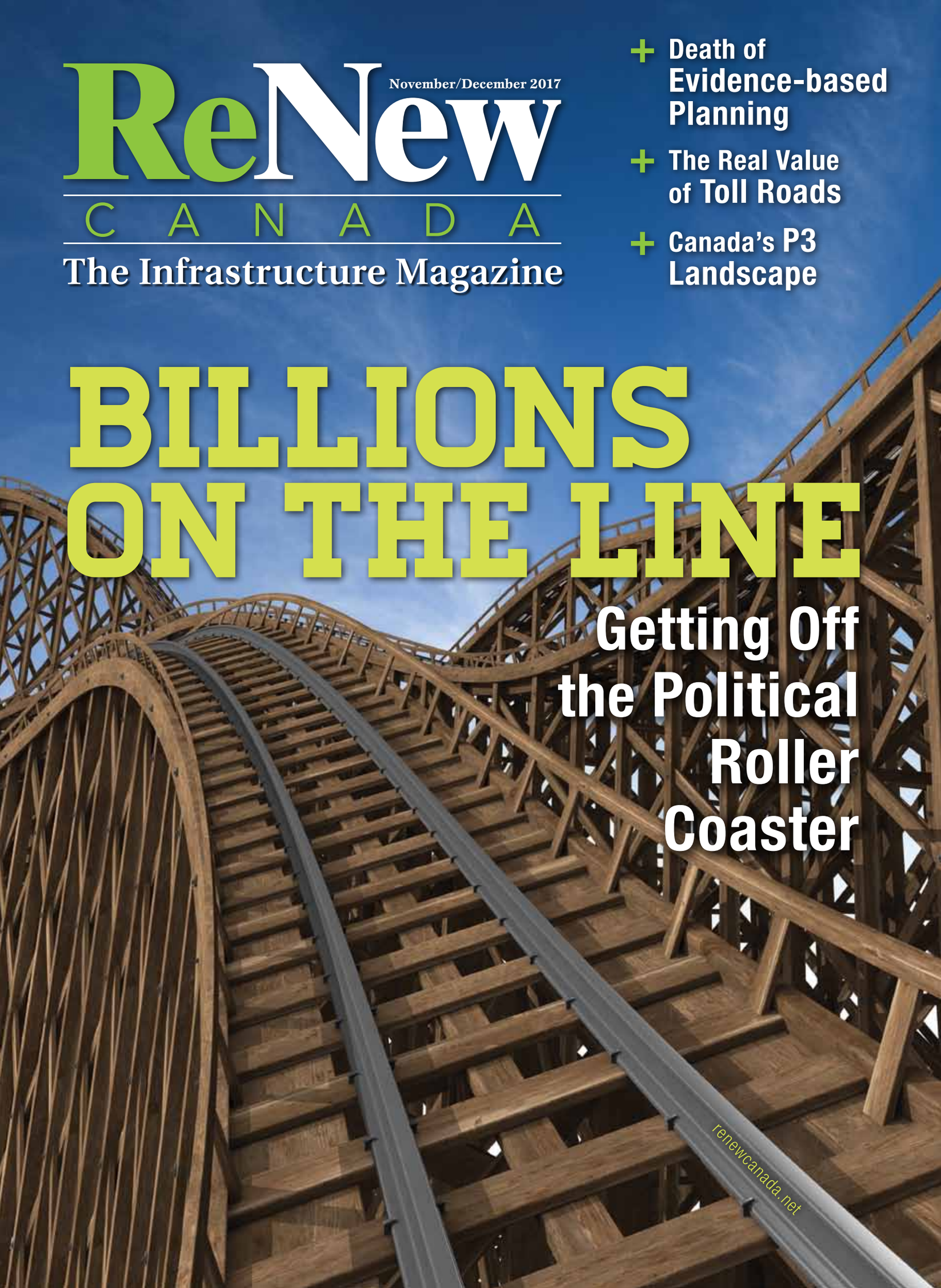
ReNew CANADA
November/December 2017
The Infrastructure Magazine

+ Death of Evidence-based Planning
+ The Real Value of Toll Roads
+ Canada's P3 Landscape

BILLIONS ON THE LINE

Getting Off the Political Roller Coaster



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WHAT ABOUT CHURCHILL?

By Andrew Macklin

You may have missed the ugly situation that has been unfolding in the small town of Churchill, Manitoba.

In May, rail service to the town was suspended indefinitely due to severe flooding and washout conditions. Combined with the closure of the port in 2016, this important hub for environmental study and eco-tourism has become cut off from the rest of the province.

You would think that it would just be a matter of making immediate repairs to the rail line to get service back running and remove the community from isolation. But that's not the case. The rail line is owned by an American company, Denver-based OmniTrax Inc., who announced that they were not prepared to spend the money necessary to repair the line, with chief commercial officer Peter Touesnard stating that "We cannot justify spending the resources to repair the line […]" during a July 18th media conference.

The media conference was held to provide an update on the extent of the damage to the line. In a media release dated June 9th, the company stated that the track bed had been washed away in 19 spots, five bridges were visually damaged, and an additional 30 bridges and 600 culverts needed further assessment for structural integrity. Then at the July 18th event, AECOM Canada rail expert Ron Mitchell presented the findings of the full assessment of the rail line, with a cost range of $20 million to $60 million (later pegged at $43 million) to complete the repairs. That was a price too steep for OmniTrax to accept. Instead, it wanted the government to cover the cost.

After several weeks of no movement, Manitoba Premier Brian Pallister extended an offer to the federal government: cover the cost of fixing the railroad and re-opening the port, and the province would pour $500 million over the next decade into resources for Churchill.

This whole ugly scenario begs several questions: How did a large stretch of railroad, one that provides vital links to otherwise-stranded remote communities fall at the mercy of an American company? And now, faced with financial adversity over the cost of repairs, why should government be forced to foot the bill to bail out their investment?

Regardless of whether or not you can find legal or personal justification for the company's actions, the fallout from this ordeal could set dangerous precedents for this country. Because, if a government does foot the bill for the repair, Omnitrax walks away with a (potentially) profitable asset that cost nothing to fix, reaping all of the financial rewards of the repair. What's to stop any other company from expecting the same? Why spend the money on repairs when you can force someone else to?

Immediate action is needed. No government should pay for this repair, but no government should have allowed the sale in the first place. If there was no legal way to block the sale, well, perhaps it's time to consider some new laws to ensure this doesn't happen again. The fate of an entire community is at stake because of this.

Who will step in and save Churchill?

Andrew Macklin is the editor of ReNew Canada magazine.

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ABOUT THE COVER

Capital spending on infrastructure needs to be consistent, not based on election cycles. Find out more on what needs to change on page 8.

B.C. BUDGET UPDATE

The Government of B.C., under the leadership of premier John Horgan, has issued its first budget update stating financial priorities for the months ahead.

The Budget Update outlined current public sector infrastructure investment commitments:

$2.6 billion for **post-secondary institutions** to build capacity and help meet the province's future workforce needs in key sectors, including science, trades, and technology;

$3.1 billion to expand and upgrade **health facilities**. These investments support new major construction projects and upgrading of health facilities, medical and diagnostic equipment, and information management/technology systems; and

$1.4 billion to support investments in maintaining, upgrading, or expanding **ministry infrastructure**, such as courthouses, correctional centres, provincial office buildings and information systems.

The update also included a list of projects within the **public sector infrastructure** space, valued at **$50 million** or more. This includes projects in the education, health care, energy, transit, and transportation sectors.

Also included an announcement that the province's **carbon tax** would see an increase of **$5 per tonne** as of April 1, 2018.

NEXT ISSUE: JANUARY/FEBRUARY

Top100 Overview
Analysis of the Top100 Projects report

Q&A with Minister Sohi
One-on-one with minister of infrastructure and communities Amarjeet Sohi

Outlook 2018
What will make news in 2018

Send your letters to the editor to andrew@actualmedia.ca

WHY ENGINEERS MUST HELP SHAPE PUBLIC POLICY

By Jonathan Hack

In Canada's House of Commons, members with engineering backgrounds hold only four per cent of the 338 seats. In Ontario, the situation is even worse. At Queen's Park, home of the Legislative Assembly of Ontario, fewer than two per cent of the members are professional engineers, and not a single engineer is in the current governing party.

Why should this be a concern? Because the issues facing Ontario, Canada, and the world are increasingly complex and technical in nature. Engineers have a scientific understanding of the world in which we live, meaning they appreciate how people and systems interact over the total lifespan of projects. Engineers have an ability to simplify intricate problems and are skilled developers of evidence-based decisions and scenario analyses.

The gap exists at the policy formulation stage, particularly when it comes to critical, technically-sophisticated ministerial portfolios such as infrastructure, innovation, and the environment and climate change. Because non-technical politicians and their staff are first to devise and review new government initiatives, a significant amount of planning and consideration is given to policy ideas before engineers in the Ontario Public Service have the opportunity to review these proposals and offer recommendations.

Just as lawyers have been historically predisposed to entering politics, engineers have largely been dissuaded—but these trends are changing. The engineer of old was routinely told that their central role was to serve and protect the public. But by failing to shape policy, engineers aren't fully fulfilling their duty.

Without any doubt, engineers need to serve—but they also must lead. Engineering programs at McMaster University and the University of Ontario Institute of Technology now offer combined engineering and public policy degrees to teach critical leadership and communications skills. All of Ontario's engineering schools are working to equip graduates with the tools to not only analyze problems and develop solutions, but also explain solutions to a non-technical audience, work collaboratively with professionals from different backgrounds, and communicate to the public how society will be positively impacted.

As a result, Ontario's engineering students and graduates are now becoming increasingly engaged in politics. By positioning the modern engineer on advisory boards, provincial governments stand to reap immediate benefits from their technical and strategic understanding of processes, how things work together, total costing, and a number of other considerations that influence the creation of good public policy. Engineers are bound by a code of ethics regarding duty of care and protection of the public interest. These are the qualities that the public wishes their politicians would better embody, and engineers stand as ready participants.

For the future of our province, it is critical that government and the public recognize how important engineers are for the prosperity and growth of our communities and the quality of life Ontarians enjoy.

Organizations like the Ontario Society of Professional Engineers exist to ensure that engineers are not being undervalued or disregarded in the public sphere. In order for governments to avidly invest in engineers, they must recognize our capabilities as innovators, wealth creators, and leaders.

Jonathan Hack is the president and chair of the Ontario Society of Professional Engineers.

Alberta Renewable Electricity Program Reaches RFP Stage

Alberta moves one step closer to its target of 30 per cent renewable energy by 2030 as round one of the Renewable Electricity Program enters the request for proposals stage.

The Alberta Electric System Operator (AESO) has invited national and international companies to participate in the final stage of the competition. A total of 29 projects qualified to advance to the request for proposals stage, representing approximately 10 times the number of megawatts targeted for the first round.

"Round one of the program has attracted strong national and international interest in developing renewable generation in Alberta," said Mike Law, senior vice president and chief operating officer of AESO. "Each stage of the competition has surpassed expectations, positioning the province well to meet the 30 per cent renewables target by 2030."

Successful bidders will provide a target of 400 megawatts of renewable electricity at the lowest cost to consumers, or enough to power up to 170,000 homes. The projects are required to be operational by the end of 2019.

In total, the Renewable Electricity Program will support the development of 5,000 megawatts of renewable electricity capacity by 2030. The program is expected to attract at least $10.5 billion of investment into the Alberta economy and create more than 7,200 jobs for Albertans.

More information about the Renewable Electricity Program is available from the Alberta Electric System Operator at *aeso.ca/rep*.

Ontario Seeking Design Concepts for Hydrogen-Powered GO Trains

Ontario is electrifying the GO rail network to transform how people move around the Greater Toronto and Hamilton Area (GTHA), and is seeking design concepts for Hydrogen-powered trains as an alternative to conventional overhead wires.

Through the GO Regional Express Rail (RER) program, Ontario will deliver faster and more frequent electrified rail service on core segments of the GO rail network and UP Express. As part of planning the electrification, Ontario is undertaking a feasibility study on the use of hydrogen fuel cells. Recent advances in the use of hydrogen fuel cells to power electric trains in other jurisdictions makes it important that Ontario consider this clean electric technology as an alternative to conventional overhead wires. The Hydrogen Rail (Hydrail) Feasibility Study will inform a decision on how Ontario will proceed with the electrification of GO rail services.

"This announcement is a critical step to helping us understand the possibilities of using hydrail on our network," said Robert Siddall, acting president and CEO of Metrolinx. "This procurement process will allow Metrolinx to identify partners with Bi-level EMU experience and capacity to integrate a hydrogen fuel cell system into their Bi-Level EMU products."

A number of rail vehicle manufacturers will be commissioned to prepare designs and to demonstrate the impact that incorporating hydrogen fuel cells into bi-level trains would have on the performance of the GO rail network. This work is an important part of studying the feasibility of hydrail.

The province has issued a Request for Proposals (RFP) for concept design work to show how a hydrogen fuel cell system could be integrated into a Bi-level Electric Multiple Unit (EMU) train.

An EMU train is an electric-powered train consisting of multiple self-propelled carriages linked together. An EMU does not require a separate locomotive, as electric motors are incorporated in each carriage. Examples of EMUs currently in service include the Heathrow Flyer in the UK, the AGV in France and the TTC's Toronto Rocket subway trains.

The Hydrail Feasibility Study is anticipated to be complete by the end of 2017, with a decision on electrification technology to follow.

Canada Approves Ambassador Bridge Enhancement Project

The Government of Canada has announced that it has approved the Canadian Transit Company's application for the proposed Ambassador Bridge Enhancement Project spanning the Detroit River between Windsor and Detroit to replace the existing bridge. In addition to approving the Canadian Transit Company's application, the Government is moving forward expeditiously with the Gordie Howe International Bridge project.

The project will see the construction of a six-lane bridge to replace the 87-year-old current Ambassador Bridge, as well as an expansion of the Ambassador Bridge's associated Canada Border Services Agency facility.

"The construction of the replacement

(*Continued from page 6*)

Ambassador Bridge together with the Gordie Howe International Bridge project will ensure that Canadians continue to benefit from the efficient movement of people and goods at this crossing while providing infrastructure improvements for the local community," said Marc Garneau, minister of transport.

Under Canada's *International Bridges and Tunnels Act*, the project is subject to conditions that will ensure the efficiency, safety, and security of the crossing and mitigate the impacts of the project on the local community. The conditions include the dismantling of the existing bridge when the replacement bridge is open, improving local infrastructure, creating new public green spaces, and protecting the environment and considering Indigenous interests.

The Windsor-Detroit gateway is comprised of the Ambassador Bridge, the Windsor-Detroit Tunnel, the Detroit-Windsor Truck Ferry, and the Detroit River Rail Tunnel. It is the busiest commercial land border crossing between Canada the United States, handling more than 25 per cent of the overall Canada-U.S. trade per year, and approximately 30 per cent of the trade carried by truck.

In 2015, 2.5 million trucks carrying over $120 billion in two-way trade crossed the Ambassador Bridge. It is also the second busiest passenger vehicle crossing, with 4.2 million vehicle crossings in 2015.

$360 Million Committed to Yukon Resource Gateway Project

Prime Minister Justin Trudeau and Yukon Premier Sandy Silver have announced over $360 million in combined federal and territorial funding to improve road access in two mineral-rich areas: the Dawson Range in central Yukon and the Nahanni Range Road in southeastern Yukon.

In total, the Yukon Resource Gateway Project will help upgrade over 650 kilometres of road and build or replace numerous bridges, culverts, and stream crossings. Better road access will help Canadians and local businesses take greater advantage of the economic potential of Yukon's natural resources, and set the stage for the long-term development of the territory's growing mining sector.

"The Resource Gateway is one of the most significant projects ever undertaken in this territory and will have an incredibly positive impact on the Yukon economy," Silver said. "I'm pleased to see the Government of Canada's commitment to the Resource Gateway project. With this commitment, we will continue working with First Nations to complete the project agreements. First Nation agreement is essential to the continuation of the project and we look forward to working in partnership with them on this milestone development."

In the Dawson Range, four separate public road systems will be upgraded. Improvements to the Nahanni Range Road will include upgrades from its junction with the Campbell Highway to the border between Yukon and the Northwest Territories.

In support of the Yukon Resource Gateway, the Government of Canada has committed to contributing up to $247,381,000 to this project. Following the development of project agreements with affected First Nations and environmental and socio-economic review, the Government of Yukon will contribute up to $112,802,000.

The Government of Canada funding is being made available through the New Building Canada Fund—National Infrastructure Component.

Online at renewcanada.net

VIDEO: Springbank Off-stream Reservoir project. **bit.ly/OffStream**

REPORT: Planning could save Ontario billions on infrastructure. **bit.ly/OntSave**

Credit: IERHA

NEWS: Selkirk Regional Health Centre opens. **bit.ly/SelHealth**

Credit: Rick Radoll

VIDEO: Eglinton LRT tunnel—one year later. **bit.ly/EglinLRT**

GETTING OFF THE ROLLER COASTER

Lessons from Ontario in building a better market for infrastructure.

By David Caplan

Election year is the traditional time when the air smells of fresh paint and asphalt, newspapers headlines announce funding for school repairs and new hospitals, and if you listen very carefully you can hear the sound of ribbons being cut. In British Columbia, they even have a term for it, Black Top Politics, with key ridings getting fresh asphalt to show the government working for them. Around the world this roller coaster approach to funding infrastructure is just one thing that has held the infrastructure sector back. Decisions made by governments shape the market for infrastructure and if we are to get better value in the long-term governments need to change their ways.

I was fortunate to be appointed the first minister of infrastructure in Ontario back in 2003, one of the first in the world in fact. In that role I saw a familiar pattern. After every election each ministry would be allocated money for the next four years to deliver all the promises splashed across the election campaign. Once things had settled down, capital spending was the first pot of money to get raided if operational budgets had gaps to fill. Then in the run up to elections capital budgets opened up again. For a ministry and sector with long timelines this approach made little sense, but it was a reality of government.

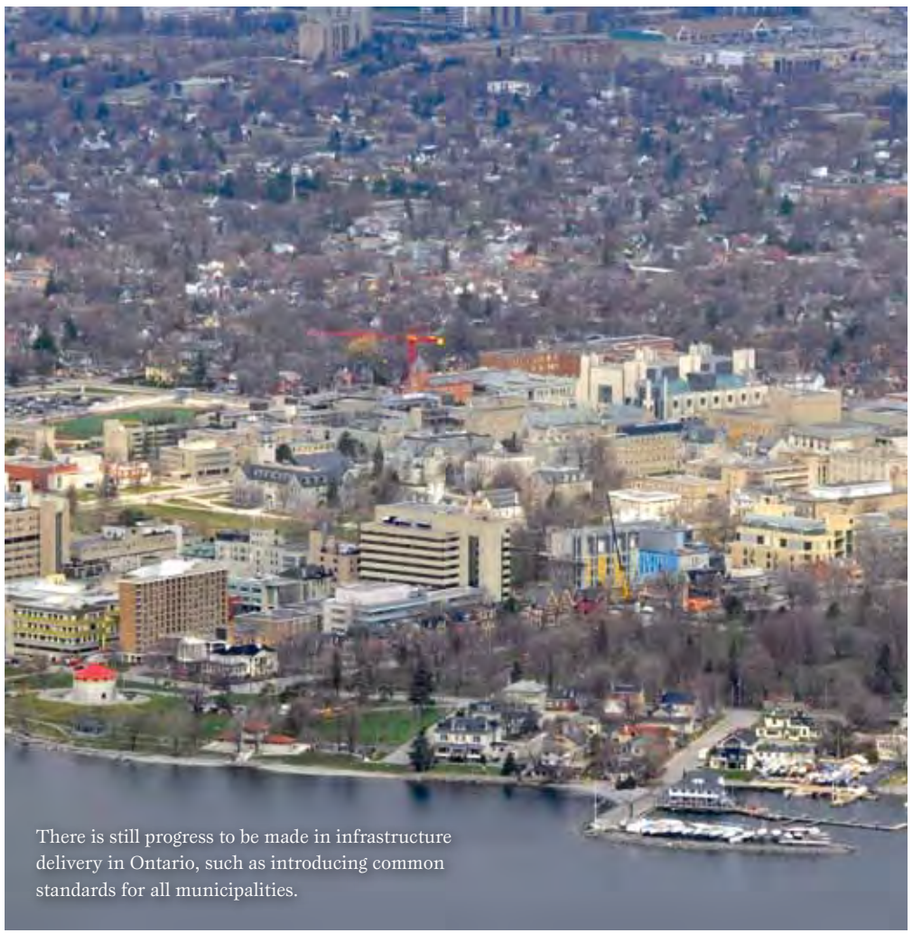
This was not the only challenge. Ontario faced several challenges in delivering infrastructure. Challenges that are not uncommon elsewhere: the ever-present budget pressures; a track record of spiralling project costs and delays; and a lack of coherent planning. To top it all off building infrastructure just was not popular for politicians—committing to something that the next guys get credit for and dealing with the negative headlines if things go wrong.

> Delivering infrastructure takes time, but Ontario has seen a pretty spectacular transformation over the last 10-15 years.

This pattern is not unique but it is one that needed to be broken. To do that in Ontario we looked at the whole system to see how much we could change. Here are some of the lessons picked up during that time that could be used elsewhere:

1 **Driving change:** The infrastructure ministry needs to be the one driving action. To do so it needs to be a central agency with oversight of others and not operate in a silo. Given that all ministries have capital spending, and their actions are all linked in some way, they need to be coordinated. As originally envisaged the Ministry of Public Infrastructure Renewal was designed to steer rather than row the boat, as a ministry it does not need to be full of people, it just needs to provide direction and coordination working with ministries with capital budgets, and make sure actions are being taken.

2 **Selling a vision:** Faced with another raid of the capital budget, our ministry was faced with presenting a box of cobwebs as our contribution at budget time when it came to new project announcements or spending commitments. We had to be creative and collated all the capital spending across ministries and instead announced a $30 billion commitment over five years. The public response to this commitment was



There is still progress to be made in infrastructure delivery in Ontario, such as introducing common standards for all municipalities.

very well received and stable infrastructure investment became the smart political move. In many respects, it changed the landscape. Any government serious about investing in infrastructure needs to present a vision that inspires the public.

3 Promising stable investment: In 2005 we introduced Renew Ontario, which provided a coordinated view of where the province should focus its infrastructure efforts around population and economic growth. Stable, long term infrastructure plans provide certainty for industry and residential investment. Having the confidence that multiple projects are in the pipeline to bid on encouraged companies to invest in equipment and skills for the long term, it also attracted new market entrants. This stability and predictability is absolutely critical.

4 Providing focus: Ontario is three times the size of Germany, and without some restrictions on where to build, there will inevitably be sprawl. This sprawl makes it very costly for governments to deliver services and infrastructure. While Renew Ontario provided the investment plan, Places to Grow provided a framework for future growth and land use. This helped protect farmland, and promote more intensive development around population centres. It also shaped decisions on where to locate transit and other public infrastructure, like sewer mains, schools, and hospitals.

5 Having the tools: To break the cycle of project cost overruns needed a fresh approach, which is where Alternative Financing and Procurement (AFP) came in (the province's public-private partnership model). Sharing risk between the public and private sector helped to break that cycle as contractors were now responsible for delays and had to deliver on what had been quoted. There are numerous problems with a low-cost bid approach that sees less focus on quality, and profits often being made through change orders as work is carried out. Having AFPs as a tool helped inject some reality into bidding and provided confidence that the price being paid was fixed. Another effective tool was the Ontario Strategic Infrastructure Financing Authority, which provided loans to municipalities and the broader public sector.

6 Having access to the talent: Finally, having a body like Infrastructure Ontario was critical. As an agency Infrastructure Ontario became a centre of excellence in government for delivering infrastructure on time and on budget. It was also important that it could access a mix of skills, including bringing in external talent as needed to develop, negotiate, and oversee AFP contracts it required—the types of skills found in the private sector.

Where we are today

Delivering infrastructure takes time, but Ontario has seen a pretty spectacular transformation over the last 10-15 years. A lot of the progress has been as a result of the changes above, but there are still areas where the government can play a positive role:

- Common standards: There are 444 municipalities in Ontario and different building codes and standards for virtually all of them. The province could also do with standardizing things like contracts. To raise quality and reduce costs across the board requires greater uniformity and a major consolidation of those codes, standards and the paperwork that goes with them. This is difficult to do as many municipalities are fiercely protective of local standards, but it is an issue that ultimately needs to be addressed.
- Unlocking the pension funds: Ontario's public pension plans lead the world in infrastructure investment but have been hesitant to invest at home. Two things are primarily cited by funds as reasons for not investing in new build infrastructure—the equity stakes are not big enough, and the risk in the construction phase in particular is too high. It will be interesting to see how the Canada Infrastructure Bank tries to solve this challenge and attract other private finance. A major challenge will be identifying assets with revenue streams.
- Consensus-based decisions: It is hard to be fully objective in developing infrastructure priorities—how do you compare a new hospital in Ottawa to a transit line in Hamilton? But given the frequency of elections and the timespan of projects, more should be done to ensure large scale priority projects have a sound business and community case based on expert opinion, and there is some degree of political consensus on that major project list. This could avoid costly cancellations every change in government.

The coming year is election year in Ontario. In June 2018 the province goes to the polls, then in October it is the municipalities' turn. When it comes to infrastructure, the aftermath of elections can spell danger and sometimes opportunity. Thankfully there seems to be consensus across party lines on the need and the value of investing in infrastructure. Governments bear a great responsibility for the efficiency and productivity of the infrastructure sector, we have come a long way, but we can still do more.

David Caplan is the vice-chair of Global Public Affairs.

Credit: Infrastructure Ontario

The Davenport Diamond project represents Infrastructure Ontario's 100th AFP project.

Credit: Infrastructure Ontario

Credit: ReNew Canada

Building Kingston's Providence Care hospital involved taking advantage of Infrastructure Ontario-managed assets.

As important as processes are, IO's success ultimately relies on people, our partners and our own, across both the public and private sectors.

DELIVERING PUBLIC INFRASTRUCTURE

What we've learned from the Alternative Financing and Procurement model.

By Ehren Cory

Earlier this summer, Infrastructure Ontario (IO) reached a significant milestone when we brought our 100th Alternative Financing and Procurement (AFP) project to market.

We are incredibly proud for having reached such a milestone in less than 12 years since our first AFP project went to market. Those 100 projects—with a capital value totaling more than $45 billion—represent a province-wide renewal and modernization of hospitals, courthouses, and significant new transportation projects including highways and light rail transit lines. Today, in communities across the province, more than 60 of these projects have reached substantial completion and are now in service. For decades, consistently delivering high-quality infrastructure on budget and on schedule has been a significant impediment to sustained infrastructure investment. Here in Ontario, the province's 13-year, $190-billion commitment to public infrastructure is in part a testament to our track record of more than 95 per cent of projects on budget and nearly three-quarters on time to their original completion date.

Beyond 100 projects

Looking ahead, we have taken the opportunity to consider how we build on our success as we deliver our next 100 projects. As you will see in IO's Market Update this year, the province has tasked us with a significant workload on all fronts. Ambitious transit projects such as Metrolinx's Regional Express Rail program continue to progress. The province's infrastructure investment also includes significant new investments in hospitals and justice facilities.

For us, the number and diversity of projects in the pipeline reinforces the need to evolve and continue refining modern project delivery methods. Large project delivery is complex and public authorities delivering projects should constantly be reviewing their track record and adjusting to incorporate new innovation and experience. We have learned many lessons—things like, how proper upfront planning can avoid expensive changes during construction; how empirical data and improved budgeting processes can help us make informed decisions; and developing new ways to link payments to completion of projects and the achievement of key milestones in ways that incentivize performance but minimize financing costs are examples of our approach.

Choosing the right partners and people

In order for us to deliver on the robust pipeline of social and civil projects we have been tasked with bringing to market, we need the best in the industry—big and small, local and international—to team up with us and successfully deliver on these many important public projects.

It is critical that the public sector select highly competent private sector partners who can be counted on. We seek out the best partners from around the world. By requiring local knowledge as a key component of any partnership, we create opportunities for companies closer to home to participate in our program. We can only maintain our reputation if we continue to hold ourselves, and our partners, to the highest standards. By doing so, we are aiming to hold up IO's work as the gold standard of project delivery, both for cost-effectiveness and quality.

An important part of that principle is to ensure our procurement process is a leading example of best practices for openness, fairness, transparency, and competitiveness. A key component of our efforts to continuously raise the bar is focused on the performance of our private sector partners. Our Vendor Performance Program was launched at the beginning of this year. It is an important part of our procurement and contract management framework. The program establishes a standard approach for evaluation of vendors' past performance that can be considered as part of a vendors' bid on future IO work. The program sets out clear expectations and benchmarks. It encourages vendor responsibility and accountability. It is central to promoting our business culture of continuous improvement—and that benefits both vendors and IO.

Smarter solutions for the toughest challenges

Your needs are changing rapidly, and your challenges are transforming the way you operate. You need a partner who is proactive, one who can identify the larger, long-term issues affecting you. We combine technical expertise with the courage to challenge conventional thinking. To help you transform the world.

Together we can build positive change.

Contact us at **hatch.com**.

HATCH

As important as processes are, IO's success ultimately relies on people, our partners and our own, across both the public and private sectors. The depth of expertise and breadth of skills at IO is what makes us truly unique. Our project delivery team includes engineers, accountants, architects, project management, lawyers, and many more professionals necessary to procure and oversee the many projects we have underway at any time. Add in the land-use planning, realty, property and facilities management, procurement, transaction finance, heritage, actuarial, and other skills that fuel the success of our lines of business, and you get a sense of the talent pool within our walls working on behalf of the people of Ontario. By partnering with best-in-class partners in the private sector, we are able to leverage the expertise of their people to execute and deliver on our priorities and programs.

More than infrastructure

Since our first project was put out to market in 2005, IO has taken on a broader mandate and additional responsibilities. We have become not only builders of public infrastructure, but stewards of publicly owned real estate and infrastructure more generally.

As our early AFP projects have entered into service, we have increasingly stepped into a role in the operations phase—helping project owners to manage the maintenance of their assets, leveraging the performance-based commercial elements of the AFP contract to ensure long-lasting, high-quality infrastructure. More broadly, on behalf of the province, our real estate division oversees Ontario's portfolio of government buildings and land, which is one of the largest and most diverse in the country—expertly managing everything from modern courthouses to award-winning energy-efficient government buildings to vacant properties that we can sell for revenues to support government priorities. This year, IO will spend over $600 million on building operation and maintenance. We will spend an additional $300 million on capital repairs and leasehold improvements to the government's overall real estate portfolio. These are smart and necessary investments in real estate assets that serve communities across Ontario. We are constantly looking for new and innovative ways to rejuvenate and reduce our portfolio for the benefit of the public sector—and the public purse.

Another considerable milestone we reached recently came thanks to our lending program. As of late last year, we had approved more than $8 billion in loans to about 380 clients. These loans help municipalities build hockey rinks, water treatment facilities, affordable housing units, and hundreds of other projects that make a real difference to the residents of a community.

Add all of these responsibilities together and a much more significant opportunity arises. By combining all of this work more strategically, we are able to leverage real estate in a way that benefits Ontario communities much more significantly than one AFP project or smaller building upgrade on its own.

Making an impact in communities

The West Don Lands, east of Toronto's downtown, offers a perfect example of what all parts of IO can do to help transform a neighbourhood. For so many decades, this parcel of land was a derelict brownfield. IO led the work that ultimately unlocked the economic potential of 80 acres of land.

That work included removing more than 800,000 tonnes of soil from the site. A new flood-protection berm made development possible on an additional 80 acres of land. It

also protects a flood plain that includes much of the existing downtown core.

As always, our success in transforming the Don Lands came as a result of working collaboratively across the public and private sectors. We worked across multiple levels of government and with partners like Waterfront Toronto to develop and realize a clear vision. We engaged the expertise and capabilities of the private sector to deliver that vision. This award-winning community is now creating considerable jobs, adding property tax revenues for the city and province, and drawing even more investment to the area.

Our work in Kingston demonstrates how we can use our significant real estate holdings toward that goal of increasing its benefit to the community.

Construction on Kingston's Providence Care Hospital was completed late last year. This new, modern facility provides a spectrum of care, particularly for the area's aging residents. It was constructed using IO's made-in-Ontario P3 model, just like Kingston General Hospital in 2011.

The property on which Providence was built is part of a much larger, 122-acre site that IO manages on behalf of the province. When we developed a master plan for that property, we aimed to satisfy not only provincial requirements, but those of the surrounding community as well. That broader thinking, and community mindset, helped identify the opportunity for the new Providence facility to be developed on the site.

We have also partnered with various Kingston non-profits by providing low-interest loans to support their own smaller, but crucial, capital projects in the areas of community health and social services and affordable housing and have financed numerous projects with Queen's University. The City of Kingston is one of IO's larger loan clients with over $300 million in approved loans for a wide variety of projects including Kingston's new police headquarters.

The sum of all that work adds up to a far more meaningful and significant contribution to Kingston than each initiative viewed on its own.

There are many other examples like this—in London, Toronto, Kitchener-Waterloo, Cambridge, Guelph, Ottawa, and more.

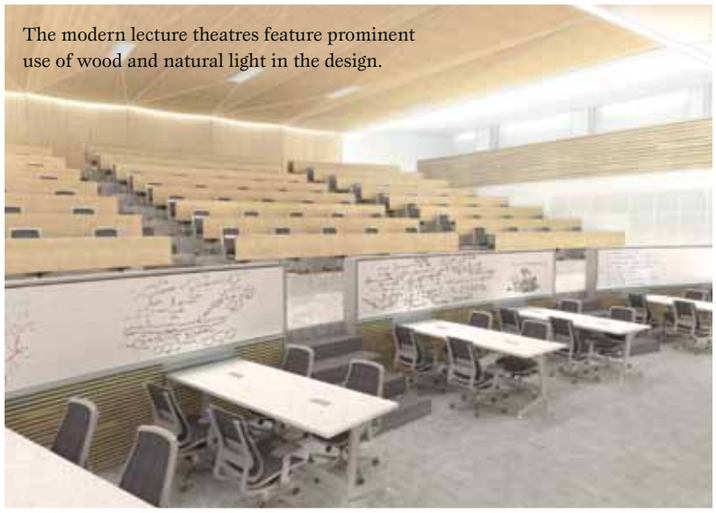
Assets that are surplus to the government's needs become an opportunity to support other government infrastructure priorities. Most recently, we managed the sale of both the LCBO headquarters along Toronto's Queen's Quay and OPG's downtown Toronto headquarters. In both cases, the properties were sold for higher than their projected value—yielding over $750 million. The net revenue from those deals support critical new and modernized public infrastructure.

IO uses a number of tools to deliver on its responsibilities. We take a pragmatic approach toward a pragmatic goal—leverage our expertise to modernize public infrastructure and enable the government programs that serve the people of Ontario.

Ultimately, however, the ingredients of our success are simple: talented people, good partners, and strong programs. With those three Ps, we are confident that our next 100 projects will continue providing the infrastructure that serves the people of Ontario in so many ways and adds up to more than the sum of its parts.

Ehren Cory is the chief executive officer of Infrastructure Ontario.

Credit: B+H+ mcCallumSathe



The modern lecture theatres feature prominent use of wood and natural light in the design.

Credit: ReNew Canada

Progress on the construction of the Mohawk College net zero energy building circa summer 2017.

AN EDUCATION IN ENERGY

Working to learn and build net zero energy at Mohawk College.

By Andrew Macklin

"It's an ambitious timeline," said Tony Cupido, building and facility manager for Mohawk College in Hamilton, Ont. "There are other net zero builds out there but not on this scale and not on this timeline."

Indeed, the college is faced with a significant change in the development of Canada's largest institutional net zero energy project, just over 90,000 square feet in size. From September 30th of 2016, when shovels officially hit the ground at the site, the project has just 23 months before welcoming thousands of students to the new facility.

The Joyce Centre for Partnership & Innovation was a result of a successful application from the spring of 2016 to the Strategic Infrastructure Fund, the federal government program targeted at stimulating growth and renewal of infrastructure at post-secondary institutions. The net zero energy target, according to Cupido, was a "strategic initiative to set our application and project apart from others."

The site itself in nestled within a small plot of land on the north side of the Mohawk College Fennell Campus, formerly a green space and outdoor walking path for students to navigate from the main parking lot to the I-Wing, home to the McKeil School of Business.

Getting started

The design work for the new centre was awarded to a team of B+H Architects and mcCallum Sather Architects. To get started, the team put some rigour into figuring out what the building would need to look like from an energy standpoint. Within the first week, an energy budget of approximately $520 per square foot was established, and the client (Mohawk College) was told that they needed to stick to that target in order to achieve net zero energy.

"It's the first time in 30 years in the industry where the energy budget was established, essentially, in the first week," explained Joanne McCallum, co-founder and director of mcCallum Sather. The target, based on extensive research done by the team, laid the foundation for the way of thinking early on in the project.

On the Mohawk College side, the aggressive target was met with "no resistance," according to Cupido, who was surprised by just how well everyone embraced the target. He explained that previous attempts to achieve the energy targets needed for LEED Silver and LEED Gold buildings at the school were met with significant resistance.

Building energy resources

Due to the size of the rooftop footprint of the building's exterior, it was understood that just covering the centre's roof with solar

panels would not provide the energy capacity needed. There was adjacent property available for geothermal wells, so 24 wells were dug at a depth of 180 metres to provide additional energy resources.

However, those two resources still did not meet the demand of the new centre, which will see upwards of 1,000 or more students using the building at peak times, so the college had to look for other opportunities within its current footprint. The result was the ability to attach solar panels to the rooves of two of the wings of the campus.

But there was a hitch. The A-Wing had the right surface conditions to be able to utilize solar energy, but because of the weight of the roof already in place, the building would not be able to support the panels. So, the college deferred some of its maintenance budget, and Cupido and his team were able to locate a lightweight insulated concrete solution for the roof. Cupido estimated that new solution reduced the weight of the roof by upwards of 60 per cent per square feet, allowing the college to place as many solar panels as it wanted on the roof of the wing.

Challenges expected

With a tight timeline to reach substantial completion, there is an even greater emphasis on ensuring that the integrated team is able to work together.

That starts with the design and build team responsible for executing the project on time and on budget, no matter what adversity occurs. On this project, weather has been a major challenge, with 34 days lost to precipitation as of August 3. In the planning phase, there was a cushion of just 21 days lost due to weather factored in. But thanks to the collaborative effort of the entire team, most of that time has already been made up.

"You cannot effectively deliver something like this without having a team that is really pulling together as an integrated team, really working hard to solve problems," McCallum said.

"From an owner's perspective, some of that is a leap of faith," Cupido said, "Even if you know all of the consultants, contractors, subs, et cetera, having them all work together cooperatively is never a guarantee.

There is also the team within the college that need to work together cooperatively to achieve the demands of a net zero energy building, which requires a swift cultural change amongst the college's s taff and students.

"Right now we are starting the process of helping with some philosophical and cultural changes, creating paradigm shifts for students, staff, occupants, and others," Cupido said. That means changing years of habits involving energy use, such as the removal of unnecessary plugloads like space heaters and fridges, turning lights and computers off when they are not in use, and setting room temperatures both when occupied and unoccupied.

"It reflects the cultural shift we all have to go through as we move towards a net zero society," said McCallum. "Which means, we all have to be accountable for our own energy use."

An education in energy

The people most likely to hold the college accountable will be its own students, as the centre will become an active teaching tool. Cupido envisions that students will be able to track energy use in the building, whether it be through an online program or app-based platform. That will allow the students to become invested in the targets set for overall energy use.

That tracking could evolve into students taking over the energy operation of the centre, be it through a capstone project or a new course developed to compliment the facility.

The new building is also one of 16 participating in the Canada Green Building Council's (CaGBC) Zero Carbon Pilot Program. The program is a two-year pilot of the CaGBC's new Zero Carbon Building Standard. The information received from the pilot project will […] inform the further development of the standard as well as tools, resources and education to accelerate market transformation."

"Being part of the pilot helps open us up to scrutiny, review, and partnership where we're all going to grow in this together," said Cupido. "We're on learning on this project; there's no template that says this is exactly the way to do it. But after the pilot, I think there will be some good case studies that say 'if you're really interested in this, this is how you do it. Here are the issues, here are the challenges from the earliest conception and planning stages right through to the operations.'"

Andrew Macklin is the editor of ReNew Canada magazine.

A Building Like No Other

Building an asset that does not function like anything else around it, but still compliments everything in the immediate area, it was a difficult challenge for the design team.

"[The centre] has a simple but dynamic design," said McCallum. "It doesn't look the same as anything else along the streetscape."

According to Kevin Stelzer, lead architect for B+H, "the engine of the building is the sun, and we wanted that to be very clearly expressed."

With an expansive curtain wall on the leading edge of the façade, the natural light will pour into the north side of the building, providing natural heat for those inside.

For the roof, Stelzer explained that the college became excited about the concept of green terraces as part of the outdoor features, even though the space would need to be a renewable energy generation point. As a result, large photovoltaic structures will be put in place, supported by steel beams, which will act as canopies for the terraces below, while also protecting the terraces from the weather.

To learn more about the construction of these design elements, visit *netzerocollege.ca*.

Summary of Planned Building Systems

The following list provides a summary of the primary aspects of the project that are helping to meet the net zero energy objectives of the Joyce Centre for Partnership & Innovation: (Source: Canada Green Building Council)

- High-performance building envelope to maximize heating, cooling and natural light
- Green roof with extensive planted areas
- Solar panel array (4,345 m^2, 500 kW)
- Solar thermal array (50 kW)
- Geothermal wells (24 x 180 m deep)
- Variable refrigerant flow heat pumps system
- Storm water harvesting (342,000 L)
- Sensor-controlled LED lighting
- High-efficiency plumbing fixtures
- Energy target of < 75 ekWh/m^2/annum

The Toronto and Region Conservation Authority new headquarters is one of the 16 projects involved in the Zero Carbon Pilot Program.

Credit: DTAH

THE NEXT FRONTIER

The new Vancouver Fire Hall, the only emergency services building among the 16 projects, demonstrates the diverse building types that are part of the Zero Carbon Building Pilot program.

Credit: CaGBC

Setting a new standard for Canada's building sector.

By Mark Hutchinson

In December 2016, the Pan Canadian Framework on Clean Growth and Climate Change cited sustainable buildings as one of the means to attain reductions in GHG emissions, specifying measures to help drive down the industry's emissions. This watershed moment for the green building industry put a spotlight on building performance as a critical solution to climate change.

Changing the conversation

Building on the industry's progress, the Canada green Building Council (CaGBC) has been working to spearhead the next evolution of green building, aimed at meeting the needs of the emerging low-carbon economy. Launched on May 29, the CaGBC's Zero Carbon Building Standard is a critical step toward mitigating building emissions. As Canada's first green building program to make carbon emissions the key indicator for building performance, the standard positions Canada in an elite group of countries working on similar initiatives, including Australia, France, Brazil, and the U.S.

Recognizing carbon emissions as a key indicator of building performance is an important and fundamental shift for our industry. To date, regulators and those incenting carbon emission reductions (including CaGBC) have focused on energy efficiency—however the most important factor in the carbon footprint of a building is often not its energy performance, but the carbon intensity of the electricity and fossil fuels used. Recognizing the differences in regional electrical grids and fuel choices is therefore critical to accurately assessing environmental impacts and guiding investments.

The CaGBC Zero Carbon Building program reinforces the importance of energy efficiency, while also driving careful choices about the types of energy used and encouraging more renewable energy generation both on the building site and offsite.

Industry needs to take notice

CaGBC is not alone in expanding from a strict focus on energy efficiency. Regulators are increasingly recognizing the importance of addressing building emissions holistically, and carbon is bound to become increasingly important to both new construction and the operation of existing buildings. For example,

the City of Vancouver's updated Green Buildings Policy for Rezoning includes greenhouse gas intensity requirements, and Toronto is considering the same. On the existing buildings front, the Government of Ontario recently mandated energy and water reporting for large buildings, and others are planning to follow suit; it is not at all inconceivable that carbon emissions will also be part of reporting and disclosure requirements at some point in the future. Finally, all Canadian provinces will soon be impacted by one form or another of carbon pricing, changing how different forms of energy impact operating costs.

Leaders that are quick to address building emissions will benefit from recognition while future-proofing their assets, positioning themselves for long-term savings and securing their place in the growing low-carbon economy.

Simplicity and flexibility

The ultimate measure of success is the actual volume of carbon emissions from building operations year over year. In order to recognize the inherent limitations of existing buildings, the requirements of the CaGBC's Zero Carbon Building Standard have been kept minimal, focusing primarily on the key outcome: reduced carbon emissions. Cost effectiveness is enhanced by providing the flexibility to drive carbon reductions by whatever means make the most sense for a given building. This can include energy efficiency measures, fuel-switching, and generating renewable energy on the building site or off-site.

The themes of simplicity and flexibility also apply to the requirements for the design of new construction projects. Recognizing that the design stage provides a unique opportunity to make decisions that will yield reliable long-term carbon reductions, a couple of key design elements were incorporated in order to guide industry. Specifically, there are requirements for thermal energy demand intensity (a measure of the building envelope and ventilation strategies) and for on-site renewable energy generation. Both of these strategies are going to be key to meeting carbon emission reduction targets in the long run.

Shifting the focus to emissions and providing flexibility to meet a zero carbon balance creates an opportunity to apply new approaches, technologies and products, spurring Canadian innovation along the way.

One step at a time

Carbon emissions are going to be a key metric of building performance going forward, both for environmental and economic reasons. The CaGBC, through the release of the Zero Carbon Building Standard, is providing commercial, institutional, and multi-family asset owners and managers with a framework, developed through extensive industry consultation, which allows them to begin the process of transitioning to the low-carbon economy of the future.

The standard is not intended to overwhelm with the possible challenges of immediately achieving a zero carbon balance. Rather, it aims to raise awareness of the growing importance of carbon emissions, provide a framework for assessing those emissions, and inform strategies to reduce them.

To start learning about zero carbon for your buildings, visit *cagbc.org/zerocarbon*.

Mark Hutchinson is the vice president of green building programs for the Canada Green Building Council.

The Northwest Territories is "punching well above its weight" when it comes to P3s, with multiple successful projects including the Stanton Territorial Hospital (under construction).

Credit: Bird Construction

P3s ARE THRIVING!

Successes are being realized from coast-to-coast.

By Mark Romoff

Canada's infrastructure sector is bracing for a boom. Federal, provincial, and territorial governments have recently committed to historic investments with a long-term view to address the national infrastructure deficit and to build new and needed assets.

But amid the early announcements and commitments, the public-private partnership (P3) industry was quietly concerned. There were worries that perhaps the federal government might shy away from the use of public-private partnerships to deliver large, complex infrastructure with the removal of the P3 screen that was placed on projects over $100 million.

Amarjeet Sohi, Canada's minister of infrastructure and communities, quickly set the record straight by stating, "P3s will continue to play a critical role in projects across the country." Particularly as the federal government moves forward with the Canada Infrastructure Bank, P3s may be more important than ever to deliver on the ambitious federal program.

The removal of the screen was intended to respect the choices and decisions of local communities. If public-private partnerships truly deliver value for money, complete projects on-time and on budget, and build projects to last over the lifecycle of an asset, then provinces, territories, municipalities, and Indigenous communities will pursue the model. And it is happening.

The Canadian market now has 266 P3 projects located across the country and across key industry sectors. Those that are operational or under construction are valued at nearly $123 billion.

Ontario continues to drive the national P3 market, while the recent change of government in B.C. makes it a bit harder to predict short-term P3 growth in the province. We saw a P3 chill in Alberta after Premier Rachel Notley formed the provincial government in the spring of 2015, so it will be a while before we get a sense of how P3s might be used on provincial projects in the coming years. (It should be emphasized, Edmonton and Calgary continue to pursue municipal P3s.)

There has always been an ebb and flow of jurisdictions that have embraced or been standoffish when it comes to P3s. And while that may continue, it's becoming increasingly difficult for governments to ignore the success of the P3 model in Canada.

The bumper sticker slogan is "P3s are On Time & On Budget." They make good financial sense for governments to use them as long as it's for the right reason and the right project. But the benefits extend beyond on-time and on-budget delivery. P3s are ultimately designed to provide the best possible value for taxpayers, to make the best use of public resources and to ensure a high standard of asset management.

The benefits are long term, well beyond the political mandate of any one government. The economic impact is generational and the numbers speak for themselves.

The Canadian Centre for Economic Analysis (CANCEA) has independently estimated that P3s have saved Canadians as much as $27 billion over the last 25 years. These projects are being built 13 per cent faster than those brought to market in the traditional way, which has added a further $11 billion in value to the Canadian economy. Most important, P3s are creating 115,000 jobs and generating five billion dollars of additional wages on average every year.

So, it shouldn't come as a surprise, given those numbers, that we're seeing evidence of new and emerging P3 markets across Canada. This new wave of entrants represents provinces, territories, and municipalities that have studied the successes in other jurisdictions and taken note of their best practices.

There is also heightened interest among First Nations communities that reached out to CCPPP, and some of our council members, anxious to learn how the P3 model might best be applied to their infrastructure needs.

While they have much to learn from the experiences in bigger markets like Ontario, British Columbia, Alberta, and Québec, these newcomers would do well to take note of the work being done in Saskatchewan.

Saskatchewan can't really be described as an emerging market. We're better to call it an erupting market considering its size and the

Credit: Bird Construction

Saskatchewan is recognizedd as an erupting market for P3s, with several successful projects both underway and built, including the recently-completed joint-use schools project.

Transit projects across Canada have proved widely successful for using the P3 model, including the Confederation Line LRT in Ottawa.

number of projects it has undertaken. The province has pursued an ambitious and highly successful P3 agenda over the past five years.

Since the fall of 2012, the province has established its own procurement agency, SaskBuilds, and between the agency and municipalities, they have procured nine projects. Six of them are already operational. Three are under construction, including the $1.88 billion Regina Bypass—Saskatchewan's largest transportation project. The bypass is expected to be completed approximately six years sooner than could have been achieved through traditional procurement.

As much as Saskatchewan is a proven P3 producer, Northwest Territories (NWT) is a confirmed P3 champion punching well above its weight. The NWT government has undertaken one of the most forward thinking and innovative P3 initiatives in Canada. The Mackenzie Valley Fibre Link project installed nearly 1,300 kilometers of fibre between McGill Lake near Fort Simpson and the Arctic Ocean at Tuktoyaktuk to provide high speed internet to remote northern communities.

NWT is also building the Stanton Hospital as a P3 and is on the forefront of delivering another project that will spur economic development, while addressing the effects of climate change. The Tlicho All-Season Road is currently in the procurement phase and will be a vital link to Yellowknife.

As it stands now, the region is serviced by an ice road, which is only accessible for three months a year. It means supplies and food have to be flown in the rest of the year and that means higher prices.

The ice road has become increasingly less reliable in recent years as lake levels change and the district experiences wide swings in winter temperatures and snowfall accumulation.

Newfoundland and Labrador has also adopted the P3 model to address its healthcare infrastructure. Under the leadership of Premier Dwight Ball, the province determined that public-private partnerships needed to be part of its infrastructure tool kit.

Over the past few months, the province launched a procurement process to design, build, finance and maintain a new 120 bed long term care facility in Corner Brook. Plans are also underway to use the P3 model to replace Corner Brook's Western Memorial Regional Hospital.

P3s aren't new in Manitoba. The City of Winnipeg is home to five projects. But the provincial government has never been engaged in the use of the model—at least until now.

In May of this year, Premier Brian Pallister announced his government's intention to explore P3s as an option to build four new schools with a total value of more than $100 million. They will accommodate 2,500 students with the ability to take as many as 3,300. In making his announcement, Premier Pallister cited the innovation and ingenuity used to build 18 P3 schools in Saskatchewan.

Nova Scotia is one of the pioneering provinces, engaging in a public-private partnership to build schools in the 1990s—schools that are still valuable and useful assets to the provincial education department. Today, the government is doing its due diligence to determine whether the P3 approach would be the best way to redevelop the QEII Health Sciences Centre in Halifax, including the replacement of the deteriorating Victoria and Centennial buildings.

There is also serious consideration being given to using the P3 model to twin about 300 kilometers of highways in Nova Scotia. It could be a project valued at more than $2 billion.

Add in the increased P3 activity currently under way in municipalities across the country and it becomes clear—Minister Sohi was right. P3s are playing a critical role in the delivery of infrastructure in Canada.

Mass transit P3 projects are under construction in cities like Ottawa, Edmonton, and Waterloo. Ottawa has two more in procurement, while Edmonton and Waterloo are each considering a second phase P3 project. Success is breeding success in Canadian P3s.

Of course, all of this activity and impressive results have distinguished Canada as a global leader in the P3 space. Our model is considered best in class and, to that end, the world comes to Canada to learn how to execute public-private partnerships.

Mark Romoff is the president and CEO of the Canadian Council for Public-Private Partnerships.

Community and stakeholder relations play a vital role in the successful development of today's community infrastructure assets.

ENTERING THE POST-CONSULTATION ERA

The changing landscape of community engagement in infrastructure.

By Jacques Bénard

Historically, community relations and stakeholder engagement in infrastructure and urban development projects were considered an ancillary function. It was about satisfying regulatory requirements and social expectations. Many proponents went through the motions, often reluctantly, hosting promotional open houses and presenting at public hearings projects, which could only accommodate symbolic adjustments. That's changing.

This approach is no longer enough to get projects approved. Simply going through the motions can lead to projects being delayed and derailed by citizens, interest groups, and local politicians.

In a recent editorial feature, the National Post identified 35 large-scale infrastructure projects—collectively worth about $129 billion—that have been blocked or cancelled due to resistance movements. Hundreds more have faced similar challenges.

The legitimacy of regulatory approval processes for projects like these has often been called into question. Criticisms stem from apparent bias and procedural flaws to lack of public input in decision-making.

In a recent nationwide survey conducted by Hill + Knowlton Strategies, 56 per cent of Canadians said they would participate more in infrastructure project consultations in their communities if they felt their participation would impact the project. Forty-nine per cent said they would do so if they believed decision-makers listened to the results.

The bottom line? Citizens and interest groups expect more from the participatory process than an opportunity to voice their opinions. And they want to play a bigger part in decisions when projects affect them.

The notion of "social acceptability" is gradually finding its way into the government's lexicon and is increasingly invoked in project evaluations. That means proponents need to demonstrate wide public support for their projects to even be considered worthy of being granted with approvals and permits. More than ever, they're expected to make all reasonable efforts to respond to legitimate stakeholder concerns before governments determine whether or not to approve their projects.

Some will argue that the notion of social acceptability is too vague to be applicable and would not stand the test of the rule of law; that, as a decision-making criterion, it gives too much importance to individuals and interest groups. But the Superior Court of Québec seems to think differently and a recent ruling legitimizes this emerging concept.

Following the Québec minister of

environment's refusal to authorize a mining exploration project, the Court rejected a claim by Ressources Strateco Inc. based primarily on the absence of social acceptability. Strateco argued that social acceptability was not a valid consideration for which to grant—or not grant—a permit. The Court concluded that social acceptability must be considered for projects subject to regulatory approval processes even though the legislation does not refer to it, as it would be inappropriate to arrive at an outcome that would allow a project that is clearly rejected by the local community.

For proponents, this means there's a need to recognize that the political climate and regulatory landscape are both evolving. Completing the required impact studies and following a mandatory approval process doesn't translate into an automatic green light for a given project. No matter how inclined government is to approve a project, and regardless of the number of influential advocates who back it, it's no longer enough to overcome community resistance if and when it occurs.

And when it comes to potential community resistance, mitigation through early and meaningful engagement is key.

Typically, infrastructure and urban development projects involve many stakeholders, with diverse and sometimes conflicting interests. It's no secret that identifying and addressing stakeholder concerns and issues is important. But giving proper attention to social and political risks early in the planning stage is imperative. Anticipate roadblocks, decide on appropriate responses and prevent negative outcomes—that's how to avoid major disruptions down the road.

Gone are the days when economic benefits and job creation, however significant, are enough to rally support. Health, quality of life, and protecting the environment are all things communities want to consider. So proponents must build in as much flexibility as possible to accommodate a variety of interests.

Strategies, too, need to be defined and implemented during a project's life cycle. This requires close collaboration between project teams and engagement specialists. A successful community and stakeholder relations program will usually blend a variety of targeted in-person and digital participatory tools. It will reach out to all key stakeholders—including those who offer opposing views—rather than solely championing advocates.

Obviously, it's rare for everyone to agree on all aspects of a project; but in our experience, assisted negotiations often provides opportunities to find common interests. This, of course, helps define conditions that work for the majority and allow a project to become more broadly accepted. The result is that conflicts don't spiral out of control and it's easier to resolve differences as the project unfolds.

With the emerging notion of social acceptability gaining ground in government circles, there's no doubt that we're entering a post-consultation era.

Citizens and interest groups not only realize their influence, but expect to take part in decisions that affect them. That clearly means there's a need for more strategic community and stakeholder engagement. To manage risks. To avoid pitfalls. And to successfully deliver projects.

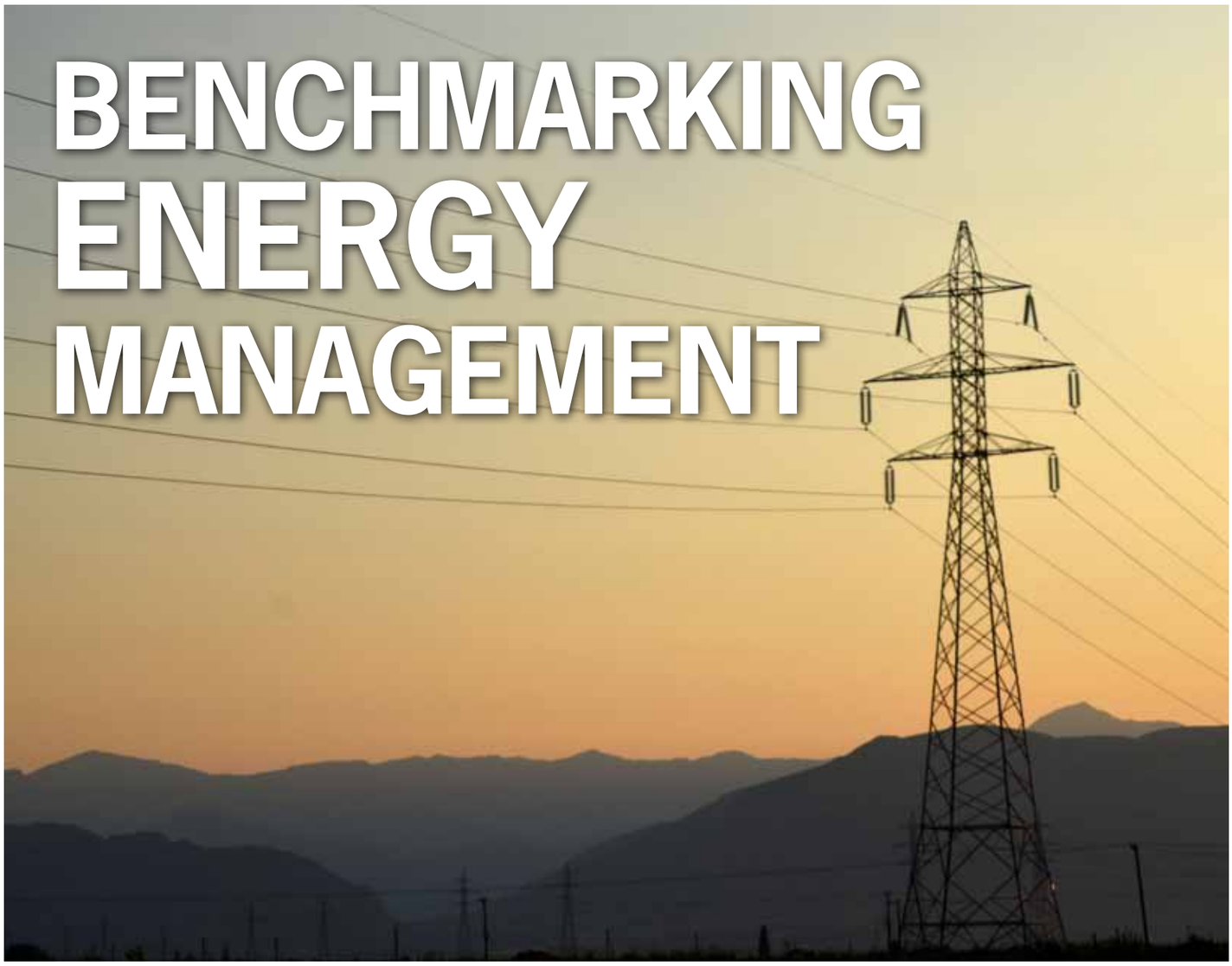
Jacques Bénard is the senior vice president of infrastructure + urban development for Hill + Knowlton Strategies.

Where the Trolls Live

Underneath the Vimy Memorial Bridge in Ottawa, Ont. **—Staff**

Credit: Greg Stevenson

BENCHMARKING ENERGY MANAGEMENT



Credit: Group EnerSense

How big data can reduce energy consumption.

By Shooka Karimpour and Thomas Dandres

According to a 2015 International Energy Agency (IEA) report, the energy sector contributes to the bulk of greenhouse gas emissions worldwide (about two thirds). Despite ongoing effort to develop and expand the scope of alternative energy sources, currently most of our energy needs are being met by fossil fuels. Electricity in some provinces such as Ontario, British Columbia, and Quebec run on nuclear power and hydro-electricity with fewer emission than conventional sources, but overall about 80 per cent of Canada's GHG emission comes from the energy sector.

The changes in energy infrastructure and migration to alternative energy sources are slowly creeping as hard-path approaches. To combat and mitigate the risks associated with energy use in the short-term, Canada must advance this use of energy management tools and a soft-path approach to inform future reductions.

Benchmarking is the process of establishing a standard against which the performance of a business function, a product, or a service can be measured. It's a tool that is widely used amongst organizations and industries to compare and measure the success and progress of an organization with other similar institutions, or with its own performance in the past.

In the energy sector, there has been an exponential development in big data collection and real-time tracking abilities, both within an energy utility and by consumers. Greater data availability has enabled improved benchmarking of both supply and demands energy performance. On the supply side, utilities are constantly using dynamic and static assessment and benchmarking tools to gauge their performance indicators, such as capacity, system loss, energy distribution and accessibility among many other factors. At the demand side, customers with sizeable consumption portfolios in electricity and other sources of energy can measure their energy use and performance using benchmarking tools and software. Using different energy benchmarking tools (e.g., Energy Star) buildings and industries can determine if they are using more or less than their peer facilities with similar occupancies, climates, and sizes. By benchmarking energy

> Beyond reducing cost and facilitating electric grid operations, benchmarking has the potential to improve energy efficiency and bring about some environmental benefits.

use, it is possible to set targets for promoting best practices and achieving better energy efficiency in buildings and industrial facilities.

Benefits of benchmarking

Benchmarking drives action: You can't manage what you don't measure! Energy benchmarking can provide the roadmap to energy savings. It can inform energy efficiency goals, provide motivation for action, and help create the business case for energy improvements or retrofits. Energy benchmarking can be a powerful driver for investing in energy efficiency measures. Although it is not the only solution to address the challenge of energy management, energy benchmarking is an important starting point and a way of measuring ongoing improvement.

Lower life cycle energy costs: Operating costs and expenses are a significant concern to building and some of the industrial and non-industrial processes. According to the U.S. Energy Information Administration, among the most energy-intensive manufacturing are food, beverage, tobacco products, paper, iron, and steel manufacturing, petroleum refineries, and coal product manufacturing, which can benefit from detailed energy benchmarking and energy management. Energy benchmarking can not only lead to savings on energy costs, but it can potentially lead to lower facility and equipment maintenance.

Benchmarking works best when it's done consistently over time. The normalization and benchmarking process have to be reviewed periodically, and recommendations for corrections when necessary are made to ensure a superior energy performance. If performed in real-time or near real-time using energy benchmarking and monitoring tools, the facility manager can proactively identify changes in energy consumption due to degradation in equipment performance and/or failures.

Superior environmental performance: Beyond reducing cost and facilitating electric grid operations, benchmarking has the potential to improve energy efficiency and bring about some environmental benefits. Energy use correlates to greenhouse gases and climate change; and there are other important environmental problems associated with energy use, such as acid rain and air pollution that have adverse effects on ecosystems and human health, are also associated with energy consumption and could be mitigated by using energy management tools.

Hurdles in energy benchmarking

Data availability and benchmarking level: Energy benchmarking involves the development of quantitative and qualitative indicators through the collection and analysis of energy-related data. Monthly energy use data can be easily determined from the billing information. Furthermore, detailed facility information such as equipment, and operational schedule must be gathered. Detailed interval-based energy use data (e.g., in five-minute or 15-minute intervals) that some electrical utilities provide to their clients, enables access to near real-time consumption. This data aggregated by property, however, it would not provide detailed analysis on where and how the facility is consuming energy, beyond the whole-facility approach. In such cases, sub-metering is used to analyze how energy is used on a much deeper level than can be determined from whole-facility meters alone.

Management engagement in action: Energy benchmarking won't make a

By using the data collected from power meters, benchmarks can be created that can help to understand where efficiencies in energy use can be found.

difference unless the results are properly translated into actionable insights that people in management can understand and appreciate. The benchmarking tools, once used and translated correctly, can be used to evaluate the performance of common plant elements such as motors and compressors. For such equipment, benchmarking would help to compare the efficiency and performance of the elements with its own performance over time, and with their expected catalogue performance. It can be used to evaluate systems for waste or misuse. The energy waste might be simply associated with longer hours of operation or an improper setting on the equipment.

Rigorous consideration of benchmarking outputs and indices can help in designing a shut-down procedure. This is to ensure that parallel multiple elements are not running simultaneously when the performance of fewer elements would yield a similar output. In building management, it would help to eliminate the leaks by improved insulation, or encourage the use energy efficient lighting and HVAC systems. The overall success of an energy management program depends on the involvement and commitment of all level employees, from top management (to put the program to action) to on-site personnel (for widespread implementation of the program).

Environmental performance and energy benchmarking

While reducing energy consumption enables cost savings, the associated environmental benefits truly depend on the technologies used to generate energy. It is easy to identify these technologies when the energy is produced at the consumption point, such as with conventional cars and trucks that burn gasoline. In which case, energy benchmarking may be directly linked to the environmental performance of the product or service. It's more complicated when we consider products and services consuming electricity. Indeed, electricity might be generated from different sources of energy that dramatically differ regarding their cost and environmental impacts. For instance, running a data center powered by the grid in Alberta or Quebec would lead to very different emissions since, in Alberta, electricity is generated mainly from coal and natural gas while it is mostly from hydropower in Quebec. Thus for the same power consumption, the greenhouse gas emissions would be at least one hundred times higher in Alberta.

Moreover, these technologies usually change over time. For instance, Ontario's nighttime power demand is so low that electricity is generated from nuclear and hydro power plants that emit fewer greenhouse gases per kilowatt-hour. During the day when power demand increases, natural gas power plants kick in to provide most of the additional electricity needed. This result in an increase of greenhouse gas emissions per kilowatt-hour consumed. Such trends are not generally captured by energy benchmarking tools, because the current techniques used to account for environmental impact assessment are based on average values of power generation. Calculating environmental benefits requires very detailed information on the regional energy system. Very few utilities provide such information. A greater transparency of electric grid operation is required to improve the assessment of environmental benefits obtained by energy benchmarking.

Why do we care about energy benchmarking?

Studying the life cycle of energy sources illumintaes the interconnection between energy consumption, depletion of fossil resources (coal, oil and natural gas), and emitting pollutants. The era of big data can enhance environmental and economic performance across the energy supply-chain. This is especially true for electricity as the operation of electric grids are increasingly being documented. They could also contribute to the improvement of existing benchmarking tools and the development of new energy efficiency programs aiming to support not only a smart production but also a smart consumption of energy by including spatial and temporal information in feedback loops. This leads to improved performance of all players within an electrical grid.

Shooka Karimpour is the co-founder and chief technology officer of Group EneSense Inc. Thomas Dandres is the research officer at CIRAIG/Synchromedia.

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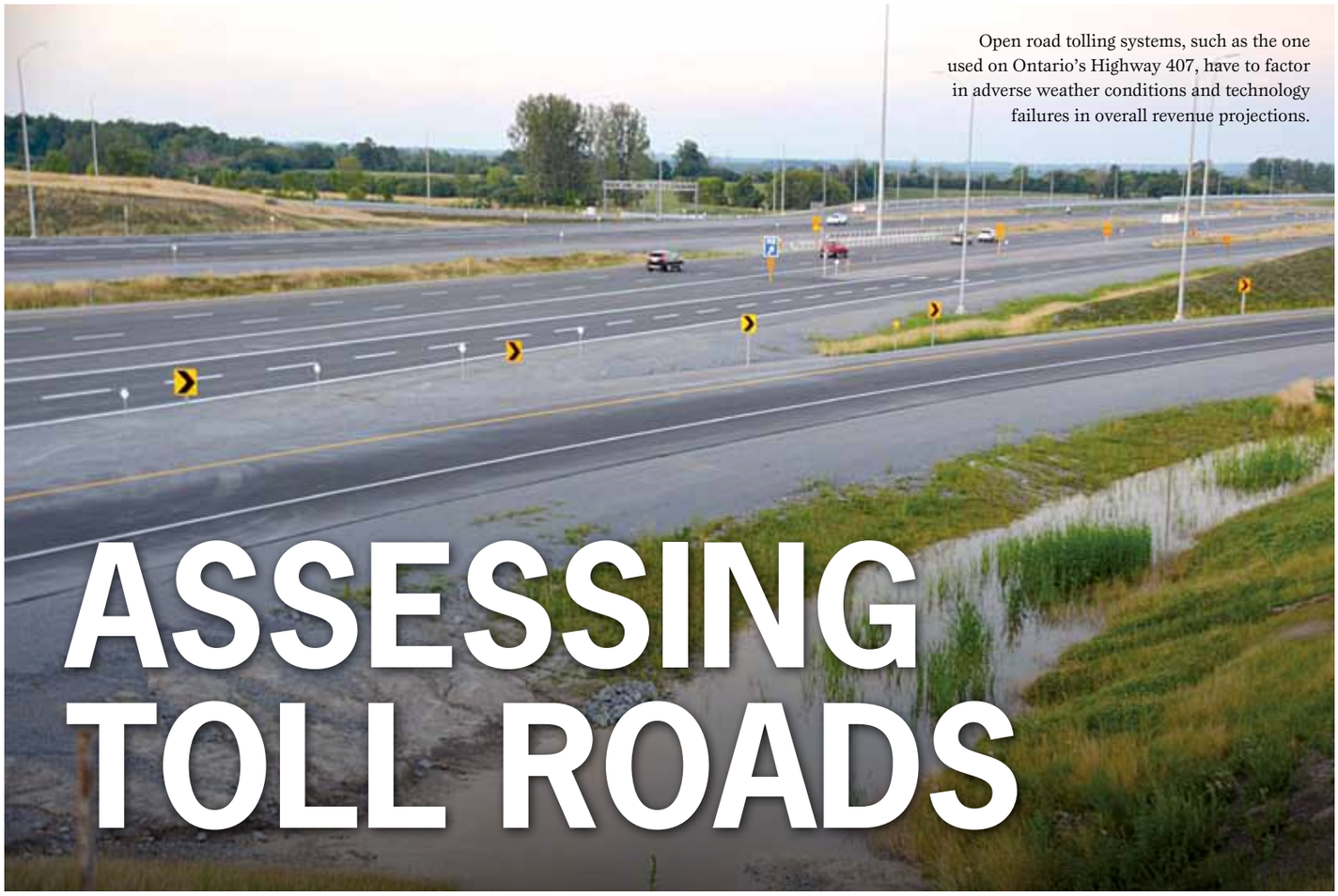

Open road tolling systems, such as the one used on Ontario's Highway 407, have to factor in adverse weather conditions and technology failures in overall revenue projections.

Credit: ReNew Canada

ASSESSING TOLL ROADS

Understanding the real value of pay-to-play road projects.

By Priscilla Adjei

In recent years, DBRS has witnessed increasing interest from both public and private sector parties in the procurement and development of volume-based public-private partnership (P3) projects, notably for assets such as toll roads and managed lanes. Private sector firms have shown interest in both greenfield and brownfield projects, including recapitalizing some assets that previously encountered challenges. High-quality greenfield assets are unlikely to be rated above the BBB range, given the greater degree of uncertainty concerning the establishment of initial baseline traffic and revenue levels as compared with projects where the revenue source is a pre-determined availability payment from a credit-worthy government counterparty.

DBRS takes into account the following topics in its assessment of toll roads and managed lanes projects.

Traffic and toll revenue study

DBRS attributes significant importance to the traffic and toll revenue (T&R) study provided by an independent, reputable and specialized firm with a solid track record in toll road demand forecasting. DBRS typically expects to receive an investment-grade level T&R study, providing an annual traffic and revenue forecast covering the term of the concession, with an overview of the methodology and inputs used to calibrate the travel demand model.

Economic and demographic fundamentals

Traffic levels are driven significantly by economic factors such as population growth, local economic activity often represented by gross domestic product, employment rates, and household income statistics. Studies that retroactively examined erroneous traffic and revenue forecasts found that over-projections tended to occur as a result of an over-reliance on sustained economic growth assumptions rather than assessments that unbiasedly consider the variability in future economic performance and its impact on traffic.

Traffic profile

Our company compares the proportion of commuter-based versus leisure-based traffic and multi-axle vehicle traffic to light-weight cars as part of its analytical process. Traffic driven by commercial and business activities is expected to be less volatile compared with leisure-based traffic. Characteristics that are supportive of a commuter-based traffic profile are viewed favourably, such as the tendency of traffic peaks to occur during typical morning and evening rush hour periods and origination and destination patterns between residential areas and economic centres or major industrial parks.

DBRS also analyzes the assumptions regarding the proportional use of the asset by vehicles exempt from paying tolls (exempt vehicles), which often include high-occupancy vehicles carrying three or more passengers, public transit buses, and emergency vehicles. DBRS notes that investment-grade projects typically exhibit exempt vehicle traffic of less than three per cent of overall traffic figures.

Value of time

The proportion of motorists expected to use tolled highways is a function of the computed time savings and the cost to use the lanes (cost-per-minute saved) versus the value placed on time savings by the motorist (value of time or VOT) estimated from the results of stated preference surveys collected from travelers in the study area. Motorists with greater VOTs than the cost per minute saved are more likely to choose available toll and managed lanes.

Value of time is influenced by the number of free alternatives, the congestion levels of alternative routes, the competitiveness of tolls as compared with alternative tolled routes, and gas prices. DBRS notes that VOT

estimates have been a major contributing source of predictive failure in T&R forecasts.

New or alternative routes

The construction of a new highway or material improvements made to the existing road network within the service area of a toll road asset could dampen traffic materially.

> Traffic driven by commercial and business activities is expected to be less volatile compared with leisure-based traffic.

Some concession agreements acknowledge the adverse impact that additional roads and lanes may have on existing concessionaires. Provisions that compensate the project company for lost revenues as a result of new competing routes and expansions are viewed by DBRS as adding stability to the credit profile of the asset. Other concession agreements may only provide limited or no compensation. In such cases, the company forms its views with the opinion of the technical advisor regarding the extent or lack of available space for expansions and concerning the long-term state capital improvement plans to determine the potential risk of new capacity additions. The availability of free alternative routes also requires consideration, particularly where these are not congested.

Rate setting autonomy

Considerable emphasis is put on the powers granted to enforce collections and increase user fees. DBRS views transactions where the project company is given a great degree of autonomy to set toll rates as the most credit-positive. This ability to set tolls often makes the project less sensitive to recessions, as revenue lost on declining traffic can be partially made up by increasing toll rates to a captive user base with a high dependence on the facility for commercial and business travel, although the degree of flexibility will ultimately be constrained by the price elasticity of demand of the user base. The company would at least expect that the concession agreement would allow for annual toll increases that are indexed by relevant and local inflation benchmarks and that are also supportive of inflation rates of key labour and material inputs required to adequately maintain and improve the project.

Toll collection and enforcement

Toll collection methods can comprise the use of cash and credit card toll booths operated by attendants and/or open-road tolling facilitated by electronic systems. Open-road tolling systems can generate revenue leakages from deliberate abuse by some drivers who have no intention of paying tolls or from misread licence plates caused by technology failures or adverse weather conditions. The existence of toll enforcement legislation that eventually leads to legal action and non-renewal of licences is considered to be highly supportive in the assessment of a project's credit profile.

Key financial metrics, terms, and stress testing

Debt Service Coverage Ratios (DSCRs)

A thorough examination of the demand profile of the asset is made by the company and corroborated with the results of the external T&R forecast, upon which we would usually develop its own stress cases for traffic volumes. The company expects that a brownfield tolled asset with good operating history, benefitting from significant barriers to entry within a jurisdiction experiencing above-average economic growth, to generally have a minimum projected DSCR over the life of the concession of at least 1.40 times to enter the investment-grade category, calculated on the basis of financial projections accepted by DBRS. Greenfield projects for which there is no historical data are expected to have materially higher DSCRs as metrics are often weakest in the initial years of operation, as volumes ramp up.

Revenue break-evens

In addition to coverage ratios, the company will also calculate a revenue break-even, which will be a leading driver of project ratings. The performance of toll road projects within North America, and globally, has had an irregular track record, with many projects becoming distressed assets. Projects have typically failed when actual traffic and revenue results were around 50 per cent of initial projected levels. As a result, DBRS expects greenfield projects to be able to withstand a substantial revenue break-even test, possibly within the range of 30 per cent to 60 per cent to be eligible to be rated within the investment-grade category.

Once traffic levels become established for a new project supported by a few years of operating data, or for brownfield projects that are being rated with an existing history of sufficient operating data, revenue break-even requirements will be limited to possible downside scenarios in the event of a recession. During the 2008 and 2009 financial crisis, DBRS observed that some solid operating assets experienced cumulative declines of up to 20 per cent.

Flexible financing arrangements and reserves

Projects may benefit from favourable financial arrangements that provide an enhanced ability to avoid a default caused by traffic and revenue underperformance. Transportation Infrastructure Finance Innovation Act (TIFIA) loans, for example, provide flexible financing terms for volume-based projects, including an extended capitalized interest period over the initial few years of the operations period and/or the potential right to defer a portion of debt servicing if toll revenues prove to be insufficient, which assists in protecting the viability of the project while traffic is ramping up in the early periods.

Additional reserves, beyond the standard debt service reserve account and lifecycle reserves, that may be used to supplement revenues by an amount sufficient to make debt service payments should traffic and revenues not materialize as planned also enhance the feasibility of greenfield projects.

Available relief measures such as principal and interest payment deferral options and additional qualifying reserves are also considered in DBRS's calculations of revenue break-evens.

Operating and maintenance and lifecycle break-evens

Although DBRS views the operating and maintenance (O&M) and lifecycle tasks associated with road projects to be fairly predictable and of low technical complexity, tolled highway projects are expected to meet higher operating and lifecycle break-even tests above those required for an availability-based road project rated in the BBB range to account for the revenue risk. However, because volume-based transactions have higher DSCR requirements, they will, therefore, tend to exhibit O&M and lifecycle resiliencies that are sufficiently high for the rating category.

Priscilla Adjei is the vice president of infrastructure finance for DBRS.

MODERNIZING INFRASTRUCTURE

New funding mechanisms provide opportunities to build sustainable infrastructure in our communities.

Federal programs provide the opportunity to embrace sustainable cities.

By Alison Babbitt

Over 50 per cent of the world's population currently lives in cities. And this number is expected to rise to 66 per cent by 2050, thereby placing significant demands on urban infrastructure around the world.

Urbanization is especially significant here in North America because 82 per cent of us live in cities, according to the United Nations.

The federal government's recently proposed Canada Infrastructure Bank, along with its Smart Cities Challenge announced in this year's budget, demonstrate the government's commitment to modernizing Canada's aging infrastructure by challenging cities to create ambitious plans and providing access to the funds necessary for their success.

But what does it really mean to be a so-called "smart city" or "sustainable city?"

Consider how new infrastructure projects have been traditionally organized. Each new project is budgeted and developed as separate and distinct from the next. While this piecemeal approach has worked in the past, it may not be the best strategy if we are concerned about growing cities that are competitive, resilient, and sustainable in the long-term. In contrast, sustainable city projects are large-scale developments that plan entire communities as opposed to just singular undertakings.

Comparatively speaking, Canada faces less pressure to adopt these new development models than other countries. Our population is certainly less dense than it is in the world's mega-cities. Our cities do not face the same kinds of environmental challenges as others, such as heightened smog or lack of access to fresh water. But the fact that there is less urgency does not mean that we lack the political will and social interest to start implementing smart city principles now.

Sustainable city development involves creative, future-oriented city planning and big questions. How can new technologies be integrated to improve citizens' quality of life? Can we be more efficient by introducing real-time monitoring and data analysis? How do we shift our practices to be more environmentally sustainable? Can we eliminate waste by focusing on circular economic principles? How can we eliminate redundancies to save costs? Visualizing development in terms of communities rather than projects creates space for innovative investors, suppliers, builders, operators, and funders to work together to bring these ambitious plans to life.

Sustainable cities concepts are already being explored in Canada. For example, Canada Lands Company will be developing Ottawa's newest residential community, Wateridge Village, to be a "village within a city." Toronto will also soon have their own sustainable community, as SideWalk Labs Inc. announced their plans to develop a digital city testing ground downtown. Although construction has not yet started, the site development plans indicate that embedded smart sensors, self-driving cars, and high-tech zoning will all be features of the community.

Building a sustainable city requires significant investment. Consequently, it may also be time to reconsider our traditional financing methods. Canada's new infrastructure bank is an innovative approach to help leverage private capital for public infrastructure. By offering protection from losses and reduced risk through taxpayer-funded guarantees, the aim is that private companies may be more willing to invest and take risk on highly complex projects. Other cities have incorporated value capture initiatives to offset the costs of smart cities, usually in the form of a tax. Simply put, value capture means that the economic uplift generated by new infrastructure will be used to fund the infrastructure. For example, if new transport infrastructure leads to increased land values in surrounding areas, the properties could be taxed to fund the infrastructure.

The private sector will have a large role to play in establishing sustainable infrastructure. It is anticipated that private sector investment partners will work with the Canada Infrastructure Bank to transform the way projects are planned, funded, and delivered. By leveraging this expertise, funding will be used strategically to maximize the opportunities they present. The private sector will also be relied on to encourage greater collaboration and investment in housing, trade infrastructure, and data availability.

The World Bank estimates that, in developed countries, a doubling of infrastructure capital is capable of increasing GDP by 10 per cent. Additionally, Juniper Research estimates that cities could save upwards of $19 billion by 2021 by becoming smart cities. Given these figures, the

global infrastructure deficit, and the perceived social benefits, it is easy to see why many governments have made room in their political platforms for infrastructure development.

The complexity of sustainable city projects also comes from the fact that they are to be delivered by multiple providers and stakeholders, each responsible for different parts of the value chain. As a result, each stakeholder may adopt a different view of the appropriate risk allocation. Inevitably, there will be conflicts of interest between each contributor as they perform their role in the larger project. Implementing an effective chain management process, apportioning risk appropriately and formulating a matrix of risk mitigation mechanics, will be essential to minimize the potential for multi-party disputes.

Canada has started to address the issue of risk apportionment with the introduction of the infrastructure bank. One of the objectives of the bank is to reduce risk for private sector investors by offering guarantees as well as functioning in an advisory capacity operating as a centre of expertise and support for privately funded public infrastructure projects.

In order for any new approach to be successful, it will be essential for risk management and risk allocation to be considered, evaluated, and apportioned at all stages of the value chain. Poor risk allocation in the early stages can have severe knock-on effects during the later stages of a project. The cost effects can be disastrous as projects get larger and more complex, as the risks—and the associated costs—continue to rise. It will be crucial to carefully manage risk allocation so as to minimize such effects.

As the Smart Cities Challenge gets set to launch this autumn, now would seem an opportune time for innovative companies to get involved with building sustainable city infrastructures. With a mandate to work with all levels of government and private sector investment partners, the Canada Infrastructure Bank spurs new opportunities for savvy investors and businesses at all levels of the supply chain. The sustainable city concept is not simply about increasing technology and preserving green space. At its core, it embraces the idea that the past may no longer be an appropriate guide when it comes to developing the future.

Alison Babbitt is a lawyer within Norton Rose Fulbright's global infrastructure, mining, and commodities team who specializes in project finance.

SMART OPPORTUNITIES

How new technology can build smart cities across Canada.

By Alex Miller

The City of Kingston's industrial lands story map allows potential clients to understand the availability of industrial land in the community.

Credit: Esri

Smart communities are productive, livable, and sustainable. They have a local economy that harnesses the talents of the residents, a development approach that protects and even improves its natural environment, and a resilient physical and social infrastructure that strengthens the community. People expect all levels of government to work together to help them build and sustain their cities.

The Canadian government recognizes this and is running a Smart Cities Challenge, with millions of dollars in prizes. The money will help communities use technology to become smarter. The challenge asks: what is the top priority for improving your city, town, or community? How can smart technology and new practices it enables create real impact?

Priorities differ, and there is no magic answer for every community, but a properly executed digital transformation is key. It's also urgent. In June, the CRTC ruled that all 911 messages (texts, calls, etc.) come to emergency responders with an address attached. Local emergency responders must be ready.

While geographic information systems (GIS) help governments to respond to those sorts of demands, it also saves them time and money, and increases the quality of services offered to their communities. However, the tools needed to make better decisions involve much more than just technology. It's a synergy of people, processes, data, and technology working together to solve community challenges. This synergy is what makes communities smarter.

What improves when communities become smarter?

Public works: Cities are under serious pressure to digitize their assets so they can be found easily in one place. Being able to do that is a profound saving in time and money.

Digital transformation also helps public works professionals more easily anticipate necessary infrastructure repairs in typically challenging areas, thereby extending their life. These include;

- Roads and bridges;
- Solid waste facilities;
- Parks and grounds;
- Water and wastewater; and
- Street furniture, poles, and lighting.

Barrie, Ont. is a city growing at a rapid rate while their decades-old assets must be maintained under tight budgets and new environmental and accounting regulations. These complex demands require an enormous volume of information collected, stored, analyzed, and reported. Barrie adopted Cityworks, a GIS-based asset and work management solution. This centralized and streamlined the monitoring, maintenance, repair, and reporting of a growing infrastructure.

Planning: If planning incorporates geodesign, it ensures a sustainable future that won't compromise land, water, or air quality. GIS combined with holistic design helps communities to make informed decisions and solve sustainability issues such as:

- Environmental sustainment;
- Transportation planning; and
- Urban forms that put people first.

Prince George, B.C. decided to develop their own mobile app which fit their needs using Geocortex Essentials and the Cityworks. Now, underground locators and other field workers no longer travel back to the office multiple times each day to take on new jobs, retrieve information or deliver status reports. One worker has calculated that the app is saving him 15 kilometres of driving per day.

Public safety: Effective emergency response demands an integrated response combined with information shared from an accurate asset inventory. When that's happening, all these services are improved:

- Emergency response;
- Event security;
- Crime prevention; and
- Infrastructure protection.

Alberta's Shock Trauma Air Rescue Service (STARS) used Esri's ArcGIS technology to improve operations at its Emergency Link Centre. STARS developed a dynamic web mapping application that allows dispatchers to access up-to-date and complete information about an emergency. They can direct appropriate resources much more quickly, which increases patients' chances of survival.

Public health: Whether responding to an outbreak or safeguarding against the threat of one, the ability to share complex information through the common visual language of a map benefits everyone in the community.

The current opioid crisis is an example of how mapping and integrated information improves the response time of health care providers and helps the public understand both how their governments are responding and where to find help if they need it. Maps and apps also help public health and safety agencies to know how effective their responses are.

Economic development: Communities vie for new capital investment, tourism income, and the resulting tax revenue. GIS provides economic development officers and potential investors with insight into the

lifestyle and demographic characteristics of the community, demonstrating the potential of new development sites and commercial properties.

Kingston, Ont.'s GIS team partnered with the Real Estate & Environmental Initiatives Department and developed a GIS app, the city-owned industrial lands story map, to cut down calls to city staff and to showcase to prospective clients, real estate agents, and developers, the availability of industrial land that can be immediately developed.

The Los Angeles garbage collection department was accused of underserving some neighbourhoods, so the city used GIS technology so that Angelenos can easily compare the efficacy of the garbage pickup on their street with others. People became more engaged with their neighbourhoods: now, they can easily report illegal dumping, schedule a pickup of a bulky item, or even volunteer for a community cleanup.

Change is not easy and barriers to innovation are many. Common hurdles are organizational culture, complacency, and a sense of futility, since doing nothing seems easier. Here are some suggestions on how to tackle them.

Build a guiding coalition: A coalition for a local government might include people from corporate services, planning, engineering, fire, police, and sanitation departments. The coalition will provide the intelligence needed to understand how GIS can help their different departments improve. This type of collaboration can also get other departments and businesses engaged, so that you become an aggregator of information.

Form a strategic vision and initiatives: Develop a vision and then a strategy. The vision is the adoption of geospatial technologies and the strategy outlines the specifics—who, what, when, where, and why—that's the plan for achieving the vision.

Try and eliminate GIS jargon from your strategy. This is essential for overcoming the factors that inhibit change and winning acceptance from non-GIS teams.

Don't ignore those who resist, as this gives them time to spread their discontent and if they have significant influence, that can be serious. Often, resistance is rooted in perception rather than reality. Securing executive buy-in will help minimize resister impact.

Remove barriers: Plan for training. Engage the human resources team to create training for employees who support institutionalized GIS use. Training plans and workforce development plans aligned with your change strategy help remove barriers for those new to the technology.

Create short-term wins: Short-term wins build momentum and increase buy-in. These wins must be communicated to the guiding coalition. Story maps combine text and multimedia into a compelling narrative. It's an easy way to create a high-impact visualization of relevant data and a good way to demonstrate how to use geospatial technologies. If someone in your team creates a story map, share it and encourage others to participate.

Most importantly, team effort is required to spark interest in, and adoption of, geospatial technologies. After all, collaboration and participation are at the centre, and ultimately the goal, of all smart communities.

Alex Miller is president and founder of Esri Canada.

Ryerson's Institute for Infrastructure Innovation intends to develop courses that meet the needs of Canada's evolving infrastructure industry.

THE NEED FOR **NEW EDUCATION**

Training needs for the evolving infrastructure procurement landscape.

By Ashley De Souza

Unfortunately, infrastructure in Canada is aging and under distress, requiring significant upkeep. The reasons are various, including historical funding deficits, uncoordinated systems planning, and climate change and extreme weather events such as tornadoes, flash floods, and ice storms. These factors have imposed increasing pressures on the structural integrity and performance of Canadian infrastructure systems.

As public infrastructure assets age and demand for usage increases, long-term funding must be in place to extend the life of these existing social and core infrastructure assets for as long as possible.

We all know, there is a great need for expanded road, bridge, and transit capacity to address increasing urbanization and resulting traffic congestion.

We all know, in order to provide a higher quality of healthcare, we need to have modernized, state-of-the art hospitals and health care facilities to serve our population.

We all know, to create more vibrant, liveable communities, we need to expand our community and recreational infrastructure.

We all know the economic benefits investments in infrastructure has both provincially and municipally.

The numbers speak for itself.

In Ontario, recent research shows that $1 billion invested in infrastructure generates and supports $16.3 billion in GDP in the province over 30 years. Research also shows that these investments support 85,000 jobs in the province, $1.7 billion in provincial tax revenue, and $1.6 billion in federal tax revenues.

The infrastructure landscape today is very robust with unprecedented levels of funding for infrastructure projects from coast to coast to coast. Over the past decade we have been experiencing what some have coined as an "infrastructure renaissance" right across Canada. Governments of all levels and all political stripes realize the value and importance of investments in infrastructure.

With this renaissance has also seen the introduction of new innovative procurement and delivery models as governments look to new ways to finance and procure these unprecedented levels of infrastructure investments. However, all the new investments also bring some new challenges for industry.

As the infrastructure landscape has rapidly evolved, many public and private sector participants still struggle to understand some of the new models being introduced. Some contractors, particularly in the civil sector, struggle to identify how and where they can participate in these projects and have expressed a strong desire to play a larger role. Some public owners still grapple with decisions about when and where to use some of these new models and others are reluctant to adopt new models altogether. Knowledge, collaboration, and partnerships are essential strategies for both companies and government to successfully participate in and deliver projects in this marketplace.

In response to the fast growth of public-private partnerships and investments in public infrastructure renewal in Canada, the Ryerson Institute for Infrastructure Innovation (RIII) was launched as part of the City Building strategy of Ryerson University and the Faculty of Engineering and Architectural Science

By providing modern post-secondary education, Canada can continue to be a leader in the development of new renewable, resilient infrastructure assets for our communities.

(FEAS). RIII was established with a vision to become a world-renowned research and training institute that provides innovative technical and policy solutions to contemporary infrastructure challenges.

One of things we recognize is that the infrastructure landscape is constantly evolving, and that procurement models are changing, new methods and materials are being implemented, and new technologies are coming to market. Our team has focused our efforts on five key areas: innovative project delivery, big data & urban informatics, urban systems engineering and infrastructure asset management, innovative construction materials, systems, and design, and climate change and resilient infrastructure.

There is a demonstrated need to approach infrastructure challenges with a collaborative effort, one that engages industry and academia. Connecting researchers and students with the public and private sectors can provide comprehensive solutions to the development of smart, sustainable, flexible, and resilient infrastructure systems.

Filling the gaps

Over the years, I have heard from contractors and companies of all sizes that: some of their staff lack the knowledge and experience to participate in larger public-private partnerships, some struggle with the ability to really promote innovation through existing projects, or simply that others have a desire to learn more and expand and enhance their technical expertise. In previous capacities, my efforts to help bridge this knowledge gap has been a challenge as there seems to be a lack of formalized educational programming to help both public and public sector actors better understand these models.

Academia can play an important role by helping to bridge this knowledge gap and that is exactly what the RIII endeavours to do. Our goal is to collaborate with government partners, individual companies, and industry associations to identify where these knowledge gaps exist in order to develop specific educational content and formalized training programs.

As public-private partnerships and alternative financing and procurement models increasingly become the norm in today's infrastructure projects, education and training needs to be targeted to meet the specific needs of the job market.

Customized skills training programs in infrastructure need to be developed to create a more fluid connection between what is being trained in the classroom and the needs of government and industry in the marketplace.

Human capital development and recruitment will continue to be a necessity for both the public and private sectors as Canada continues to drive forward on and be a global leader in infrastructure spending and development. Greater collaboration is essential to not only recruit more Highly Qualified Personnel (HQP) into the industry but to identify the appropriate continuing and executive education programs needed to ensure both public and private sectors have the tools and expertise necessary as governments continue to tackle Canada's staggering infrastructure deficit.

Over the next 12-18 months, RIII will broaden its external outreach to identify and explore educational and training opportunities to meet the needs of both government and industry. We want to encourage greater employer participation both government and industry, as part of the process.

We would love to hear from you if you have any ideas, suggestions, or have an interest in partnering. To learn more about RIII or to get involved, please feel free to contact us at *riii@ryerson.ca*.

Ashley De Souza is the executive director of the Ryerson Institute for Infrastructure Innovation.

Top100
Canada's Biggest Infrastructure Projects

For a look into the complete Top100 list, visit
top100projects.ca

The future of the Site C Clean Energy project will have a significant impact on the 2018 Top100 Projects report.

Credit: BY Hydro

FIVE BURNING QUESTIONS

Previewing the release of the 2018 Top100 Projects report.

By Andrew Macklin

The annual release of the Top100 projects report is just a few months away, included with the release of our January/February edition of ReNew Canada.

We have spent months researching well over 200 projects for the 2018 edition of the report, digging up the most up-to-date information to determine the 100 that should appear.

As we wrap up the research phase and focus on pulling the resources together to begin writing, there are five burning questions that we are excited to answer when the report is published.

1 How much change will we see in the top 10?

None of the projects that appeared among the top 10 of the 2017 report were expected to be completed this year. But with fluctuating project values, and multiple multi-billion-dollar infrastructure projects currently under development, what will change when the 2018 report is released?

2 Will the Site C project be included?

It's the type of issue that can keep an editor up at night, knowing that a major project could need to be removed as the report goes to press. We know that the B.C. Utilities Commission is supposed to provide its independent analysis of the project on November 1st, but we don't know if that report will provide the final verdict on whether to proceed, delay, or cancel the $8.775-billion hydroelectric project.

3 How many new projects will be included?

I feel like we should include some sort of over/under or pool-type contest with this each year, because the answer isn't known until a few days before the report is published. Here's what we do know: at the time that we published the 2017 report, there were 19 projects scheduled for completion this year. We know a few of those are facing delays that will push their completion into 2018, such as the Waterloo ION LRT, but just how many get wrapped up by December 31st isn't yet known.

4 How many projects will be in the billions?

Last year, 50 projects broke the $1 billion threshold for the second straight year, down from the record 52 in our 2015 report. Of the 19 scheduled for completion in 2017, only three were among the billion-dollar projects: The Spadina Subway Extension, the Maritime Link Project, and the Alberta Carbon Trunk Line. With 47 returning, will 2018 set the record for multi-billion-dollar projects under development in Canada.

5 Is this the year we break the $200-billion threshold?

At the time of release, the 2017 report stood at just over $187.5 billion. That number was adjusted to $186.4 billion a short time later, thanks in large part to a reduction in the cost of the F.G. Gardiner Expressway Strategic Rehabilitation Plan. We have already seen cost increases on a few of the projects in the top 10. Will those increases, along with the introduction of new projects, be enough to breakthrough the $200-billion mark?

For more information about the 2018 Top100 Projects report, and to read the latest news on the projects included in the annual report, visit *top100projects.ca*. And don't forget, tickets are now on sale for the 2018 Top100 Projects Key Players and Owners Dinner, taking place at The Carlu in Toronto on Tuesday, February 20th. To purchase tickets, or to sponsor the annual event, visit *top100projects.ca/celebrate*.

Andrew Macklin is the editor of ReNew Canada magazine.

Top100

Canada's Biggest Infrastructure Projects

MARK YOUR CALENDAR:

February 20, 2018

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APPOINTED


Phil Verster

The board of directors of Metrolinx has appointed **Phil Verster** as its new president and CEO.

Over the last 12 years, Verster has overseen operations and major construction of rail services in England, Scotland, and Ireland. Among his most recent assignments as a managing director of Britain's Network Rail have been running Scotland's railway operations, the ScotRail Alliance, and initiating work on the East West Railway, a new rail line linking Britain's high tech corridor between Oxford and Cambridge.

At ScotRail, Mr. Verster oversaw the delivery of $3 billion of new electrification of the Scottish railroad. Most recently, at the East West Railway, Mr. Verster led successful efforts to re-launch the project through creative partnerships with the municipalities and local leaders it will serve while simultaneously designing and engineering the project in the most cost effective way.


Scott Livingston

The Government of Saskatchewan has announced that **Scott Livingstone** has been named chief executive officer of the new Saskatchewan Health Authority.

Since April 2010, Livingstone has led the Saskatchewan Cancer Agency as president and chief executive officer. Previously, he served as CEO of the Saskatchewan Health Information Network (now eHealth Saskatchewan).

Livingstone will take on the formal role of CEO when *The Provincial Health Authority Act* is proclaimed and the Saskatchewan Health Authority is officially established. He will immediately begin to play a key role in helping to organize and build the new organization.

The 12 current Regional Health Authority CEOs will continue to lead the day-to-day operations of the RHAs until the Saskatchewan Health Authority launches. That date is still being determined, but is anticipated to occur in late fall 2017.


Eric Peissel

Eric Peissel, currently serving as WSP's vice president of transportation for Western Canada, will be assuming the role of national business line executive—transportation, for WSP in Canada on January 1st, 2018. This appointment follows the announcement that **Dave Jull** will be retiring from this role on the same date, after contributing more than 40 years of insight, leadership, and innovation during his tenure with the firm. Over the next fourth months, Peissel will work closely with Jull to ensure a seamless transition between the roles.

Peissel has been with WSP for over 16 years and has managed teams in Quebec, Ontario, and Western Canada. In his new role, he will be responsible for providing national leadership, client development, and strategic direction for the transportation business line. He will report directly to **Greg Northcott**, chief operating officer in Canada, and will be based in Montreal.


Mark Dvorak


Vladimir Stritesky

exp Global Inc. has announced that **Mark Dvorak** has been named as its new president in addition to his current role as chief operating officer. Former president and co-chief executive officer, **Vladimir Stritesky**, retired July 31st, 2017.

Dvorak was named Chief Operating Officer in April 2016. With over 20 years of experience, he has evolved from an exp staff engineer, to a senior project manager, to vice president transportation for U.S. Central operations. In addition to his solid technical and managerial skills, he has also nurtured many valued client relationships.

Stritesky became president and CEO in 1995. With his guidance, exp has diversified into several major market sectors and grown from a regional Ontario firm to a global organization with over 100 offices across North America. He has assumed the role of advisor to the CEO to ensure a seamless transition of leadership.

Ivan Dvorak will remain chairman of the board and will act as CEO of exp.


Faisal Kazi

Siemens Canada has announced the appointment of **Faisal Kazi** as president and CEO of Siemens Canada Limited. Kazi replaces former president and CEO and current chair of Siemens Canada **Robert Hardt**, who departed the company in June 2017 to take on the role of catalyst partner at next47, Siemens' separate unit for start-ups established in 2016.

As president and CEO, Kazi will be responsible for leading the overall strategic direction of the company.

Kazi joined Siemens in 1991 and has worked in various areas of the business in the Netherlands, Germany, and the United States. Prior to his appointment as president and CEO, he was senior vice president responsible for the energy management division in Canada and acted as the regional and sales head of the transformers business in North and South America. In this role, Kazi led major energy projects in Alberta, Manitoba, and New Brunswick.

Kazi is a passionate champion of Siemens Canada's corporate social responsibility programs, including the annual fundraising campaign for Cystic Fibrosis Canada.


Emma Mercer


Andy Jones

Carillion Canada has announced changes to its senior leadership team.

Emma Mercer has been appointed chief financial officer effective immediately. Since joining Carillion in 2008, Mercer has held several senior positions, most recently finance director of the UK construction business, prior to which she was chief financial officer and senior vice president of Carillion Canada.

Lee Watson has been appointed chief transformation officer on secondment from EY. Watson has been a partner at EY since 2008 during which time he has advised on numerous transformations and restructurings for UK companies. His appointment is effective immediately.

Andy Jones, currently president and chief executive of Carillion Canada, has been appointed chief operating officer, taking up this role effective October 1st.

In addition, the company has announced that chief operating officer Richard Howson, managing director of Carillion Construction Services Adam Green, and managing director of Carillion Services Nigel Taylor left the company on September 30th. Group strategy director Shaun Carter will be leaving the company by the end of the year.


Joanne McCall

Parsons has announced the appointment of **Joanne McCall**, senior vice president, to the position of market leader for the Greater Toronto Region. She will immediately assume responsibility for growing business in the

region, while she continues her current duties as Parsons' Civil/Structural Division leader for Canada until a replacement is named. In her new role, McCall will oversee regional business development not only in Parsons' Civil/Structural Division, but also in Parsons' Transport, Systems, and Industrial divisions.

"The government of Canada is making historic investments in infrastructure," said **Mike Johnson**, president of Parsons Group. "By more than doubling existing infrastructure funding, many projects that were once only a dream can now come to fruition. Our local team is ready to help, and Joanne will make sure that Parsons' capabilities, expertise, and legacy of delivering some of the most important infrastructure projects in Canada are well known and understood."

McCall is a licensed professional engineer in Canada and the United States and has more than 23 years of experience in infrastructure planning, design, management, and construction, both in North America and overseas. She has been with Parsons for 21 years through its acquisition of the Canadian firm, Delcan. Prior to joining Parsons, she worked for the Ontario Ministry of Transportation.

Martin Jobke

Kerry Rudd

Martin Jobke has accepted the role of president of the Associated Engineering group of companies, effective January 1, 2018. As part of the company's leadership succession, Associated Engineering's board of directors selected Jobke, a civil engineer with 33 years of experience, to succeed president & CEO **Kerry Rudd**, who will retain the role of CEO after the transition.

Since joining the company in 1987, Jobke has held roles of increasing responsibility, most recently vice president and general manager of Associated Engineering's B.C. operation. As a civil engineer, Jobke specialized in transportation engineering, and led the delivery of traditional and alternative delivery projects in the resource and municipal sectors. In his role as vice president and general manager, he expanded the B.C. operation to include offices in Victoria, Whitehorse, and Yellowknife, in addition to its offices in Vancouver and Kelowna.

RESIGNED

The City of Toronto announced that, after five years as chief planner and executive director of the City Planning division, **Jennifer Keesmaat** has decided to leave her position effective September 29 to pursue other interests.

Keesmaat joined the municipality in September 2012 and since then has successfully championed and led a wide array of projects including the first comprehensive plan for the downtown in 40 years (TOCore), Toronto's first Council-approved Transit Network Plan (Feeling Congested), OMB reform, Chief Planner Roundtables, the Ravine Strategy, Complete Streets Guidelines, Planners in Public Spaces, and the Planning Review Panel as well as partnered with other City divisions and agencies on a number of significant transit projects including the King Street Pilot Project, Scarborough Subway Extension, SmartTrack, Eglinton Crosstown LRT, Waterfront LRT, and the Relief Line.

Keesmaat's role with the City was her first foray into public service. Prior to joining the City, she was a principal at design firm Dialog and had a distinguished career as a planning consultant and strategic planner. Her career took her to international projects in the United States, Ireland, and Greece as well as across Canada.

Credits: ReNew Canada

Pierre Lapointe of FPInnovations (in Quebec) gives an overview of timber construction in Canada to the audience at Woodrise 2017.

Top: The RESCON team, including RESCON chair Bruno Giancola (4th from left), president Richard Lyall (7th from the left), vice-president Andrew Pariser (9th from left) and past chair Tad Putyra (right) pose at the 2.7-kilometre natural sand dune in Arachon, southwest France. **Bottom, L-R:** RESCON president Richard Lyall, joins Stephane Dion, Canada's Ambassador to Germany, RESCON chair Bruno Giancola, and board member Joe Francavilla for dinner in Bordeaux.

WOODRISE 2017 BORDEAUX, FRANCE

A team of builders from the Residential Construction Council of Ontario (RESCON) attended the inaugural world congress on tall wood buildings in Bordeaux, France in September. It was called Woodrise 2017, a joint Japan-France-Canada symposium on the imperative of intensifying urban areas and fighting climate change by building more tall buildings out of wood.

Wood is a sustainable building material that is unsurpassed in carbon capture and contributes to the global struggle with climate change. Stemming from the Paris Climate Accord obligations, countries such as France, Japan, and Canada (through British Columbia and Quebec)—three key green allies who participated in the symposium—are becoming leaders in building mid-rise and tall wood buildings.

Representatives from the Ontario Ministry of Natural Resources and Forestry updated those in attendance about the development of an alternative solutions guideline that would enable the permitting of a wood buildings over six storeys which will be released this fall. Furthermore, the National Building Code of Canada is considering introducing tall, mass-timber construction by 2020. This good news was received well by the RESCON delegates, especially after learning at Woodrise that Ontario is an importer of wood from Europe despite its vast forests.

As advocates of timber construction in Canada, RESCON president **Richard Lyall** joined Canadian Ambassador to Germany **Stephane Dion** and renowned B.C. architect **Michael Green** as three of the initial signatories of the International Woodrise Alliance.

Lyall was also recognized by his peers in the RESCON delegation for 25 years of outstanding service to the GTHA's residential construction industry.


Jane Bird, senior business advisor at Bennett Jones.


Former Nova Scotia premier Darrell Dexter ran the province under the NDP banner from 2009-2013.


Olivia MacAngus, vice president of corporate development for The Plenary Group.

Credits: ReNew Canada

THE INFRASTRUCTURE LAB TORONTO, ONT.

The Infrastructure Lab, an initiative from Global Public Affairs, brought together a panel of experts for a discussion on how the newly-elected B.C. government will impact infrastructure development in the province.

Moderated by Canadian Council for Public-Private Partnerships president and CEO **Mark Romoff**, the presentation began with a summary of the current state of affairs in B.C., with notes on what infrastructure promises were made during the campaign, what actions have been taken thus far, and who the key players in the government are from vice-president of B.C. for Global Public Affairs **Rebecca Scott**.

Following the overview, the discussion focused heavily on current and proposed infrastructure projects across the province and how the status of those projects could change over the life of the NDP-Green coalition government. **Jane Bird**, senior business advisor at Bennett Jones, discussed how the removal of tolls from the Port Mann and Golden Ears bridges will impact the development of the $3.5-billion George Massey Tunnel Replacement project, which is currently in procurement.

A discussion followed that focused on the shift in priorities that could occur under the new leadership. Former Nova Scotia premier **Darrell Dexter** talked about how any change in leadership will take a fresh look at infrastructure priorities, causing a shift in what gets developed first. Based on promises made during the campaign, and the strength of the NDP support in the Greater Vancouver Area, the speculation was that transportation and transit projects in that region would be of particular focus. Those projects are likely to include replacing the Pattullo Bridge, construction of the Broadway Line, and the development of the Surrey LRT.

From a contractor side, **Olivia MacAngus**, vice president of corporate development for the Plenary group, discussed that this government looks poised to continue infrastructure development, which should mean plenty of opportunities for contractors in Western Canada.

COMMUNITIES OF PRACTICE EDMONTON, ALTA.

ReNew Canada publisher **Todd Latham** joined 26 other government leaders and association representatives from eleven provincial and territorial asset management Communities of Practice (CoP) in Edmonton for a national workshop designed to develop a collaborative framework among the various organizations.

The in-person, three-day meeting which was facilitated by **Guy Felio** (a.k.a., Dr. Infrastructure) explored ways to share information and assist each other across Canada while continuing to deliver asset management services to our communities. Having regionalized communities of practice recognizes the differences in the size, physical location, function and legislative realities within each jurisdiction so the discussions focused on ways to collaborate and share resources, tools and best practices that would not just help advance asset management practice locally, but also provide a national, harmonized voice. The group will meet again in Quebec City at the end of October with the intent of creating a final structure and mandate for the group.

Each CoP is structured to meet local needs related to public infrastructure asset management and was created to provide for knowledge transfer and information sharing among their respective communities and constituents. The groups who participated in Edmonton were: Atlantic Infrastructure Management (encompassing Newfoundland and Labrador, Nova Scotia, New Brunswick, and Prince Edward Island), CEIRU (Quebec), Asset Management Ontario and the Ontario Coalition for Sustainable Infrastructure (Ontario) Asset Management Saskatchewan, Infrastructure Asset Management Alberta, Asset Management BC, and Yukon Asset Management. Manitoba and NWT are also represented and will be forming similar groups. The Canadian Network of Asset Managers (CNAM) is the national CoP and also participated. CNAM helped bring the group together through an offering of the Municipal Asset Management Program (MAMP), delivered by the Federation of Canadian Municipalities and funded by the Government of Canada.

For more details on the program, visit *fcm.ca/assetmanagementprogram.*


From left to right: Steve Blayney, Jennifer Rose, and Andrew Stevenson.

Credit: CPWA

APWA PUBLIC WORKS EXPO ORLANDO, FLA.

The Canadian umbrella chapter CPWA always hosts a fun 'Team Canada' luncheon at PWX and this year **Mike Sullivan**, executive director of the Canadian Common Ground Alliance (CCGA), was the speaker. He addressed the importance of damage prevention and expressed support for the *Underground Infrastructure Safety Enhancement Act*.

One of the highlights of the luncheon was the announcement of the winners of the CPWA National Public Works Week Awards contest. These awards recognize municipalities who go the extra kilometre to advocate for and educate the public about public works in their community. **Jennifer Rose**, director of environmental services for the City of Vaughan, Ont. accepted the Large/Metro Centre award from **Steve Blayney**, CPWA director for Manitoba, and CPWA president **Andrew Stevenson**.

Credits: ReNew Canada

SNC-Lavalin's Francois Vitez leads the panel discussion on new and emerging energy storage opportunities in Canada.

Ontario deputy minister of energy Serge Imbrogno.

Julie Blunden of the California Clean Energy Fund discusses how energy storage will be a market driver of the next decade.

ENERGY STORAGE CANADA TORONTO, ONT.

The technology and innovation behind energy storage (ES) is evolving quickly, and both the private and public sector are taking notice.

As discussed at this year's Energy Storage Canada conference in Toronto, there are growing opportunities for the technology both at home and abroad, as the quality and capacity continue to improve.

The National Research Council of Canada (NRC) is in the process of releasing its roadmap for energy storage opportunities in this country, first turning its focus to evolving energy needs in Alberta. The research is identifying the " […] market potential, roadblocks, and actions required at the planning and procurement […]" stage in order to ensure the adoption of ES technologies by 2021. The project scope was done with three pillars: market opportunity, technology assessment, and economy and environment. As a result, the NRC will be able to provide detailed information of where the best opportunities for market penetration of ES technologies exist in the province. Following the release of the report, NRC will focus its attention on similar research in both the Ontario and Atlantic Canada markets.

In a panel discussion focused on the current implementation of ES technologies, the conversation focused on the numerous challenges that are currently impeding wider adoption. Funding continues to be an issue, not just for the development of the technology itself, but for covering the day-to-day costs in efforts to sell the technology. Research and development can run dry, quickly, leaving little room for covering operations costs while trying to secure clients. There is also the challenge of moving beyond the 'industry pedigree', trying to convince people that startup technologies are better than more expensive products available from companies with well-established names in the business. There are always concerns about 'fly-by-night' companies, ones that won't exist long enough to service the ES product should an issue arise, and solutions need to be found to assuage those concerns.

But there clearly are opportunities for the industry. As the technology improves and the solutions compact, concerns over the physical footprint of an ES solution are removed. This is especially important in some of Canada's major centres, where extra land for energy creation and storage is not available for most companies.

The energy storage industry continues to expand in size and scale. And with the quality and capacity of the technology rapidly improving, the opportunities for energy storage in Canada continue to grow.

Credits: ReNew Canada

Brad McLellan and Dan Ferguson of WeirFoulds discuss the importance of project documents.

A panel discussion looked at funding mechanisms available for municipal infrastructure.

WEIRFOULDS INFRASTRUCTURE FORUM TORONTO, ONT.

The third annual infrastructure forum hosted by WeirFoulds LLP turned its focus to municipal infrastructure, exploring how projects can promote economic development and revitalize the core of our cities.

Ron Bidulka, managing director for consulting and deals and PricewaterhouseCoopers LLP, began the discussion by suggesting that the move to build events centres for arts, cultural, and sports and recreation facilities on the outskirts of town has changed, as cities now look to these facilities to help revitalize downtown cores and provide the amenities needed to create the 18-hour city. This move has already been seen in cities like Edmonton, Ottawa, Kingston, and Moncton, where large sports and entertainment centres have moved into the downtown, providing nearby residents with the ability to work, live, and play within a few kilometre radius.

In the case of Oshawa, as explained by director of economic development services **Kyle Benham**, new projects like its downtown arena and regional courthouse have been key components of an overall redevelopment strategy that is changing the community. Once seen primarily as a manufacturing hub, the city has diversified its economic opportunities and introduced transit-oriented development to make the community a destination for commuters and families in the Greater Toronto Area.

As the discussion progressed, presentations from the team at WeirFoulds focused on making sure those community infrastructure projects are structured for success. That includes the importance of properly-developed project documents, managing risk allocation, and identifying the best source for financing the build. By addressing these key components of the development process, public infrastructure projects can improve the economic development of a city's core.

IS **EVIDENCE-BASED PLANNING** DEAD?

By Matti Siemiatycki

The question arises in response to a long litany of recent cases where evidence has mingled uncomfortably with political expedience in the selection and approval of billion dollar transportation, energy, and social infrastructure projects.

At its core, the principle of evidence-based planning is deceptively simple, designed to achieve the appropriate balance between the political and technical inputs into decision-making.

The role of politicians is to establish the project objectives as the voice of the citizenry in a democracy, with input from the community.

Then the independent civil service and their hired consultants undertake impartial assessments of the project merits, to consider the financial, environmental, and social benefits and costs of the undertaking.

Following study completion, the politicians are meant to weigh the collected body of evidence and consult further, and then select the options that best meet the project objectives at the lowest cost.

The attraction of evidence-based planning is that it is intended to support the rational, transparent, and efficient allocation of scarce resources, and guard against politically motivated boondoggles.

Over the past decade, the Canadian planning establishment has embraced the evidence based planning paradigm for large infrastructure projects. Business case assessments, benefit cost studies, and environmental assessments are now standard practice nationwide.

And yet in practice, in recent years we have seen all sort of ways that evidence based planning can be used and abused.

Analysts and civil servants are pressured to fit evidence to meet the politically favoured solution. Study findings are cherry picked to provide the healthiest picture of a project. Unfavourable evidence is vigorously contested and undermined. And when it comes time to make decisions, the evidence is often entirely disregarded.

Indeed, the current state of affairs has seen evidence based decision-making replaced by a more insidious form of policy based evidence-making.

The misuse of evidence in the planning and selection of infrastructure mega-projects should be cause for great concern.

Proceeding with ill-conceived mega-projects is wasteful of public money. And undermining evidence based planning diminishes community trust in the producers of technical evidence and challenges public support for the need to invest in infrastructure, which has taken decades to build.

Reinvigorating the practice of evidence based planning requires strategies to support the integrity of the process, and the appropriate allocation of the political and expert roles.

Complete transparency of all technical evidence produced during the study of mega-projects should be mandatory prior to the approval of any project.

Independent peer reviews can be required to assess the quality of the evidence for all mega-projects, and provide a public recommendation of the preferred option. Politicians would then need to justify their decisions if they deviate from the evidence-based recommendation.

Finally, as professor Bent Flyvbjerg from Oxford University argues, professional sanctions and even criminal prosecutions should be pursued in cases where willful manipulations of evidence take place.

While harsh, there are major financial and social consequences of proceeding with mega-projects that are unlikely to fulfill the public interest based on misrepresented evidence.

Without radical solutions, evidence based infrastructure planning will cease to exist. Canadians will be worse off should this development come to pass.

Matti Siemiatycki is an associate professor in the Department of Geography and Planning at the University of Toronto.

RESIDENTIAL AND
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INFRASTRUCTURE ONTARIO: A Key Agency to Implement the Long-Term Infrastructure Plan

With billions of dollars at stake and an Ontario economy in need of productivity-enhancing infrastructure, a new study says that improvements could be made to the evaluation process used by governments to select projects.

The study, written by former Ontario deputy minister Michael Fenn and commissioned by the Residential and Civil Construction Alliance of Ontario, is called "Infrastructure Ontario: A Key Agency to Implement the Long-Term Infrastructure Plan."

Consider this: more than $200 billion has been pledged by the federal government and Queen's Park over 12 years for Ontario infrastructure – hospitals, bridges, roads, transit, sewage and water systems, and more. If this money is spent wisely, and based on integrated decision-making, Fenn says that Ontario could witness another Golden Age such as in the 1950s and 1960s where major investments transformed our economic and social landscape.

Among the study's findings:

- Better decision-making structures should be put in place to elevate infrastructure planning and project selection.
- Infrastructure Ontario's Alternative Financing and Procurement (AFP) model provides good value for money and sound "insurance" for the delivery of large or complex projects when compared with many traditionally procured projects.
- Positive AFP-type provisions could be incorporated into traditional procurement processes to offset costly and time-consuming mid-project changes that often occur.
- An "innovation dividend" of 10 per cent could be achieved through the AFP process, which could save Ontario taxpayers several billion dollars over the next decade.

Fenn adds that while Infrastructure Ontario has been effective at delivering many major projects, governments need to be more courageous and forward-looking to pave the way to prosperity.

"Projects that might have seemed expensive in the 1950s are now viewed as wise investments," Fenn says. "The same holds true today, but we must ensure that projects are justified based on rigorous study and analysis."

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