidance to their daughters and students about career choices. People like Bill LeDuc, Amanda's father, who helped his daughter to appreciate the opportunities afforded to her by engineering.

One year into her studies, Amanda was right where she wanted to be: helping people. On her first co-operative work term, Amanda served as

a project coordinator at St. Michaels Hospital in Toronto, contributing to the ongoing development of the facilities and support services. "The processes are just as important," Amanda says. "You have to get people in and out so that they can get the care they need."

With graduation around the corner, Amanda has a much better sense of the future—both for herself and the women who will come after her. "I want to give younger girls the feeling that they belong here," she says. "There are lots of opportunities. Engineering is a career for a woman."

### RUSSELL WONG

Faculty of Engineering,  
University of Waterloo  
editorial@mediaplanet.com

### DAVID DOW

Diamond and Schmitt Architects

**WE RECOMMEND**

**Soaring standards**  
Manitoba infrastructure receives a boost of vitality, including one of the world's most sustainable airports.

PAGE 4

"...we estimated that the new terminal would have 2,000 tons less carbon per year than the old one, even though it's about 20 percent larger."

**A growing female presence p. 2**  
Why women are a growing force among the engineering ranks.

**Saving the world p. 7**  
Harnessing the power of engineering to create positive change.

## MEDIA PLANET

ENGINEERING & INFRASTRUCTURE  
1ST EDITION, SEPTEMBER 2011

Responsible for this issue:  
**Publisher:** Clayton Hartford  
clayton.hartford@mediaplanet.com  
**Designer:** Penelope Graham  
penelope.graham@mediaplanet.com  
**Contributors:** Ward Alsop, Michelle Donovan, Paul French, Chantal Guay, Ted Kritsonis, Klaus Hartmann, Cahill Pui, Russell Wong

**Photo Credit:** All images are from iStock.com unless otherwise accredited.

**Managing Director:** Gustav Aspegren  
gustav.aspegren@mediaplanet.com  
**Business Developer:** Shannae Ingleton  
shannae.ingleton@mediaplanet.com

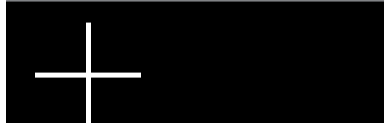
**Distributed within:**  
National Post, September 2011  
This section was created by Mediaplanet and did not involve the National Post or its Editorial Departments.



FOLLOW US ON FACEBOOK AND TWITTER!  
[www.facebook.com/MediaplanetCA](http://www.facebook.com/MediaplanetCA)  
[www.twitter.com/MediaplanetCA](http://www.twitter.com/MediaplanetCA)

Mediaplanet's business is to create new customers for our advertisers by providing readers with high-quality editorial content that motivates them to act.

### DON'T MISS!



## A professional pairing

**The most enduring and satisfying architecture integrates the technical, spatial and aesthetic aspects of building.**

To achieve this result requires the closest teamwork between structural, mechanical, electrical engineers (and other project relevant specialists), and the architect. A successful building requires a dynamic and fluid relationship between the architect and engineer. While in the past the architect performed the role of team leader, this relationship is frequently reversed with today's increasingly complex building types.

It necessitates a more level exchange of ideas and a flatter hierarchy. One obvious example of this new paradigm is the number of recent projects using the Integrated Design Process. A system devised to remove the traditional hierarchical team structure, it attempts to give equal weight to each member of the design team and particularly recognize the importance of engineering in the new sustainable building designs of today. Diamond and Schmitt Architects has successfully used this process on a number of projects to great success—most recently on the CANMET Materials Technology Laboratory in Hamilton, which has been designed to achieve LEED Platinum certification. David Dow is Principal with Diamond and Schmitt Architects.

# DESIGN SHOWCASE

INSPIRATION

## Liveable creation

- 1. AUTOMOTIVE CENTRE OF EXCELLENCE AT UOIT**
  - Location: The campus of the University of Ontario Information Technology, Oshawa.
  - Owner/Developer: University of Ontario Information Technology
  - Architect: Diamond and Schmitt Architects
  - Total area: 16,632-square-metres.
  - Total construction cost: Approx. \$100-million.
- 2. MOHAWK COLLEGE OF APPLIED ARTS AND TECHNOLOGY**
  - Location: Hamilton, Ontario, Canada.
  - Owner/Developer: Mohawk College of Applied Arts and Technology
  - Architect: Zeidler Partnership Architects.
  - Total area: 13,995 square meters.
  - Total construction cost: \$ 16,500,000.
- 3. MONTREAL ACOUSTIC HALL**
  - Location: St-Urbain Street, in the Quartier des spectacles de Montréal.
  - Owner/Developer: Public-private partnership between the Government of Québec and SNC-Lavalin, through its subsidiary Groupe immobilier Ovation, which executed the design, construction and financing of the concert hall, and will provide operations and maintenance services for the next 27 years.
  - Architect: Diamond and Schmitt Architects.
  - Total area: 19,187 square metres.
  - Total construction cost: \$ 259 M.

PHOTOS: 1.TOM ARBAN, 2.ZEIDLER PARTNERSHIP ARCHITECTS, 3. CICALDA DESIGN

# LIUNA



## Ontario Provincial District Council

We are the Union that built the Confederation Bridge in Prince Edward Island, Hibernia in Newfoundland, the 407 highway in Ontario, the Fort McMurry oil sands project in Alberta and infrastructure projects right across this great country, we are LIUNA, 70,000 strong in Canada. Our members are skilled in building everything from tunnels to towers.

We urge government at all levels to continue to invest in building Canada. On behalf of our Vice President Joseph Mancinelli, Tri-Fund Director Cosmo Mannella, our Ontario Provincial District Council, our Locals throughout Canada and our members we want to congratulate MediaPlanet for their work in highlighting the infrastructure deficit and the importance of continued investment in Canada's Future.

LOGISTICS CIVIL ENGINEERING GREEN TECH INFRASTRUCTURE INDUSTRY TEACHING RENEWAL CONSTRUCTION RESEARCH ENVIRONMENT SUSTAINABILITY GEOTECHNICAL SENSING AND INFORMATION TECHNOLOGY



**Discovering the next generation** of sustainable infrastructure and construction techniques and systems is a pressing global priority. At McMaster University's Faculty of Engineering, Dr. Saiedeh Razavi, the Chair in Heavy Construction, has set her sights on advancing innovation in construction processes and techniques for the industrial and infrastructure sector that respect the environment and utilize new sustainable construction methods. It's such an important priority, that a group of thirteen private and public sector partners is funding her work.

And it's one more reason why building a sustainable future starts right here, at McMaster University.

[www.eng.mcmaster.ca](http://www.eng.mcmaster.ca)



## INSPIRATION

ELEMENT

2

TRANSFORM  
OUR TRANSIT  
SYSTEM

**Canada's Midwest has a new look that's anything but mundane.** A major revamp underway in Manitoba cities will bring beauty to the province—and unprecedented sustainability.

# Infrastructure boom: Creating provincial icons

## HOW WE MADE IT

**Many outside Winnipeg may not know it, but the city is going through a renaissance with its new international airport being the centerpiece, and the first of its kind in Canada.**

The new terminal at Winnipeg's James Armstrong Richardson International Airport, which began construction in 2007 with funding from the Winnipeg Airport Authority, is set to open on October 15. While the new-look airport has been built to accommodate bigger planes and more passenger traffic, it was ultimately designed to be one of the most energy-efficient airports in the world.

## Measuring the eco impact

LEED (Leadership in Energy and Environmental Design) is a certification system created by the Canada Green Building Council to measure how environmentally sustainable a building is. This includes energy savings, greenhouse gas reductions, water efficiency and indoor air quality. Points for LEED certification are also

earned when builders use supplies made from renewable or recycled materials, and they are mandated to dispose of all waste through an environmentally-friendly process.

"One way we were able to contribute to lower energy consumption was to provide a high degree of insulation and introduce a displacement ventilation system," says Stanis Smith, senior vice president of Stantec, the firm that designed the airport's sustainability components. "Most buildings have air supplied from above, but displaced ventilation supplies air from a lower level or even from the floor. This matters in an airport because by ventilating from above, the cooling and heating system only really covers a third of the volume of that space. Winnipeg's airport will cover a wider area using less air this way."

## Let there be light

The terminal was also built using a lot of glass as a way to increase the level of natural light beaming in, and to provide views for visitors to gaze at. But the roof is sloped enough to bring in daylight, yet reduce the amount of direct sunlight so as not to increase the amount of cooling needed



## A new direction

■ Airports have been examining ways they can contribute to reductions in greenhouse gas production. Although there are limitations to what can be achieved by this industry sector, in part because of stringent safety and operations requirements, there are ways to apply high-level sustainable design principles to airport projects.

Stantec Inc.

inside.

The heart of the terminal is a large, open atrium space with a skylight above that basically acts as a visitor's arrival into Winnipeg—a grand ceremonial space that connects to the other areas of the terminal. The premise behind this was partly based on the glass-heavy design of Ottawa's newest terminal, Smith says.

## An unprecedented approach

Smith adds that it's hard to put a dollar value on what the LEED-inspired sustainability building practices amount to because of variables that include terminal size, climate and passenger traffic, among other things.

"It's very difficult to quantify exactly how much energy costs are saved without having two airports of the same size running side-by-side," Smith says. "We did a calculation and an analysis of what the greenhouse gas emission reduction would be, and we estimated that the new terminal would have 2,000 tons less carbon per year than the old one, even though it's about 20 percent larger."

Despite all the green initiatives sur-

rounding the terminal's construction, no actual renewable energy elements were applied on the property, be they solar panels or wind turbines, for example. "Sometimes these things are done for optics instead of making a real difference, and we wanted to design this with elements that make sense for the terminal," Smith says.

The airport is part of an infrastructure boom that is positioning the city for the 21st century, Smith adds. This includes the Canadian Museum of Human Rights under construction in the city's Forks area, and the return of the NHL's Winnipeg Jets, who will play out of the MTS Centre, currently undergoing renovations to meet league standards.

"Along with those projects, this terminal will be a real catalyst for the city," Smith says "Railway stations in the 19th century made cities attractive as transportation hubs, and it will be airports doing that in the 21st century."

TED KRITSONIS

editorial@mediaplanet.com

## THE LEARNING EXCHANGE

MOHAWK COLLEGE . CA

future ready

MOHAWK COLLEGE

#1 COLLEGE  
IN THE GTHA

Creating the  
perfect storm  
in the name of  
innovation.

The Automotive Centre of Excellence (ACE) is the first climatic testing and research centre of its kind in the world and is now open for business. ACE is an independent commercial testing facility owned and operated by the University of Ontario Institute of Technology.

UNIVERSITY OF ONTARIO  
INSTITUTE OF TECHNOLOGY

OSHAWA, ONTARIO | www.ace.uoit.ca

BUILDING  
COMMUNITIES

All photos: Winnipeg James Armstrong Richardson International Airport  
Stantec Architecture in association with Pelli Clarke Pelli

Stantec's Manitoba team is comprised of dynamic consulting professionals who provide integrated and sustainable solutions across the entire building spectrum. Our offering of architecture, interior design, facilities planning and operations, buildings engineering, environmental management, program and project management, transportation, urban land engineering, and water consulting services address the complex nature of the urban environments.

Stantec is proud to contribute to local community projects such as the **Winnipeg James Armstrong Richardson International Airport**, Masterplan of Winnipeg's new **Sports, Hospitality and Entertainment** district, Kenaston Underpass, and Waverley West Development.

To learn more about Stantec, go to [stantec.com](http://stantec.com)

Follow us on

Visit our blog at [stantecinc.blogspot.com](http://stantecinc.blogspot.com)

One Team. Integrated Solutions.



**SOARING STANDARDS**  
1-3. Winnipeg's James Armstrong Richardson International Airport was designed to be one of the most energy-efficient airports in the world.  
PHOTOS: GERRY KOPELOW



# CREATING CANADA'S NEXT GENERATION OF INNOVATIVE LEADERS



Carleton University is one of the nation's leading institutions in the study and research of engineering, architecture, industrial design and information technology. Our comprehensive range of programs provides students with an environment that is engaging, diverse and challenging. We have the unique advantage of being located in the heart of the National Capital Region with access to world-class industry and government research and development laboratories.

*Most of the graduate programs are offered through the Ottawa-Carleton Joint Institutes, expanding access to broader areas of research and advanced studies.*

We offer many exciting undergraduate and graduate degrees.

**Bachelor of Engineering in:**

Aerospace, Architectural Conservation and Sustainability, Biomedical and Electrical, Biomedical and Mechanical, Civil, Communications, Computer Systems, Electrical, Engineering Physics, Environmental, Mechanical, Software, Sustainable and Renewable Energy

**Bachelor of Architectural Studies, Bachelor of Industrial Design,**

**Bachelor of Information Technology in:**

Network Technology, Interactive Multimedia and Design, Photonics and Laser Technology (NEW)

**Master's degrees in:**

Aerospace, Biomedical, Civil, Electrical and Computer, Environmental, Human-Computer Interaction, Information and Systems Science, Infrastructure Protection and International Security, Mechanical, Sustainable Energy, Technology Innovation Management

**Master of Architecture, Master of Architectural Studies, Master of Design**

**Doctoral degrees in:**

Aerospace, Architecture, Civil, Electrical and Computer, Environmental, Mechanical

DELIVERING CANADA'S PUBLIC INFRASTRUCTURE FOR THE 21<sup>ST</sup> CENTURY

**innovative  
eco-friendly**



Communications Security Establishment Canada - "Long Term Accommodation Project"

**INNOVATING THROUGH PUBLIC-PRIVATE PARTNERSHIPS**

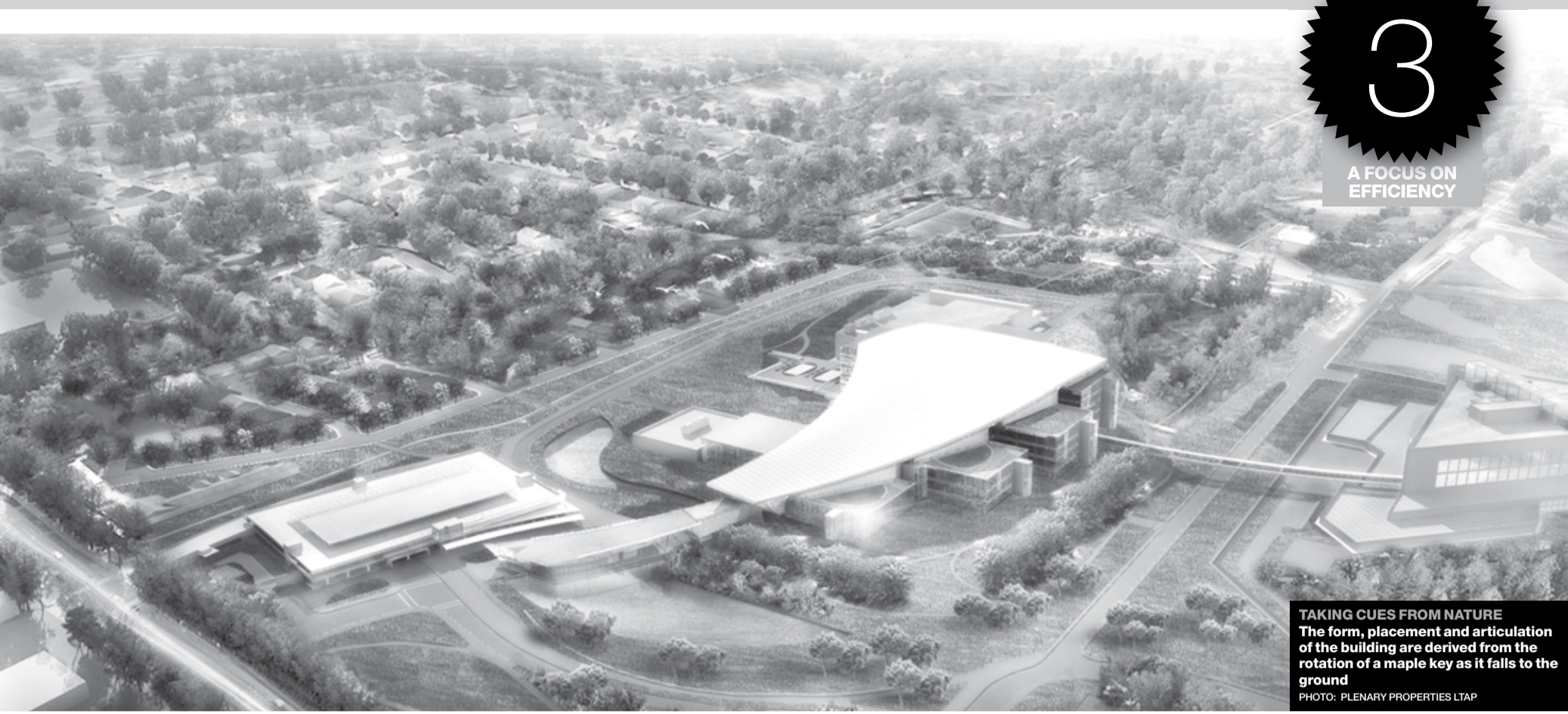
Communications Security Establishment Canada's new headquarters is a public-private partnership with Plenary Properties. Through this partnership, Plenary Properties will design, build, maintain, operate and project finance the new headquarters facility over a 33.5-year period.

Public-private partnerships provide innovative design and lifecycle solutions such as green technologies, efficient use of space, eco-conscious construction techniques, and energy-saving building systems. They deliver better results because they consider long-term maintenance and operations of the facility from day one.

By working collaboratively during the design stage, the architects, engineers, builders and facilities managers can optimize the performance of the facility.

"We knew that having an environmentally-friendly facility was important to us," says Bob Brûlé, Project Lead with the Communications Security Establishment Canada. "We would not have been able to achieve the innovations we are getting through a traditional procurement approach. All indications are that the Public-Private Partnership process will deliver a state-of-the-art facility that exceeds our expectations, yet remains within our budget."

INSIGHT



**TAKING CUES FROM NATURE**  
The form, placement and articulation of the building are derived from the rotation of a maple key as it falls to the ground  
PHOTO: PLENARY PROPERTIES LTAP

Canada's cyber-forces will move into a new campus designed to be **equal parts high security and eco-friendly.**

Eco-conscious cyber sleuths

Communications Security Establishment Canada ("CSEC") is Canada's national cryptologic agency, mandated to provide and protect information for the Government of Canada. CSEC's work includes intelligence support for Allied ground troops and the Canadian reconstruction mission in Afghanistan, the interception of foreign threats to Canada, and the protection of Canada's information technology systems.

**A new facility to accommodate CSEC's growing workload**

After 9/11, CSEC has doubled in size to keep up with the increased activity of international threats to Canada and its allies. CSEC requires a new facility to meet the organization's growing operational requirements and mandate of protecting the safety of Canadians. The Long-Term Accommodation Project will house over 2,000 employees, highly sophisticated equipment and classified information in a secure facility.

"The work that CSEC staff does is chal-

lenging and, with advances in technology, is becoming increasingly complex. In response, the organization needs a facility that promotes collaboration and is agile enough to bring together people from different areas of expertise quickly and efficiently, in order to respond to global events," says Bob Brûlé, project lead for CSEC. "We can't predict exactly how our work will evolve in the coming years, so it's important for us to have a facility that can adapt with us and allow us to be equally responsive in the future."

The facility will be world-class from the perspective of workplace design innovation, access to emerging technology and flexibility to respond to CSEC's changing operational requirements.

Plenary Properties LTAP will design and deliver the new facility and ensure facilities management and IT services over a 30-year period. The consortium includes: consortium lead Plenary Group; builder/construction manager PCL Constructors Canada; design team WZMH Architects (Architect of Record)/ HDR Architecture (associate architect and engineer)/ MMM Group Limited (mechanical, electrical, security, IT design engineer)/ Adjeleian Allen Rubeli

Limited (structural designer)/ Enermodal Engineering (green designer); electrical subcontractor Plan Group; mechanical subcontractor Modern Niagara; facilities manager Honeywell; and IT provider HP.

**Efficiency is a key objective**

From the design development and engineering techniques to the construction approach and operations, CSEC's new facility is a model of efficiency. Each floor of the main building is designed to limit the time it takes to walk to any destination within the facility.

The design of the facility uses the concept of pods, which are standardized and stacked like a LEGO set. This design streamlines construction processes and enables a shortened construction schedule of just 42 months for the 775,000 square ft. building. Each pod is outfitted with a limited number of furniture components which allows flexibility to quickly adapt work teams by changing the configuration of the pods, without additional construction.

"Being able to reconfigure the furniture is only one aspect of the flexibility in this facility," says Brûlé. "The underlying technology infrastructure

will support these reconfigurations making it almost seamless, but it is also being built with the flexibility to accommodate new and emerging technologies as we move forward—a tremendous asset from our point of view."

**Green design**

Because the computer systems they use are so energy intensive, CSEC insisted that the facility itself compensate by being as green as possible and incorporating sustainable design. It has been designed to achieve LEED Gold certification and meet BOMA BEST certification during the operating phase.

The facility is designed to integrate into the heavily wooded surrounding lot. The local community will benefit from the enhancement of existing nature trails. Trails inside the secure perimeter can be used by employees for jogging/biking and cross-country skiing. Many of CSEC's employees prefer to bike to work. To support this healthy lifestyle choice, 250-plus bike racks will be provided at the site, along with showers. Access to public transportation was also included in the layout of the site.

High thermal performance walls

of windows fill the facility with natural light to reduce the building's electricity consumption, while the windows' low-e coating reduces air condition requirements. Rainwater collection ponds reduce the facility's consumption of water for irrigation. Grass, plants and trees cover the site, instead of asphalt and concrete, reducing storm runoff and retention of heat. As well, solar panels supply enough renewable energy to meet 135 percent of the power requirements of the shipping and receiving building and further reduce the electricity needs of the entire facility.

Indirect free-cooling has been incorporated into the mechanical systems to cool parts of the facility at a fraction of the cost and energy requirement of conventional cooling systems. Through the application of this and other green building systems technologies, energy consumption is expected to be reduced by up to 40 percent compared to the model national energy code for buildings—standard building practice.

KLAUS HARTMANN  
editorial@mediaplanet.com

Can engineers save the world?

The acacia trees are blooming outside the office where Duncan McNicholl meets with Aaron Chabonda, the District Water Officer for Karonga in Malawi. Almost 30% of the water-points in this district - the hand-pumps and taps that grace the pages of non-profit brochures - are broken or poorly located. Duncan is here to discuss the implementation of a monitoring and mapping tool that will help local civil servants identify which water-points need fixing and where new wells should be placed. The tool, designed by Engineers Without Borders Canada (EWB), is already helping other Districts provide secure access to water for literally thousands of Malawians.

**One systemic problem at a time**

The general public may wonder why an engineering graduate isn't drilling wells or building infrastructure, but Duncan believes his work represents the true potential of his profession. "Engineers solve systemic problems," he says. "A well is only as good as the human and technological systems that keep it working. My job as a global engineer is to strengthen those systems."

He's not alone—there are other EWB teams in Malawi, Ghana, Burkina Faso and Zambia, all working to create systemic change by helping local leaders, governments, entrepreneurs and communities, to build local solutions in the fight against poverty.

**Engineering for the planet**

Back in Canada, the idea of a global



Ward Alsop  
Fundraising and Communications Manager  
Engineers Without Borders Canada  
www.ewb.ca

engineer is a major component of EWB's work. "We believe that engineers have a bigger role to play in the world," says George Roter, EWB's co-founder and CEO. "As the complexity of our work grows, it's easy to lose that connection. We're working to strengthen it through relationships with universities and professional associations across the country."

EWB sees Canadian engineers as a potential army of change-makers, and is working to unlock their potential. It's quietly succeeding. In 2010 alone,

EWB reached 15,000 engineering students through in-class workshops. These modules are designed to foster an enhanced sense of social responsibility and ethics, an entrepreneurial mindset, and to develop the ability to apply systemic solutions in complex problems.

**Canadian education, world-wide results**

The University of British Columbia offers a course on locally relevant technology selection that's based entirely on EWB learning modules. At Memorial University in Newfoundland, Andrew Fisher, associate dean of undergraduate studies, says that EWB's efforts are "greatly enhancing our ability to graduate Global Engineers who are prepared to face the complex challenges of tomorrow." In total, 250 engineering faculty members, teacher's assistants

and administrators across Canada support EWB's global engineering curriculum.

While Duncan and Jacob speak in Malawi, a new class of young engineers receives an education enhanced by his experiences and insights in Canada. It's a remarkably comprehensive approach to poverty elimination—from work in Africa to education that prepares the next generation of change-makers. It's also a source of pride for many professional engineers, who see a familiar and relentlessly pragmatic problem-solving approach being applied to global poverty, one of the world's biggest problems.

To learn more about EWB Canada and the global engineering program visit [ewb.ca/globalengineer](http://ewb.ca/globalengineer).

WARD ALSOP  
editorial@mediaplanet.com

HARNESSING THE POWER OF THE NEXT GENERATION

**A group of five McMaster students are working to build a more sustainable future by better harnessing the next generation of green energy technology.**

Nathan Cox, Varun Goyal, Deepak Gidwani, Piyush Patel and Aekam Sodhi, all fourth-year computer engineering students, have spent more than 2,000 hours developing a system to help solve the problem of intermittent energy supply from wind and solar.

The Dynamic Demand Controller

works by moderating power to household electrical devices, such as refrigerators, which can cause strain on the power grid. A micro-controller monitors grid frequency through a standard power outlet, and when generation is greater than demand, due to a gust of wind, for instance, the controller tells the electrical device to turn on. When generation is less than demand, the controller tells the electrical device to turn off. For appliances such as refrigerators, a sensor ensures food is kept at safe temperatures.

"Four of us spent time working at

Hydro One, so we saw first-hand the challenges of connecting wind and solar power to the energy grid," said Goyal.

"Wind and solar power don't provide constant power output, so backup generation has to be used," said Cox. "But backup generation is expensive and creates pollution. We think the Dynamic Demand Controller could be the answer to this problem."

Besides reducing the need for expensive backup power, typically produced by natural gas turbines that kick in when solar and wind power is low, by making appliance operation "smarter",

the Dynamic Demand Controller better complements the grid and allows more renewable power to be connected. By stabilizing the power grid in this way, dependence on carbon-emitting resources could be substantially reduced.

The Dynamic Demand Controller is just one example of sustainable engineering initiatives currently being studied at McMaster. Rafael Kleiman, a professor of engineering physics, is leading a project to develop the next generation of solar technologies that will be more efficient and less expensive, and Jim Cotton, associate director

of the McMaster Institute for Energy Studies, is working with Pizza Pizza to develop heat recovery units that use and store a portion of the 90 percent of the energy wasted from the chain's pizza ovens. McMaster's campus is also home to a bus shelter lit at night by solar energy gathered by day in flexible solar strips that conform to the curved roof of the shelter.

MICHELLE DONOVAN  
McMaster University  
editorial@mediaplanet.com

# Big Multi-Nationals Want to Chip Away at Ontario's Electricity Transmission Company



By Don MacKinnon  
*President  
Power Workers' Union*

Twice in the past eight years, Ontario's government faced stiff public opposition to the privatization of Hydro One, the provincially owned transmission company. Now a stealth effort is underway to accomplish the same goal – one that will compromise service quality, reliability and safety while driving electricity costs even higher.

Some of the same big foreign companies that are already major beneficiaries of Ontario's huge wind and solar subsidies want to own and operate expansions of the transmission lines to connect green energy. The Ontario Energy Board (OEB) has already granted some new transmission licenses while other applications are pending.

Recently, Hydro One has been criticized for delays in connecting small solar projects to the grid. From the outset, evidence suggested that in many instances the connections could not be made without jeopardizing the reliability of the system locally. The system upgrades would be numerous, expensive and would take time to assess and complete. The province's highly generous microFIT incentives drove the number of connection requests to an overwhelming 12,000-plus. Yet, the government gave Hydro One no choice, "directing it" to deliver. Besides being a good example of politics overcoming common sense, it also created an unfair impression of the company's operational capability while generating sympathy for new "out-of-province" network players.

Since Sir Adam Beck founded the company in 1906, the provincially owned Hydro One (formerly the Hydro Electric Power Commission of Ontario, then Ontario Hydro) has reliably, safely and affordably delivered electricity to Ontario homes and businesses while generating significant economic prosperity. Today, Hydro One's assets include 30,000 kilometres (km) of high voltage lines and associated transformer stations; 26 interconnections with neighbouring provinces and states; and over 123,000 km of distribution wires serving 1.3 million customers, mostly in rural areas.

The synergy between transmission and distribution assets throughout the province allows for strategic location of skilled work crews with sufficient resources to respond quickly to system problems and storm damage.

Well over 1,300 highly trained and mobile Hydro One Power Line Technicians and more than 1,000 employees in the electrical forestry group, stationed throughout Ontario, maintain both transmission and distribution power lines. They also respond to storm damage like the 1998 Ice Storm and many serious weather related events every year.

Hydro One receives oversight from the provincial government, public committees and the OEB. New transmission players, although subject to OEB regulations, do not receive the same level of public scrutiny.

How then will Ontario consumers know if the new players are delivering a good deal? What impacts will these new entrants have on Hydro One's continuing ability to leverage assets for the benefit of the public and consumers? Clearly, system maintenance and storm repair capability will be compromised and that means service quality to the customer is compromised.

Ironically, tax incentives that have been in place for years are designed to encourage municipal distribution companies to merge with one another to achieve cost reductions through economies of scale and duplication of bureaucracies.

Carving up Hydro One will provide no benefit to the customers or the province and would

jeopardize service. Once again, as in the Green Energy Act initiatives, multi-national companies are the real winners.

Sustaining and growing Ontario's economy requires transparent planning and sound investments.

- Renew and expand our electricity grid
- Renew and expand our clean hydroelectric and nuclear generation
- Recycle our existing coal stations to use carbon-neutral biomass supplemented by natural gas when needed for peak demand
- Utilize carbon-emitting natural gas generation for peak demand only
- Implement cost effective conservation and demand management programs

These are the best approaches to ensure Ontario continues to have one of world's most reliable, lowest-carbon and lowest-cost electricity systems.

## ANOTHER TROJAN HORSE FOR ONTARIO'S ELECTRICITY CONSUMERS

So far, the tens of billions Ontario has spent on intermittent wind and solar energy is not delivering the promised benefits to the environment or the economy.

Instead,

- Ontario's long standing, competitive electricity prices are rising unnecessarily
- Ontario has chosen to become dependent upon carbon-emitting, price volatile natural gas generation to back-up intermittent wind and solar farms
- Natural gas generation is now used for much more than peak demand
- Ontario will not meet its greenhouse gas targets
- When gas supplies are short, Ontarians will pay more for electricity and heating
- Big multi-national corporations are the real winners

Now Ontario consumers face another threat.

Some of these same foreign companies want to chip away at Hydro One, the province's transmission company, under the guise of competition.

Ontario is now approving licenses for new transmission companies that could result in a piecemeal hodgepodge of privately owned transmission lines.

Since these new companies won't receive the same government oversight, who will ensure that Ontario consumers get a good deal?

What about Hydro One's ability to leverage its assets for the benefit of its owners, all Ontarians?

Troy learned too late that gifts are not always what they seem. It's time to tell your elected representatives to keep Hydro One viable and growing for the benefit of future generations of Ontarians.

For more information please go to a [www.abetterenergyplan.ca](http://www.abetterenergyplan.ca)

**From the people who help keep the lights on.**

