

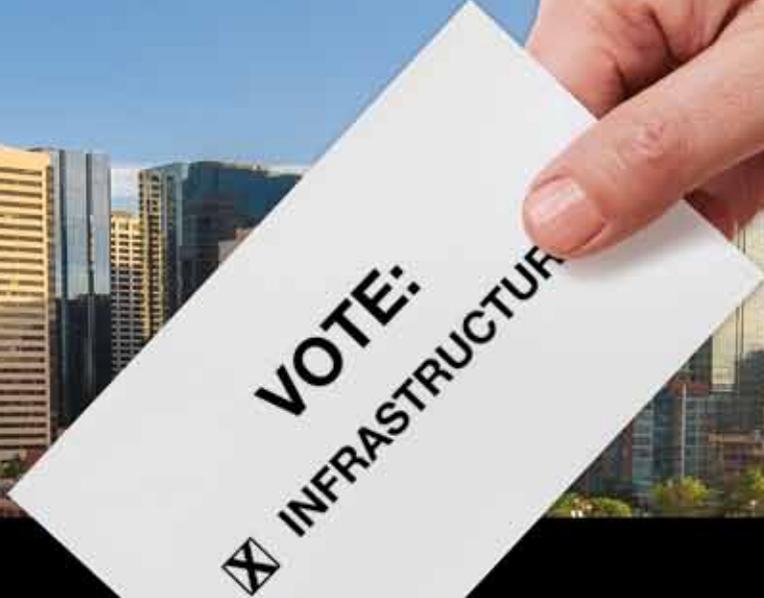
ReNew

May/June 2018

C A N A D A

The Infrastructure Magazine

- + Failure Mitigation
- + The Retrofit Economy
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ReNew

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The Infrastructure Magazine

MAY/JUNE 2018

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MAYBE YOU SHOULDN'T RUN FOR OFFICE

By Andrew Macklin

There is no need for me to explain why investing in public sector infrastructure is a high priority for every level of government. We can all clearly see what decades of under-investment has meant for our ability to provide basic, expected services for our citizens at a reasonable level of quality. But in the last several months, especially in the Greater Toronto Area but also throughout other parts of the country, we have seen what happens when the shovel-ready desires of politicians conflict with the thoughtful, researched approach to infrastructure development: a costly clash that puts millions of dollars at risk of poor investment.

A case in point is the conflict between the Ontario Ministry of Transportation, the City of Toronto, and Metrolinx. The first two parties, as a result of political influence, have attempted to override the decisions made by Metrolinx for transit development, decisions that are based on thorough research as part of an extensive planning process. Transit stops like Lawrence East, Kirby, and Park Lawn, originally deemed by Metrolinx as not worth considering, have somehow become priorities, most likely as a result of this outside influence.

Somehow, the NIMBYism that has plagued attempts for thoughtful development in decades past has reached a new level; one where people in positions of power wield their mighty fist to rally the troops to

fight hundreds of millions of dollars in investment that has been written off by the experts as unnecessary, redundant, and/or wasteful. And at the same time, our bridges crumble, our transit systems are over-capacity, and our hospitals are bursting at the seams.

But then, as election season approaches, politicians scramble to find ways to secure the votes needed to win. Sometimes that means pushing for a transit stop that the people want, even when the experts say it shouldn't be built. And even though the experts are right, the threat of a new contender looms, and the decision to cave to the wants of the voters, rather than the experts, becomes reality.

We are at a tipping point. We have more needs than money when it comes to infrastructure development and rehabilitation. Every dollar must count. Every dollar must be spent wisely.

So I've got an idea. If you think that the immediate, short-term desires of your community outweigh the fact-based direction from experts and the longer-term needs for municipal and regional development, maybe you should do us all a favour and not appear on the next election ballot. We clearly can't afford your brand of politics. ✱

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With elections looming, where could infrastructure be a battleground issue?

Read more on page 8.

BILATERAL AGREEMENT WORTH \$11.8 BILLION FOR ONTARIO



The signing of the bilateral agreement between the Government of Canada and the Government of Ontario for Phase Two infrastructure funding will result in over \$30 billion invested over the next decade.

The breakdown of the **\$11,846,483,456** in federal government funding is:

\$8,340,401,116 for public transit;

\$2,848,855,330 for green infrastructure;

\$407,159,893 for community, cultural & recreation infrastructure; and

\$250,067,117 for rural and northern communities' infrastructure.

The new funding will allow communities to start moving forward with identified priorities, including transit megaprojects throughout the Greater Toronto Area.

NEXT ISSUE: JULY/AUGUST THE INNOVATION ISSUE

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SUPERLINX IS A PRACTICAL SOLUTION TO AN INTRACTABLE PROBLEM

The Toronto Region Board of Trade recently kick-started an informed debate about transit governance in the Greater Toronto and Hamilton Area. Its “Superlinx” proposal is a bold idea worthy of serious consideration.

The Board suggests uploading the region’s 11 municipal transit systems to a new provincial agency instead of continuing to build, operate, and maintain them on a fragmented city-by-city basis. Some municipal officials would participate in governance of the new agency, but all assets and liabilities would be uploaded, freeing up fiscal capacity for cities to address other priorities.

Like most ambitious proposals, some experts immediately poured cold water on the idea. Ironically, many called on the board to slow down, as if transit development has proceeded too quickly in recent years. While time will tell where any of this goes, Superlinx raises the bar for campaign commitments in a year when Ontarians head to the ballot box municipally and provincially.

Lost in the debate so far is how Superlinx fits into the macroeconomic business cycle. While the Canadian and global economies have enjoyed upward momentum since the Great Recession, growth will eventually contract. In response, governments of all stripes will pursue stimulus measures focused on infrastructure. Institutional investors will also prioritize infrastructure in stable jurisdictions. Cities across the Toronto-Waterloo corridor should recognize that another free-for-all for stimulus dollars will not deliver better results than rallying behind a common regional body with the responsibility, authority, and accountability to deliver on what constituents want most: tangible progress on regional mobility.

The board recognizes that the regional level is the local level, especially from an investment perspective. The more we talk “local” and continue to focus on individual LRT projects, bus routes, and separate authorities, the more distant we sound from global trends and capital markets. Cities like Paris, London, and New York use regional authorities to manage transit, and there are numerous capital-intensive infrastructure programs that citizens already recognize are better delivered through agencies at higher levels of government, including power generation, aviation, and health care.

We can do more to leverage our common strengths as a world-leading financial and infrastructure-delivery super cluster. International delegations routinely visit Infrastructure Ontario and the Canadian Council for Public-Private Partnerships to learn our best practices. The new Canada Infrastructure Bank headquartered in Toronto will help accelerate innovative infrastructure development. Canada’s pension funds, life insurance companies, and institutional investors already invest billions in transportation projects across the nation and beyond.

Municipalities do not have the debt capacity or revenue tools to pay for the scale of investment required. A provincial agency would be uniquely positioned to bridge the gap between the region’s strong cities and the federal government, private sector, and international investors. Superlinx would finally move transit to funding, in contrast to stale debates about moving funding to transit.

Clark Savolaine is a senior manager in KPMG’s Deal Advisory–Infrastructure practice in Toronto. All views expressed here are his own.

Credit: Government of B.C.



B.C. PROVIDES FUNDING FOR HIGH-SPEED RAIL STUDY

Washington Governor Jay Islee with B.C. Premier John Horgan.

Northwest grows in economic importance, and we look to reduce barriers to expansion across our borders.”

An economic analysis released last month by Washington state estimated that a high-speed corridor link could create up to 200,000 jobs for B.C. and U.S. workers, and generate billions of dollars in economic benefits for the Cascadia Innovation Corridor between B.C., Washington, and Oregon.

The Washington state legislature last week approved funding of up to US\$1.2 million toward the new in-depth study.

The new study will build on the previous preliminary analysis, and will consider the practicality and business case for a high-speed corridor service by addressing factors such as ridership levels, system development, delivery methods and financing. It will include involvement by key community representatives, and stakeholders from the public and private sectors.

The consideration of a high-speed corridor is part of B.C., Washington, and Oregon’s plan to strengthen the region’s global economic competitiveness and stimulate job creation. ♣

As part of ongoing efforts to strengthen the partnership between British Columbia and Washington state, the B.C. government will help fund a study of a potential ultra-high-speed corridor service connecting Vancouver with Seattle, Portland, and beyond.

“The convenience of a one-hour trip

between Vancouver and Seattle would create countless opportunities for people in both B.C. and Washington, from sports or concert getaways for families, to untold economic growth potential for businesses,” said Horgan. “Exploring the possibility of creating a clean, efficient high-speed corridor is particularly important as the Pacific

Credit: Ville de Québec



An artist's rendering of part of the tramway network.

QUEBEC CITY UNVEILS PLAN FOR TRAMWAY NETWORK

Québec City has presented the components of the transit structuring network project, which will re-invent the city’s transit network and provide better service for crowded commuter lines. The project is estimated to cost close to \$3 billion.

“It is largely thanks to the support of the Government of Quebec that we can achieve one of the largest collective projects in history designed for Quebec City. The active participation and dedication of the members of the advisory committee on sustainable mobility, coupled with the commitment of the citizens, allow us to present a project that propels Quebec towards modernity,” said Régis Labeaume, mayor of Quebec City.

The existing public transit system is at maximum capacity in several locations. It will be difficult to cope with the increase in planned travel in the coming years without bringing in new modes of travel. The

structuring network will bring this increased ability to carry more people in the same period of time.

The new transit structuring network will have four components:

- Tramway (23 kilometres, including 3.5 kilometres underground);
- Trambus (17 kilometres);
- Public transportation infrastructure (16 kilometres); and
- Metrobus (110 kilometres).

Related project work (development, street extensions and infrastructure upgrades along the route) will cost about \$300 million. This development includes the reconstruction of Laurier and Hochelaga Boulevards and the extension of Mendel Street.

Current plans call for the network to be commissioned in 2026, pending the awarding of provincial and federal funding for the project. ♣

Online at renewcanada.net



NEWS: Ontario commits \$11 billion to high speed rail. bit.ly/Ont-HSR



NEWS: Transurban acquires Montreal toll highway. bit.ly/MONToll

Top 100 Canada's Biggest Infrastructure Projects VISIT top100projects.ca FOR UPDATED 2018 LIST!

Victoria's infrastructure was hard hit in 2017, with both record lows and record highs in rainfall within months of each other.



VICTORIA'S INFRASTRUCTURE REALITY

Mayor **Lisa Helps** understands how climate change impacts her community.

By *Andrew Macklin*

If you had walked just a few steps in any direction at the Federation of Canadian Municipalities' Sustainable Communities Conference in Ottawa, you would have heard the sound of municipalities sharing stories about the challenges they are facing in their efforts to combat the impacts of climate change.

"Here, hundreds of people are gathered from across the country who all work in and around cities who are taking climate change seriously," said Lisa Helps, mayor of Victoria.

The west coast of Canada, and Victoria in particular, has had a difficult time adapting to the new climate reality that has left municipalities scrambling to make adjustments. This past summer, the city set a record for the most consecutive days without precipitation, going more than 50 days without any rain. In inland communities, such a dry spell would undoubtedly lead to water shortages and create a heightened risk for forest and vegetation fires. But in Victoria it caused a different problem, one unforeseen by the municipality: what do you do with all of the bird poop?

What may seem like a minor issue can wreak havoc for a municipal budget. And in a town like Victoria, whose economy is partially driven by tourism revenues in the summer season, seemingly-minor aesthetic

issues can create a serious problem for a community's bottom line. The water resources needed to clean the buildings and streets, along with the staff needed to do the job, caused an unpredicted strain on municipal resources.

And then, just a few months later, in November, the exact opposite happened. The city experienced the largest amount of rainfall ever for that month, with rain events on 28 of the 30 days that month. That created a further strain on infrastructure resources, in the same fiscal year as the stress from the summer.

At the same time, the city has multiple significant new infrastructure projects in the works. The city is in the process of building a new bike lane network within the core. By the end of 2019, the first phase of the development, 5.6 kilometres, should be completed. In the three years to follow, that network will expand to 25 kilometres.

"The visibility of that makes it a very challenging project," said Helps, referring to the work that has to be done to fit new infrastructure into existing roadways. But the end result is that approximately 75 per cent of residents will live within 400 metres of the network, significantly improving mobility options for the community.

The city is also trying to improve its recreation infrastructure, as it embarks

on the Crystal Pool and Fitness Centre replacement project. In the design stage, Helps believes this is a project that should gain support from other levels of government in order to move forward.

"We've been working very hard with the federal and provincial government. We think it's a project that ticks all their boxes in terms of outcomes, accessibility, greenhouse gas reductions, and community well-being."

And at the same time as it attempts to move forward with the recreation project, it will move forward with the most unique project in the city's history: an integrated fire hall/emergency services facility. The new project, with an estimated total cost of \$35.9 million, will replace the current Fire Hall #1 with a larger station that will allow B.C. Emergency Health Services to lease space for an office and four ambulances. The new space will meet today's seismic standards, and is targeted to be completed by the end of 2022.

Like so many communities across Canada, Victoria is progressing with new integrated and adapted infrastructure, while still building the capacity to handle the challenges faced as a result of the changing climate. ♣

Andrew Macklin is the editor of ReNew Canada magazine.

Infrastructure will be a key issue in elections across Canada in 2018, with 81 per cent of the population able to cast a ballot this year.



2018 ELECTION PREVIEW

Municipal, provincial elections that could impact infrastructure spending.

By Andrew Macklin

In 2018, nine of Canada's 13 provinces and territories will see its communities head to the polls to vote in either provincial or municipal elections. Representing over 81 per cent of the country's population, the leaders elected will have a significant opportunity to influence infrastructure construction and rehabilitation budgets and priorities.

The Ontario battleground

The election season begins in Canada's most populous province, Ontario, with a provincial election to take place on June 7th. There was discussion that the date could be moved up, but current Premier Kathleen Wynne has chosen to keep the date as it was originally set.

Wynne has been the subject of record-low approval ratings in the past 12-18 months, and the party is at risk of losing its first election in almost 15 years. This comes in spite of the scandal at the top of Ontario Progressive Conservative Party (PC) with the abrupt resignation of Patrick Brown amidst sexual misconduct allegations. The party hurriedly put together a leadership campaign

that saw Doug Ford become the new leader. Ford should, if the polls are correct at press time, become the next Premier of Ontario.

Should the PC's rule the day, the transit landscape in the Greater Toronto Area could change. The party's original platform included plans to invest an additional \$5 billion for new subways in the GTA (read: Downtown Relief Line) and assume responsibility for maintenance and investments in the system. There was also a health care commitment to create 15,000 new long-term care beds in the next five years, as well as invest in building a comprehensive mental health care system (no indication on the physical infrastructure that would include). But Ford has indicated displeasure with components of the original platform, and commitments to infrastructure development are up in the air.

If the Ontario New Democratic Party (NDP), led by Andrea Horwath, are able to find a way to victory, they have stated that they will suspend the use of P3s in the province, commit significant resources to fix the health care system, and improve broadband infrastructure in remote and

northern communities.

Among the infrastructure projects to be at the centre of discussion during the campaign is the proposed high-speed rail line, the \$21-billion initiative that would represent the most expensive public sector project in Canadian history. The Liberals are pushing forward with the line that would run from Toronto to Windsor, with an \$11 billion pledge to help fund the project in its 2018-19 budget. The PC's have committed to continue the environmental assessment (EA) phase, but have made no commitment to the project beyond that, while the NDP are supportive of the project moving forward, but would like to see the results of the EA first.

The flurry of fall

The country can take a breath and watch election signs pop up all summer long before the flurry of activity begins just as the seasons turn to fall.

The season starts with two other provincial elections, with New Brunswick going to polls on September 24th followed by Quebec a week later on October 1st. In New Brunswick, early polls suggest that Premier

Brian Gallant is well on his way to a second term in office. Premier Gallant has shown he is committed to strengthening the quality of the province's infrastructure, and announced \$670 million for repairing and replacing the province's bridge infrastructure in January, one of the most significant commitments in New Brunswick's history.

In Quebec, there is the potential for the first non-Liberal or Parti Quebecois government for the first time in a half century as the nationalist Coalition Avenir Quebec hold the lead in the polls with six months to go. And at least one significant unfunded transit initiative could become a political football ahead of election day. Montreal Mayor Valerie Plante committed to the construction of the Pink Line during her election campaign in November of 2017, a new subway line that comes with an estimated \$5-\$6 billion price tag. As of the time this article was published, no political party in Quebec had announced if it would commit the token one-third of the project cost, but as the impacted Montreal ridings are engaged during the campaign, expect the parties to take sides on this billion-plus-dollar commitment.

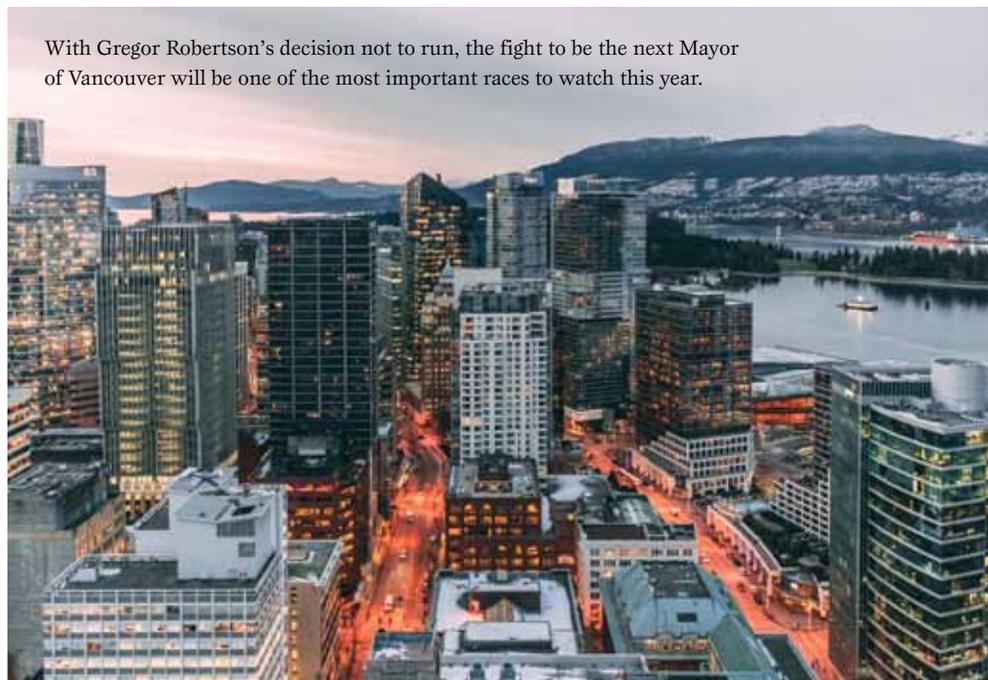
Three key municipal elections will play out over the span of five days: October 20 in British Columbia, October 22 in Ontario, and October 24 in Manitoba.

Two weeks later, municipalities in each of three Canadian territories vote in municipal elections. There is the potential for numerous infrastructure issues to be key issues during those campaigns, including solutions needed regarding clean energy, all-season roads, and broadband access to name a few.

Five days in October

Immediately following the elections in the territories, three key municipal elections will play out over the span of five days: October 20 in British Columbia, October 22 in Ontario, and October 24 in Manitoba.

We already know that Canada's third most populous city has a vacancy in the top chair, as three-time Vancouver mayor Gregor Robertson announced in January that he will not seek re-election. As contenders emerge for the job, infrastructure should play as a key issue throughout the city and surrounding communities. In town, candidates will have to weigh in on how to build government support for the estimated \$1.2 billion redevelopment of St. Paul's Hospital, and supporting the construction of the \$350-million Vancouver Art Gallery.



With Gregor Robertson's decision not to run, the fight to be the next Mayor of Vancouver will be one of the most important races to watch this year.

Credit: Aetiva Chinture

In the communities surrounding Vancouver, replacement of the George Massey Tunnel, pushing for provincial and federal funding to enable builds associated with TransLink's 10-year vision, and ensuring funding is in place for phases 2 and

it is yet to be seen if anyone else will be able to mount a serious challenge to Tory's first re-election bid.

Two days later, we'll find out if anyone can dethrone an incumbent mayor in Winnipeg for the first time in 62 years. Politically, there have been rumblings that mayor Brian Bowman has alienated citizens on both the left and right of the voter spectrum. From an infrastructure perspective, Bowman has had the difficult task of balancing multiple significant infrastructure projects in the transit, transportation and water/wastewater sectors, while also working to mend old wounds from regional communities including the construction of the all-season road connecting Shoal Lake 40 First Nation. A report released in March suggested that the city possesses a \$6 billion infrastructure deficit. And it will also be the first election in 2018 where Jenny Gerbasi will not appear on the ballot. The outgoing chair of the Federation of Canadian Municipalities has announced that she will not run after five consecutive terms on council.

Following the five-day municipal free-for-all, voters in PEI will head to the polls on November 5 for municipal elections. The year will be rounded out by votes in hamlets in Nunavut and Northwest Territories on December 3 and 10 respectively.

Perhaps nothing dramatic will happen in the results of the 12 election campaigns of 2018. But with billions of dollars needed to continue to close Canada's infrastructure gap, it will be imperative to support those who infrastructure funding a key platform component for the upcoming campaign. 🌱

3 of Royal Columbian Hospital will be among the large-scale projects that will be on the minds of candidates during the campaign.

In Ontario, there are several cities where looming large-scale infrastructure projects could influence the election results. In London, council approved a plan for a \$440-million bus rapid transit system after months of heated debate, debate that could reappear as the city goes to the polls. In Waterloo, early update of the Waterloo ION LRT, and plans for phase two of the project, will grab the attention of voters. In northern Ontario, could Thunder Bay's council inability to secure government support for the proposed event centre cause members of council to lose their positions?

And you can't mention Ontario, in this context, without bringing up Toronto. The city is facing a multi-billion-dollar infrastructure backlog, including the Rail Deck Park and the aforementioned Downtown Relief Line. Mayor John Tory was to originally be challenged by outspoken former councillor Doug Ford, who instead chose to focus on the leadership race for the Ontario PC Party. With Ford out of the race,

Andrew Macklin is the editor of ReNew Canada magazine.



Southern subway stations in Toronto have experienced over-crowding for decades. However, the focus has been on expanding the reach of the subway outside of the city, adding even more people to the busy line.



#GIMMERELIEF

Take politics out of transit planning before safety is compromised.

By Andy Manahan

It was January 30, 2018 when all eyes were on Canada’s busiest transit hub—Bloor-Yonge subway station in Toronto.

That’s the day when a vortex of bad circumstances aligned—16 problems during a three-and-a-half-hour period of chaos on Toronto’s subway system, including a frozen switch at one station at the northern end of one line, train door problems, emergency alarms, trains skipping one packed station only to further crowd the already over-capacity Bloor-Yonge (B-Y) stop, a faulty, smoking train stalling on its way to a yard for repairs causing a 20-minute delay for the next train, and a fight breaking out.

As transit users flooded into B-Y station, many people stood precariously close to the edge of platforms as they waited for delayed trains.

For some perspective, Toronto’s Line 1 Yonge-University subway line serves more than 700,000 daily transit trips; the entire line, but particularly the southern portion south of B-Y, has experienced overcrowding for many decades, says Toronto transit author Ed Levy in his book *Rapid Transit in Toronto: A Century of Plans, Progress, Politics and Paralysis*.

One urban issues writer, John Lorinc, wrote for *Spacing* magazine that the looming tragedy of someone being “accidentally shoved in front of a moving subway at Yonge and Bloor due to critical over-crowding on the platforms during rush hour [...] is no longer a question of ‘if’ it is a question of ‘when.’”

in 1969. Then, it was proposed to extend north beyond Eglinton Avenue.

The plague of politics

In Toronto, the problem with transit investment decisions is a nefarious form of what is seen in Montreal and other Canadian municipalities—

Gathering the facts to make effective transit planning decisions is often under-valued by those who want to make the case for preferred pet projects.

“Will it be you?” he pondered ominously. Although reasons have been provided for what led to this nightmare situation, a long-overdue solution is to build the subway Relief Line. In fact, Andy Byford—former chief executive officer of the Toronto Transit Commission (TTC)—said this is Toronto’s top priority.

The Relief Line has been promoted by leading transit advocates for many decades, and the TTC first recommended building the Relief Line (a.k.a. the Queen Street Subway)

politics often takes priority over the needs of the majority. Gathering the facts to make effective transit planning decisions is often under-valued by those who want to make the case for preferred pet projects.

After all, what’s the downside to transportation planners going along with a politically skewed plan—it’s only the public’s money, right? Except that there’s a limit to public coffers—sooner or later, the well runs dry and public confidence about these decisions diminishes.

A Globe and Mail article published last March featured related comments from David Crowley, a former TTC senior service planner specializing in data analysis and demand forecasting. He told writer Stephen Wickens: “Toronto’s biggest transit problem is we’ve overloaded core parts of the subway. We’d basically done that on lower Yonge 30 years ago, when I was still at the TTC. We have to relearn the importance of downtown to the whole region, the whole country. We’re in danger of killing the golden goose.”

Taking action

The Residential and Civil Construction Alliance of Ontario (RCCAO) has been banging this drum for a while. Four years ago, RCCAO produced a four-part video series (hosted on the RCCAO’s YouTube channel) to tackle how the Greater Toronto Area has lost many opportunities to improve transit because politics has dominated the planning process.

The videos provide an evidence-based argument to show how transit planning can be improved—by allowing transportation planners and engineers to provide alternative solutions and priorities based on existing and projected needs, all within a broad, multi-modal network context.

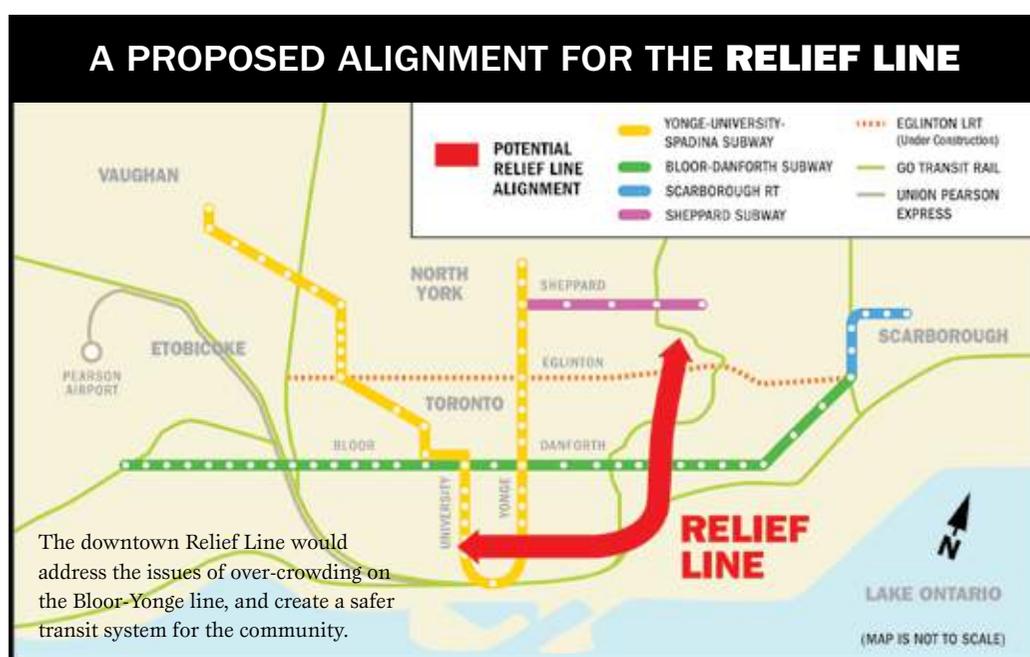
The second video in the series reveals that “nowhere is overcrowding worse on the TTC than on the Yonge line and at Yonge-Bloor station.” Through an extensive analysis of a time-series database, Crowley concludes that the Yonge line overcrowding is largely due to a tripling of commuters from York Region—the region north of Toronto—heading downtown over the past 25 years.

The third video confirms that most politically driven projects do not address Yonge line overcrowding, and that the ultimate solution is a Relief Line.

Our hope is that city council will do the right thing and commit to the Relief Line project most (or at least some) of the \$4.9 billion pledged recently by the federal government to Toronto transit. It is long overdue.

Why does it take five decades, plus another 13 years if all goes to plan—let’s make that 60-plus years—to solve a transit problem that now calls into question the safety of transit users toeing the edge of packed subway platforms?

The estimated price tag for the Relief Line is \$6.8 billion that would place it at No. 7 on ReNew Canada’s Top 100 list for



2018. Imagine how much more cost-effective this project would have been 49 years ago. To date, only \$150 million has been earmarked by the Ontario government for a planning and design study.

Imagine how a third north-south line would have transformed the city, linking the Don Valley communities with the downtown and providing relief to the Bloor-Danforth and Yonge lines.

As it stands, there won’t be any relief for Toronto transit riders any time soon—construction on the Relief Line isn’t expected to be completed until 2031, and that’s only from the financial district to Pape Station on the Danforth line, which will offer limited benefits compared to the completion of the line to at least Eglinton Avenue as recommended by the TTC in 1969.

The City of Toronto can’t wait 13 more years to relieve the pressure on its subway lines and stations. Even though costs have risen over the past few decades, further delays will dramatically increase costs.

Too often, politicians draw lines on maps without regard to network context and make decisions for short-term political gain. Even with rapid residential and commercial growth in downtown Toronto, political intervention has meant that this project has remained a low priority.

Unfortunately, the city gets stuck with politically charged transit decisions that lead to ill-conceived projects such as the Sheppard line, which did nothing to help relieve the pressure where it’s felt most.

With leaders in York Region and Scarborough pushing to extend transit TTC services to the north and east respectively, those extensions would bring far too many riders to the Yonge line and Bloor-Yonge station. Instead, improved GO

train service would offer better options than the proposed subway extensions. Subway trains coming from North York and Scarborough are already overloaded before arriving in the core, and the Eglinton light-rail transit line will further increase demands on the Yonge line.

“Data and demand patterns are telling us the stupidest thing we could do is make any of our lines longer before putting another subway through the core,” says Crowley, who says network building, redundancy, and sequencing of projects is essential for building a well-run transit line.

Canada’s busiest transit stations and overcrowded subway lines need major relief – so it’s time to make the Relief Line the number one priority. 🍀

Note: The hashtag #GimmeRelief is currently used to promote the Relief Line as the top transit priority for the City of Toronto.



Andy Manahan is the executive director of the Residential and Civil Construction Alliance of Ontario.



If wind doesn't blow and sun doesn't shine, generation decreases, which is why U.S. utilities purchase surplus electricity from Manitoba Hydro.

CROSS-BORDER POWER

Electricity agreements between Canada and the U.S. are mutually beneficial.

By Carroll McCormick

With multiple American markets making the transition to clean, renewable power, cross-border energy projects have emerged to meet the demands to service the millions of power consumers south of the border. These transmission projects, running from Quebec, Ontario, and Manitoba, to their respective neighbours Massachusetts, Pennsylvania, and Minnesota, represent billions of dollars in new energy projects that have their foundation on Canadian soil.

Manitoba

Manitoba Hydro is a veteran of cross-border power arrangements. It built its first transmission line to Minnesota in 1976 and currently has two lines—500-kV and 230-kV—to that state. Two 230-kilovolt (kV) lines, the first of which was built in 1970, run to North Dakota. Export revenues are an important part of the utility's business model.

“Our export revenues brought in more than 25 per cent of our total electric revenue over the 10-year period 2007-16. Manitoba Hydro's forecast total export revenues are \$16 billion over the next 20 years through 2037. Without export revenues, all of the costs associated with the utility would need to be covered by our Manitoba customers,” says a Manitoba Hydro spokesperson.

This is not a one-way street for the utility. U.S. demand peaks in the summer, whereas Manitoba's peaks in the winter. Because of this seasonal diversity, connected utilities effectively gain extra capacity without investment. For a utility relying on hydroelectric power, the ability to import power from a neighbour during a drought, such as the one Manitoba suffered in 2003-04, helps keep the lights on.

This time around, Manitoba Hydro and Minnesota Power want to construct a 500-kV line connecting the Iron Range 500-kV Substation near Grand Rapids to the Dorsey Converter Station northwest of Winnipeg. According to Manitoba Hydro, the line will double its ability to import electricity from the U.S., to 14,000-megawatts (MW), and increase its export capability by 855-MW to 3,185-MW.

The line has two parts: 352 kilometres of line in Minnesota called the Great Northern Transmission Line (GNL), and a 213-kilometre section in Manitoba called the Manitoba-Minnesota Transmission Project (MMTP). The two lines join near Piney, Manitoba; each utility is responsible for building its respective sections of the line.

Once the line is constructed, with a target completion date of mid-2020, Manitoba Hydro can sell more surplus electricity, for example, from its 695-MW Keeyask generating station, currently under construction. Minnesota Power will be able to meet its growing energy demands, increase system reliability, and have access to clean power.

Since 2014 Manitoba Hydro and Minnesota Power have reached an armful of regulatory milestones, including approval from the province

Through these new binational transmission projects, Canadian companies can sell their excess renewable power to the grid in the U.S.

of Manitoba and, south of the border, a Presidential Permit from the US Department of Energy, a Certificate of Need from the Minnesota Public Utilities Commission and Section 404 Permit (to discharge material into U.S. waters) from the US Army Corps of Engineers. Both utilities are working to obtain more permits, but as of March 2018 there appear to be no discouraging words on the prospects of the line's construction going ahead full steam.

Quebec

The planned Quebec-Massachusetts line, on the other hand, despite having already obtained a briefcase-full of permits, has fetched up on the February 1, 2008 denial of something called a Certificate of Site and Facility by the New Hampshire Site Evaluation Committee. That this reference is to New Hampshire and not Massachusetts, is merely confusing, not confounding. The line, called the Northern Pass Hydro project, is regularly described as a means for delivering Hydro-Québec power to Massachusetts, but also references New England, which is a geographical region comprising Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, and Connecticut.

Without export revenues, all of the costs associated with the utility would need to be covered by our Manitoba consumers.

The plan to bring power from Quebec to Massachusetts has had some twists and turns. Early options included either 100 per cent hydro power or a hydro-wind mix, delivered over one of three proposed transmission lines: Northern Pass, New England Clean Power Link or New England Clean Energy Connect, yielding six possible combinations, or options. Interested Canadian players included Gaz Métro and Boralex, which would fund a 300-MW wind farm—phase four of the Seigneurie de Beauré Wind Farms—and, of course, Hydro-Québec.

The Northern Pass lines and facilities would be owned by Northern Pass Transmission LLC, TDI New England was behind the Clean Power Link and Central Main Power behind Clean Energy Connect.

This January, Hydro-Québec announced that Northern Pass had been selected to deliver 100 per cent hydropower over a 1,090-MW transmission line into New Hampshire and onward to New England's electric grid. Benefits of the line, according to Northern Pass Transmission LLC, included

clean, affordable energy from Hydro-Québec's hydroelectric plants. The process for getting approval of the line strung back to 2011 and a submission for a Presidential Permit, which the Department of Energy issued last November.

But in an undated document issued by the Department of Energy Resources (DOER) issued sometime after February 1, 2018, DOER wrote, "On February 1, 2018, the New Hampshire Site Evaluation Committee (NSHEC) voted to deny a Certificate of Site and Facility for NPT Hydro." This, after noting that, "As a result of a robust bid evaluation process and based on the information supplied by the bidder and available at the time, the NPT Hydro project was determined to provide the greatest overall value to Massachusetts' customers."

The vote against Northern Pass by NSHEC was described as "stunning," in one news report.

Consequently, Clean Power Link is apparently back in the running. TDI New England describes the project, and its advantages as, "[...] a proposed 1,000-MW High Voltage direct current (HVdc) underwater and underground transmission cable that will bring clean, low-cost energy from the U.S.-Canadian border to Vermont and the New England marketplace. Once completed, the

project will lower costs for consumers, reduce environmental emissions, create jobs, increase tax revenues, and diversify fuel supply in New England, all while respecting Vermont's natural beauty by burying the cable."

Meanwhile, important deadlines loomed including a Request for Proposal schedule for March 27, 2018 and an April 25, 2018 contract submission. While some of the comments obtained from Hydro-Québec immediately fell behind the breaking news in Massachusetts; like that the Clean Power Link was no longer on the table, Hydro-Québec spokesperson Maxence Huard-Lefebvre stated, "One thing is sure. Hydro-Québec will export electricity to Massachusetts. We just don't know yet which option it will be."

Ontario

One province over, meanwhile, it is full steam ahead for the ITC Lake Erie Connector, a two-part transmission line, with 345kV and 500kV sections, between Ontario and Pennsylvania. The players are the Ontario Independent Electricity System Operator (IESO) on the

Canadian side and PJM Interconnection, LLC (PJM), on the U.S. side.

"We have secured all the major permits needed to build the first direct power connection between Ontario and the largest electricity market in the world that includes all or part of 13 U.S. states," says Terry Harvill, president, ITC Grid Development.

Commenting on some of the benefits of the Lake Erie Connector, Harvill notes, "This transmission line will allow load serving entities and large electricity customers in PJM to obtain, at attractive prices, energy from non-emitting wind, solar, hydro and nuclear resources during periods of surplus generation in Ontario with a resulting reduction in PJM's emissions profile.

Ontario is already interconnected with Québec, Manitoba, Michigan, Minnesota, and New York, importing and exporting electricity as part of the regular operation of its electricity market. The Lake Erie Connector is its first transmission line with Pennsylvania.

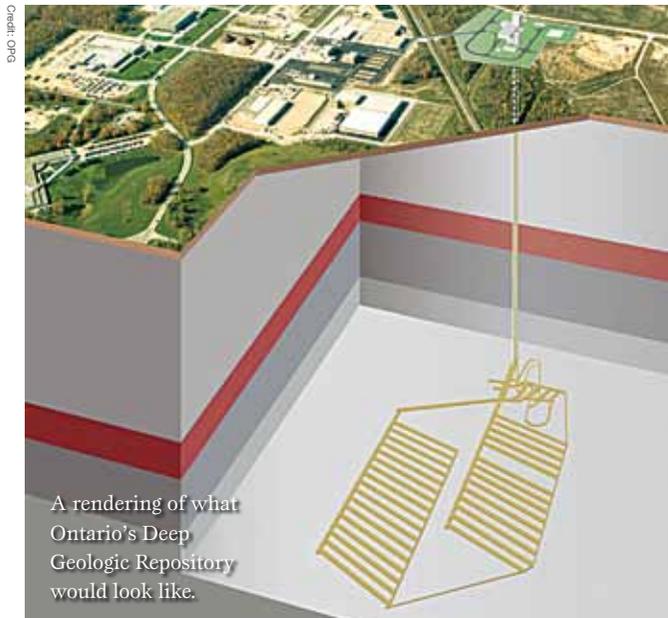
While Ontario will meet its anticipated electricity needs into the early-to-mid 2020s, even with nuclear units coming offline for refurbishment, there are other benefits to being able to purchase additional electricity from outside the province, says IESO spokesperson Jordan Penic. "Being a part of an interconnected grid means that Ontario has the ability to export and import power to provide operational and planning flexibility, and enhancing the reliability and cost-effectiveness of the electricity system. Imports contribute to competition in Ontario's energy market."

Uniquely, Penic notes, "[...] the ITC Lake Erie Connector is the first merchant transmission project in the province, meaning its costs are fully funded by private investors and not from ratepayers."

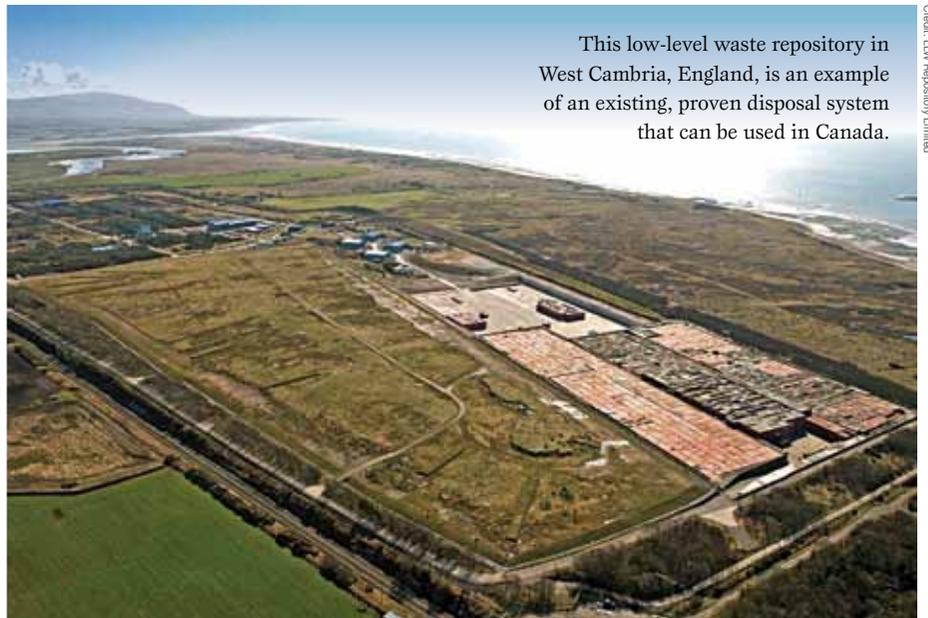
Summing up the project's status, Harvill says, "We have completed the necessary system impact studies in IESO and PJM, signed service agreements with the manufacturers of converter stations and the submarine cable, and secured nearly all land necessary for the terrestrial cable route, converter stations and construction laydown areas. Remaining steps in the project include completing cost refinements and securing favorable transmission service agreements with prospective counterparties. At that point we would be able to firmly establish an in-service date and proceed with construction." ♣



Carroll McCormack
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A rendering of what Ontario's Deep Geologic Repository would look like.



This low-level waste repository in West Cambria, England, is an example of an existing, proven disposal system that can be used in Canada.

DIVERTING NUCLEAR WASTE

What global best practices can teach Canada for safe and secure disposal.

By Jim Blankenhorn and Pierre Tremblay

When the province of Ontario turned to nuclear power, it knew that a time would come when a solution would need to be found for disposing of the waste that is generated. But as the years have transitioned into decades, governments at the provincial and federal have yet to clearly decide on the solution for the permanent storage of nuclear waste.

The solution however, is not as complex as some officials may believe. In fact, there are best practices already in place for the effective and responsible disposal of radioactive materials of all levels. The acceptance of these solutions, and their ability to truly contain these radioactive materials under all disaster scenarios, remains a challenge.

The generation of waste

The generation of nuclear power produces a very small amount of physical waste. However, that waste has radioactive properties and must be stored securely in a system that can be monitored, and needs to be secured for an extended period of time. The requirements in place for disposal are significant and must be taken into account, as they are in all global markets where nuclear energy is produced.

There are two types of radioactive materials produced through nuclear power generation: radioactive waste and used fuel. Used fuel is the more difficult of the two to dispose and requires multiple safeguards as there is still energy available even in the used fuel. Recoverability of that energy must always be considered, and some countries have already

developed technologies to close the fuel cycle and reuse the fuel. The CANDU technology used in Canada is currently being studied in China, as scientists work to identify ways to reuse the fuel from pressurized light-water reactors. That research could go a long way

in further reducing the amount of waste created in the power generation process.

It is the responsibility of the operators of the facilities to focus on safeguarding and protecting the waste that they are generating through the use of temporary storage facilities. The volumes are small, but given the radioactivity, the solutions are expensive.

There are challenges, and there are solutions

Disposing of radioactive waste is not without its challenges. There are the surface challenges, the ones that we see and hear of with regularity, including public acceptance, licensing, communications, and policy. These are the challenges that play out in the public eye, as communities, stakeholder groups, and every day citizens attempt to grasp the finer points of secure and environmentally-responsible disposal of radioactive materials.

There are also a series of challenges that must be overcome in the construction of the facilities that will store the materials. Any type of licensed repository must provide safe isolation

of long-lived isotopes, mitigate the mobility of the isotopes to the biosphere, minimize intrusion (public, vegetation, or groundwater) throughout the life of the repository, and characterization and certification of the waste to ensure compliance.

The suite of capabilities are designed based on the isotopes of concern and the risk that they present.

The good news however, is that there are valid solutions in place, being used in other global markets, that address all of these challenges. The suite of capabilities are designed based on the isotopes of concern and the risk that they present, with multiple repositories of different designs tailored to subsets and components of the overall waste system.

There are four common types of repositories that are used:

- 1 Very low-level waste (VLLW) can be disposed of in a shallow-land repository that maintains control of the waste throughout containments and protects the environment through leachate collection, which controls rainwater and groundwater intrusion for a period of time to allow the materials to decay away.
- 2 Engineered near-surface disposal takes on a different set of radioactive isotopes with different risks and uncertainties versus the VLLW. The engineered solution provides more containment, more protection, and further steps to mitigate and immobilize the materials to the biosphere for a longer period of time.

3 Concrete vaults and monoliths build on the engineered solution, providing an addition layer of containment to reduce the risk of mitigation and mobility. These structures are typically placed below-grade.

4 Deep Geologic Repositories are designed and built around multiple barriers. They can include a layer for immobilization, such as glass or an alternative synthetic rock-type material. The isotopes are then packaged in a form of corrosion-resistant container, with the containers then placed in an underground repository in a stable geological structure. The migration of the isotopes is then delayed further by surrounding the containers, within the geological structure, with some type of impermeable backfill.

The solutions provide a hierarchy of capabilities from the least amount of risk to the most. And all of the solutions are already in practice in other global markets:

- VLLW started in the U.K., and is also in use in France. The United States uses a similar system for very low-level waste;
- Near-surface disposal sites can be found in the United States, including the WCS Facility in Texas and the Energy Solutions Facility in Utah;

- The use of concrete vaults can be found in both the U.K. and in the U.S. at some Department of Energy sites; and
- The Waste Isolation Pilot Plant in New Mexico is a Deep Geologic Repository, where trans-uranic waste has been stored in corrosion-resistant containers in a 2,000-foot-thick salt bed, located 2,150 feet below the surface.

These are similar to solutions used in other European countries generating nuclear power, and have been scientifically-proven as safe, secure, and environmentally-responsible solutions for disposing of nuclear waste.

The time to act

There is, admittedly, a lot of confusion on the subject of nuclear waste in Canada. Concerns continue to be expressed by community groups, environmental agencies, and government policymakers who are unsure of the safety of the solutions being proposed for disposing of the country's nuclear waste.

But we know that this is not a discussion about technology, or at least

it shouldn't be. It is a discussion about safety, and the solutions that are currently being used in other global markets are safe solutions.

What's needed now is the political courage to accept the science behind the disposal solutions, accept this technology as safe for both the health of citizens and for the environment, and work to put these solutions in place in Canada. And if the current solutions are not acceptable, then governments need to give the industry direction on what needs to be done instead.

We have an obligation to deal with the waste we generate. We should not burden future generations with this issue, one that we have the tools to solve today. ♣



Jim Blankenhorn is AECOM's senior vice president, operations, Nuclear Environment, Management Services. Pierre Tremblay is president and CEO of AECOM Canada Nuclear Operations.

XCG's Grant Walsom at a client site in Ontario.

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Failure avoidance can be employed through safety factors, redundancies, and formulating contingency plans.



When remediation failure occurs, you must consider the remedy that makes the most sense based on cost and future liability or failure.



Photos: Grant Walsom, XCG

FAILURE MITIGATION

Understanding why brownfield contamination measures fail. *By Grant Walsom*

Often the best laid plans and manufactured solutions fail. This can be especially true when dealing with issues in difficult areas that cannot be seen, such as dealing with soil and groundwater contamination.

Redevelopment in urban centres continues to be highly important as intensification pressures for more sustainable living and lifestyles increases. Brownfields are prime sources for redevelopment opportunities for multi-unit residential and various community uses.

Brownfields are generally defined as underutilized contaminated properties. Dealing with the contamination often requires innovative solutions to minimize human exposure risks for future property uses.

For brownfields where residual contaminants are left in place due to feasibility, logistics, and cost considerations, a risk assessment process is completed followed by selection of appropriate risk management measures to eliminate the routes for possible human exposure. Examples of physical risk management measures (RMMs) can include barrier walls, soil caps, vapour barriers and diversion systems, restrictions

on basement construction, or increased air-exchanges in buildings. Process-based RMMs can include restrictions on property use, prohibition on groundwater use, and routine monitoring of groundwater, soil vapour, and indoor air quality.

When it fails

Hundreds of stories can be told regarding successful contaminant mitigation and redevelopment of former industrial properties into productive and higher uses for the changing needs of today's society.

have occurred when the full assurances and precautions that have been taken to manage any residual contamination and minimizing exposure risks to below the acceptable risk of one in one-million are not met. For the purposes of this discussion, we will assume that all contamination has been identified and fully delineated. As such, we will assume that the failure has occurred due to another occurrence.

If redevelopment has not occurred, there would be no significant failure considerations, as the high costs to construct

Remedies targeting the result of the source should be considered as band-aide solutions.

But what about those situations where the brownfield redevelopment plan fails and contaminants concentrations were not as predicted and/or the risk to human health was not mitigated?

In order to fully understand the issue at hand, we need to define failure and when it occurs. Failure would be considered to

the proposed development have not yet been incurred as the project is stalled or passed on all together.

In private developments, conventional financial models need to make sense before the property is even considered, as the return on investment (ROI) within an acceptable timeframe needs to be met. But

with public opportunities for municipal or community use where tax-based finances are used in the redevelopment, often the ROI is not the deciding factor, but the need of the community are. In these cases, it is questioned whether the best solutions are truly considered, or are the lowest cost solutions selected? We have all seen that far too often, you get what you pay for. However, fiscal responsibility with tax-derived public funds often demands the lowest cost solution be employed. Procurement practices and quality-based selection are the topics for another article.

Failure can occur due to inadequate design or product flaws, conditions that were unknown and/or unforeseen or time constraint pressures. Further, changes in the subsurface conditions and contaminant interactions due to the development on-site, or due to unknown off-site activities are the biggest contributors to failure. These condition changes can, and often do, result in altered contaminant migration pathways or exposure routes that were not accounted for in the risk assessment modeling and selection of risk management measures. Recall that we assumed that the failure

occurrence is not a result of inadequate site characterization.

Remedies for the failure can often be implemented after the fact (post development) to mitigate the changes, but at what costs, and from whose budget? If an error occurred, the cost recovery may need to be pursued through insurance settlements or legal actions. The cost recovery will take time, if successful at all.

Remedies, no matter what method or process chosen come at a cost; a cost that will be higher than if implemented before the development. Remedies that are targeted on removing the source should ensure that exposure risks are minimized and will not present any future issues. Remedies targeting the result of the source should be considered as band-aide solutions that may create future liabilities or failure scenarios.

Avoiding the remedies, means avoiding the failure. With millions of dollars at stake, wouldn't ensuring that failure does not occur be the correct course of action? Failure avoidance can be employed through safety factors, redundancies and formulating contingency plans.

Selection of appropriate risk management

measures should be the contingency plan, employment of multiple risk management measures should serve as the redundancy, while the safety factor should be supplied through completion of the risk assessment. Shortcuts on cost or oversights due to time constraints will most certainly affect at least one of these methods.

Brownfield redevelopment can be extremely rewarding for the developer, project team, and community; however, when failure occurs during the process, it can also be one of the largest headaches. Ensuring that the best solution is selected and redundant protective measures are implemented into the development to mitigate exposure risks for the future users are paramount. This often comes at a cost, but in the end the cost will be much less than the cost of project failure. ♣



Grant Walsom is a remediation engineer and partner at XCG Consulting Limited. He currently serves as the president of the Canadian Brownfields Network.

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Panorama

The Arbour

The winning design for the new tall wood building for George Brown College's waterfront campus in Toronto. —Staff



Send us your best infrastructure image, and you see it featured here. Email editor Andrew Macklin at andrew@actualmedia.ca for details.



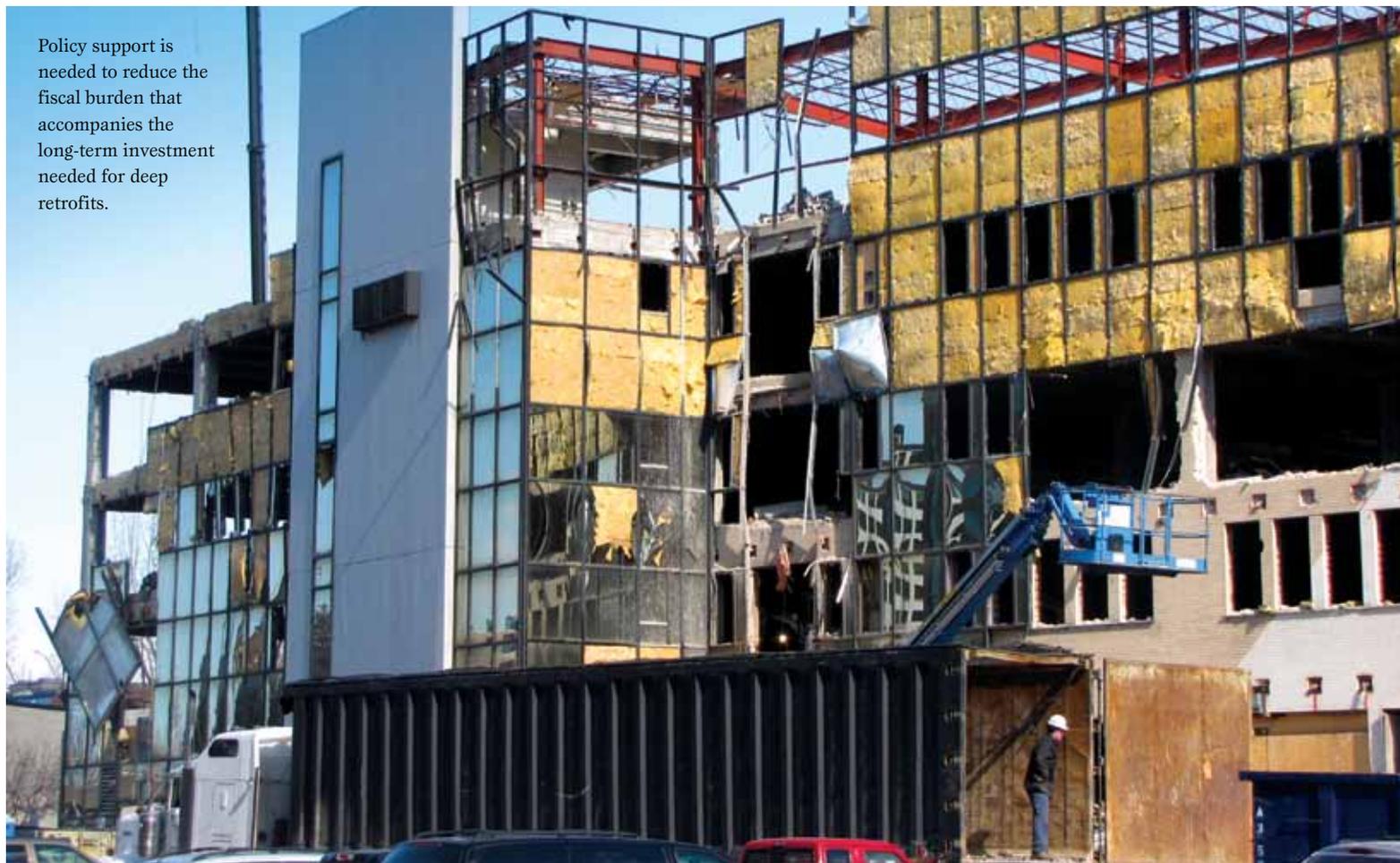
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Policy support is needed to reduce the fiscal burden that accompanies the long-term investment needed for deep retrofits.



Credit: ReNew Canada

RETROFIT ROADMAP

How government and industry will play a crucial role in driving energy and GHG reductions. *By Akua Schatz*

The Pan-Canadian Framework on Clean Growth and Climate Change aims to reduce greenhouse gas emissions by 30 per cent over 2005 levels by 2030—which is upwards of 89 megatonnes in GHG emissions. To achieve this target, Canada’s built environment is expected to be a significant contributor.

While the construction of new, highly efficient green buildings will be an important pillar of the buildings sector’s contribution, research conducted by the Canada Green Building Council (CaGBC) demonstrates that national targets can only be reached by reducing the emissions of the millions of square feet of existing institutional, commercial, and residential buildings across the country. Yet, while green building approaches, practices, and technologies are being widely adopted for new buildings, there is an underinvestment in the retrofit of Canada’s existing building stock to drive energy and GHG reductions.

Correcting this underinvestment requires the development of a strong retrofit economy where the market takes the lead in transforming Canada’s built environment

to help fight climate change and create new economic opportunities for Canadians. A healthy retrofit economy aligns supply and demand for retrofits in response to public policy objectives while establishing relationships among a number of different groups that are able to identify, qualify, fund/finance, deliver, and manage retrofit projects.

Addressing the development of a strong retrofit economy led the Council to develop two reports called the Roadmaps for Retrofits. The second of these was published on February 26 and looks specifically at how to build strong market infrastructure for the retrofit economy. The report sets out a series of comprehensive and specific actions for governments and, more importantly, for industry to build one of the world’s most robust and dynamic retrofit economies by 2030.

Understanding the barriers

When looking at the retrofit economy, we need to first understand why retrofits are not happening at the pace and the scale in which we need them to occur, even though there is a lot of money available for energy efficiency.

This can be drilled down into five key areas:

- 1 **Private capital availability and Risk:** Deep retrofits need a lot more capital and banks aren’t lending to building owners for this kind of work due to a lack of understanding about energy efficiency.
- 2 **Owner financial capacity and affordability:** The market is used to a one-to-three year ROI, and this type of investment requires them to consider a five and seven years (plus) ROI in order to undertake a deep retrofit. Not only is this payback period longer, but as mentioned above, the available credit for this type of work can cost more.
- 3 **Project confidence and expectations:** Energy efficiency is still a new and growing concept without a lot of data to demonstrate success. As a result, the market sometimes lacks confidence that predicted energy savings will materialize.
- 4 **Immature and muted pricing signals:** Carbon intensive fuels like gas are currently much less expensive than clean electricity, meaning there is not much of an incentive to switch to a cleaner system.

To date, public calls to action have focused almost exclusively on governments subsidizing retrofit activity.

Energy retrofits to our existing building infrastructure represent a \$30 billion economic opportunity in Canada.

5 Regulation: Building codes set the tone for how buildings are constructed and maintained, and we don't yet have a retrofit code that would require everyone to meet new energy efficiency standards.

The stakes are high

CaGBC is attempting to address these barriers and provide tangible recommendations with our Roadmap for Retrofits reports. To date, public calls to action have focused almost exclusively on governments subsidizing retrofit activity. While rebates and grants can be a good way to galvanize change in the market, Canada will not be able to subsidize its way into a low carbon economy. Without addressing the true barriers, we will not achieve lasting effects.

As mentioned, much of the focus of retrofit economy thought-leaders has been on the financing barriers facing building owners and the need for governments to pump in more public capital to make up for a general market failure. However, plenty of private sector capital is available domestically and globally for real estate and infrastructure projects—investment capital simply needs to be unlocked and tailored to retrofit projects. Furthermore, capital will only be unlocked when its custodians are confident of a robust retrofit marketplace that creates both investment and environmental value, underpinned by supportive public policy and an ecosystem of competent players to deliver retrofit projects.

Therefore, the question is: how can industry, governments, and non-governmental organizations create the fundamental policy and market infrastructure that will turn Canada into a retrofit economy leader and powerhouse?

Industry's role

Industry players, with support from non-governmental organizations, must stop waiting for governments to regulate their actions and realize the more than \$30 billion economic opportunity presented by the retrofit economy. It will be important for private financiers, insurers, and other financial intermediaries to lead with “green” underwriting practices and provide project financing approaches for retrofit projects and risk management products that foster building owner and financier confidence in managing risk, particularly project performance risk.

Similarly, for building owners it will be important to proactively disclose building energy and carbon performance and share data on the performance of retrofit projects to inform the evolution of industry building solutions. Industry stakeholders should also consider developing consistent standards of practice that will deepen understanding of the business case for building retrofits, and support a strong pipeline of retrofit projects that are confidently financed and successfully delivered.

Government's role

It is imperative that governments at all levels work to build market awareness of the value of the retrofit economy and continue to build the policy and regulatory infrastructure to support a well-functioning retrofit marketplace. This includes using moral suasion, and leveraging institutions like the Canada Infrastructure Bank and the Green Ontario Fund to encourage the private sector to adapt underwriting models and financing products for retrofit projects. Governments should also be providing more incentives to industry for greater data transparency and data liquidity on building performance and successful retrofit projects, in order to drive market confidence and demand for energy-efficient and low-carbon buildings.

Lastly, for this to work, the policy and regulatory infrastructure will need to expand the eligibility of inter-governmental infrastructure funding to include energy efficiency and carbon reduction building retrofit projects; accelerate the modernization of building codes, and the creation of retrofit codes, that establish minimum energy and carbon performance thresholds; and work with industry, education, and training providers to develop programs, curriculum, and credentials that will build the “green” labour market for the retrofit economy.

Canada can be a leader

If action is not taken now, Canada risks surrendering global environmental leadership and the new economic growth and international competitiveness associated with building a retrofit economy to other jurisdictions. The United States and Europe are already working to bring industry, government, and non-governmental sectors together to forge the policy and market infrastructure needed to spur their own retrofit economies.

Yet, while other countries are experimenting with new policies and new market-based solutions to build their economies, no one jurisdiction has found the definitive roadmap to put in place the requisite policy and market infrastructure. Canada has a chance to leap ahead, and to reap the environmental and international economic advantages that will come from having a retrofit economy with an ecosystem of market participants who deliver the best products and services to global markets. 🌱



Akua Schatz is the senior director of advocacy and development for the Canada Green Building Council.

FUNDING CLARITY



With dedicated revenue streams to fund transportation, the expense of building and maintaining roads would be clearer to the end user.

Improving the effectiveness of revenue spent on infrastructure.

By *Chris Bachmann, Jeff Casello, and Jacob Terry*

Every time a driver fills up their gas tank or a passenger buys a transit fare, they might assume they are making a financial contribution to their chosen transportation system. They may also know taxes paid to each tier of government supplement the maintenance and operations of these systems.

But how many travellers would be able to explain how their various payments moved through the tiers of government before possibly contributing to the construction of new bike lanes or bus facilities? It would be immensely challenging for someone to identify which and how much of their taxes and fees go toward supporting Ontario's infrastructure. While it would be unreasonable to expect every person to know the intricacies of public finance, informed citizens desire at least a basic understanding of where their money goes and whether that money is being used effectively.

For any transit or major road project constructed or proposed in Southern Ontario, it isn't hard to find impassioned proponents and opponents—and funding ultimately comes up as one of the major

pillars of either argument. For example, Toronto's transit system has stagnated as councilors and residents argue endlessly over priorities, a problem deeply rooted in Toronto's inability to afford all of its required transit projects without assistance from higher levels of government. The road tolls for the Don Valley Parkway and the Gardiner Expressway proposed in Toronto in 2017 managed to receive approval from city council, only to be rejected by the province, in part because residents and politicians in Toronto and its surrounding municipalities couldn't agree on who should pay for these highways. Similarly, any delay in Waterloo's ION LRT project reveals arguments that the system is either worth the wait or an expensive boondoggle.

The data used in many of these debates could be made clearer if funding for the transportation network were more direct and transparent. In 2015, transportation infrastructure alone was responsible for an average of one-fifth of total spending in Ontario's nine largest cities. As one of our biggest government expenses, it is worth examining whether the way we fund

public infrastructure is effective or not. Not only would this improve the clarity of government finances, but it may lead to more support for environmentally and fiscally sustainable forms of transportation, which are often overlooked in the North American mindset due to the prevalence of automobiles. Our research at the University of Waterloo worked to open up the funding models used for transportation systems and provide insight into effective ways to pay for public infrastructure.

Funding water

Some public infrastructure is funded quite simply. For example, water supply and treatment operate on a user-pay principle in many of Ontario's cities, where fees tagged for the water system are collected from residents, businesses, and developers. Since the provincial and federal governments maintain little to no water supply and treatment infrastructure of their own, fewer data sources are required to track revenue through the government cycle. In Waterloo, more than 90 per cent of water system revenue in the past three years is estimated

to come from water-tagged fees, with the remainder coming from specific, traceable sources of revenue. The simplicity of this funding structure helps not only fee-payers but governments and third-parties monitor spending on water infrastructure with ease and accuracy. This also allows analysts to perform studies to test the effectiveness of the revenue used to pay for water infrastructure, providing two main benefits: the government can make more informed decisions about which money should be used to pay for what infrastructure, and the public may be better informed when comparing the platforms of electoral candidates.

Funding transportation

In its current state, the funding of transportation infrastructure is quite complex. At first, it seems fairly simple: local and regional governments maintain most of their road and transit networks, provincial governments maintain highways and intercity transit, and the federal government maintains VIA Rail, airports, seaports, and other ports of entry. Even with this level of understanding, the corresponding funding models are quite complicated. In practice, provincial and

funded infrastructure grants given out by the provincial and federal governments to municipal governments, and the amorphous nature of funding at the higher tiers of government make it equally challenging to understand how municipal transportation infrastructure are funded as well.

Ideas for change

If there were dedicated revenue streams to pay for transportation infrastructure, there would be less need for cities to rely on intermittent, sometimes politically-driven payments from higher tiers of government. Some provinces have made efforts to implement such streams. The provincial gas tax fund in Ontario is a partly dedicated revenue stream, since it commits a portion of provincial gas tax revenues to municipal public transit services within the province. Metro Vancouver and Translink tried and failed to implement a 0.5 per cent sales tax, similarly to fund public transit projects. In California, the Santa Clara Valley Transportation Authority instituted a half-cent transit sales tax in 2000 to fund extensions to the BART system around San Francisco, then followed it with an

Implementing more direct funding sources could also clear up some misconceptions about how transportation infrastructure is funded. Some car drivers believe they pay for roads exclusively, and that other road users (transit riders, cyclists, and pedestrians) are getting a free ride. On the contrary, gas taxes, vehicle registrations, and driver's licenses do not make up a substantial portion of the road system's funding. In fact, the dominant source of funding for roads, sidewalks, and trails at the municipal level tends to be the same: property taxes and fees paid by developers, each covering roughly 30 to 40 per cent of operating and capital costs, neither of which are exclusively levied from drivers. In Ontario, transit tends to receive even less from gas taxes and driver-levied fees, despite gas tax programs encouraging transit development. According to Ontario's Public Accounts files, much of the vehicle registration and driver's license fees are collected by the Ministry of Transportation, assumedly to recover the cost of operating the licensing program and to partially cover provincial highway costs, although this is not explicitly stated.

Perhaps if fees were directed toward auto-specific purposes like restricted-access highways, with clear messaging that other revenue pays for local roads, there would be a more positive dialogue surrounding how to pay for the non-auto infrastructure that is necessary to build cities upward and encourage more active communities. No one has sole ownership over our transportation infrastructure, and our language surrounding this crucial resource needs to shift to reflect what other countries have known for years. For our language to change, we first need to reconsider how we treat revenue politically. The stimulus-driven infrastructure funding today is not a sustainable way to consider long-term funding of transportation infrastructure. Direct, clear, and effective revenue would do much better. 🌱

Tax revenue is most effectively used when the revenue's characteristics correspond to where it is being spent.

federal governments do not specifically allocate most of their revenue to particular projects, meaning one dollar of income tax is treated the same way as one dollar of sales tax. One must assume provincial and federal transportation networks are funded through some mix of their respective revenue sources, but determining that mix is also complicated. Is Ontario's Employer Health Tax specifically restricted to the provincial health system, or is it only offsetting the health system's cost, allowing it to be spent like any other revenue dollar? What about Canada's duty fees at the border? Or employment Insurance premiums, which are intended to be applied to the employment insurance program at the federal level, but have been scrutinized in the past for being spent on other projects? The answers to these questions may be known in part to individuals working within the public-sector, but a resident wanting to understand how roads and transit are funded is left wondering. Add to this the frequent but generically-

eighth-cent sales tax in 2008 and a half-cent sales tax in 2016. These tagged revenues are useful for maintaining the stability of funding for the system, and for making a clear connection between where revenue is collected and where it is spent.

From strictly an economic perspective, tax revenue is most effectively used when the revenue's characteristics correspond to where it is being spent. For example, an income tax collects more revenue from the wealthy, so is more effectively used for redistributive services such as social housing, which are used by poorer residents. Road congestion pricing is an excellent example of a direct and effective source, as it is directly collected by inefficient road users and is applied specifically to the road system. If the revenue used to pay for transportation infrastructure is direct and uses an effective source of revenue, then the ability to maintain funding and adjust tax rates over time would be much easier.



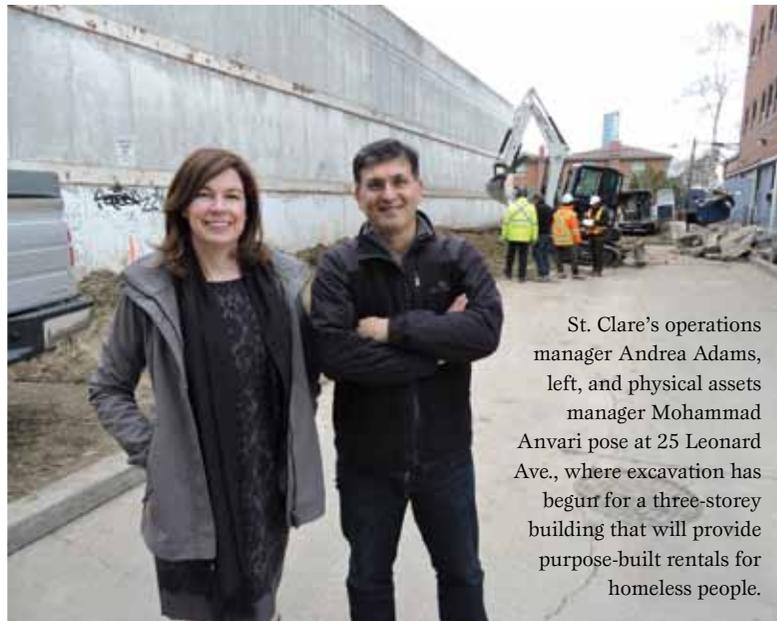
Jeff Casello is a professor of transportation at the University of Waterloo.

Chris Bachmann is an assistant professor in the Civil and Environmental Engineering department at the UoW.

Jacob Terry is a Ph.D. student in the Civil and Environmental Engineering department at the UoW.



The current rental apartments at 25 Leonard Ave. are located in downtown Toronto's Kensington Market.



Photos: RESCON

St. Clare's operations manager Andrea Adams, left, and physical assets manager Mohammad Anvari pose at 25 Leonard Ave., where excavation has begun for a three-storey building that will provide purpose-built rentals for homeless people.

BUILDING FOR THE HOMELESS

Lessons learned in building Toronto's newest shelter.

By Andrea Adams

Working with a municipality through red tape is a tough process for any developer, and it is no different when that developer is a non-profit charity dedicated to addressing the municipality's homelessness crisis.

We learned this at St. Clare's, when we offered to commit our own land, time, and financial resources to build new homes to remove people from our city's shelters and streets. St. Clare's is an experienced charitable landlord that currently owns and operates five buildings in Toronto's downtown, and rents out 75 per cent of our 415 apartments to people who come directly from the city's shelters. We pair our housing with support provided by 18 of Toronto's social service agencies. This year, we will transform an unused parking lot into 22 homes. It will enhance existing repurposed medical office building, which was converted to affordable housing in 2001, and improve the economy of scale for the site.

Despite the desperate need for housing solutions for Toronto's high needs chronically homeless population, the planning barriers to this simple and small-scale project required St. Clare's to pursue rezoning and an Official Planning Amendment. The variety of out-of-proportion reports and requirements escalated the soft costs and timeline to a scale that is prohibitive to other non-profits who would like to implement similar solutions. That's not to say it can't be done, but you must be passionate about city building, and have up front skills and resources not often available to in the non-profit sector,

and develop extensive relationships with community partners.

This story is about the partnerships that helped us overcome the challenges along the way and what could help improve this process.

The earliest partner to offer their support was the neighbourhood of Kensington Market. Representatives of this community recognized the importance of appropriate homes for hard-to-house populations and advocated for our project. This was a key early step as it created a critical base of support to build housing infrastructure for the hard-to-house. When our proposal was initially dismissed as bad planning,

have been able to solve sticky problems like garbage disposal which threatened to derail the project with unnecessary overdesign. "The city as a whole absolutely should speed up the approval process when it comes to building affordable housing," Cressy told the *Globe and Mail* in December. "We have a long way to go."

Fortunately, our project was demonstrably sensible enough to receive \$500,000 in capital funding from the City of Toronto's Open Door Affordable Housing program. This contribution was not included in our original proforma, but rescued the project from the escalating soft costs resulting from the planning process. The funding is

Municipalities need to work with non-profits for housing challenges that are beyond the scope of private developers.

our neighbours accompanied us to meetings with our city councillor and the planning department, and were vocal and persistent. This is a lesson to all developers that engagement with the surrounding community is invaluable.

The support of our neighbours helped our city councillor to also offer his support early in the process. This was a key relationship, particularly when it came to planning impasses: having our councillor at the table to help problem-solve was invaluable. Without this assistance, we would not

registered on title as a loan and comes with plenty of restrictions, but they are all easily accommodated by St. Clare's commitment to perpetually affordable housing.

It took two years, but we succeeded in building support and negotiating the planning language required to get the go-ahead for this project. We worked diligently with the planning department every step of the way, and eventually council approved the official plan amendment to allow 25 Leonard to be intensified, with the understanding and requirement that the social good provided

by the project more than compensates for the lot line and intensification exemptions required. Soil remediation began late last fall and construction is expected to begin in May, with occupancy within a year.

Then, there were our private sector partners, which included: head of the RESCON fundraising committee Phil Rubinoff, who spearheaded a \$1-million fundraising campaign; and our 20-plus donors from construction and infrastructure—including the Heavy Construction Association of Toronto, union LiUNA Local 183, the Carpenters Union and the Ontario Formwork Association. Without the confidence and support of the our private sector donors, the project would not have been possible. In turn, we are committed to making the best possible use of every donated dollar to ensure that this is a successful demonstration of private / non-profit partnership.

If we could change only one thing about the process, it would be creating a planning ombudsman to facilitate the process for projects submitted by any developer that helps the city address chronic homelessness. The ombudsman

would receive these applications, and within a designated timeframe—perhaps a week, even a month—would say, “How do we make this happen,” instead of “Here are all of the barriers you face; go hire someone who understands all of them. See you in 18 months.”

Certainly, an ombudsman position would enable the city to benefit from the housing experience and resources of non-profits who cannot otherwise negotiate planning barriers. Municipalities need to work with non-profits for housing challenges that are beyond the scope of private developers, but the ombudsman position could also be structured to allow developers of all stripes to include considerations for homelessness in their projects, and encourage creative ideas and solutions.

For its leadership role in housing development, the St. Clare’s model has been acknowledged by affordable housing consultant Michele McMaster, who said: “Canada Mortgage and Housing Corporation (CMHC) has investigated the St. Clare’s operating model, and found it to be replicable and scalable. We are delighted to have had feedback that

St. Clare’s is inspiring developers and landlords in other communities.”

Our model has been replicated in Vancouver and Belleville, Ont. We want developers of all sizes and perspectives to learn about and improve upon the work we have done. Our success is important because it builds confidence across all sectors that solutions are possible. We know we will be successful when municipal planning departments are able to encourage both the non-profit and the private sector to address our housing crisis to the benefit of all of us.

There are solutions to chronic homelessness. They aren’t complicated and they don’t need to be expensive, but it takes partnerships—between non-profit groups, governments at all levels, and the private sector—to ensure we continue to build the cities that we can all be proud of. ♣



Andrea Adams is the operations manager for St. Clare’s Multifamily Housing Society.

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DIGITAL MASTER PLANNING

Building municipal strategies to support digital frameworks.

By the Canadian Urban Institute

The rapid rise of urbanization has, in recent years, been coincident with a massive growth in connected devices (or things that talk to the internet). By 2020, it is predicted that 50 billion connected devices will exist worldwide. To be competitive and prepared to respond to emerging urban challenges and opportunities, cities should be investing in their capacity to employ this connectivity to support smarter, healthier, and more equitable and sustainable communities.

For example, the adoption of energy efficient light-emitting diode (LED) streetlights means that the street lighting infrastructure can host a communication network spanning the full reach of a city. This network can become the backbone of intelligent community services by hosting connected devices and communicating data. Another example is the implementation of smart meters, which forms a network connecting to homes across the city. Both examples highlight the potential to obtain additional community benefits from essential infrastructure through careful planning.

But the full potential of connected devices, with an increasing array of technology choices, may be difficult for municipalities to navigate. Digital master planning has recently emerged as a process for developing coherent strategies, across multiple municipal departments, to develop an intelligent community.

A Digital Master Plan (DMP) identifies

locally-significant community stresses, evaluates potential information and communications technology (ICT) solutions, and outlines a roadmap to achieve effective integration of selected solutions. It can be a proactive method for cities to understand which, of the seemingly endless smart tech solutions available, might successfully provide high social and economic returns.

In a working paper from the Marron Institute, Dr. Anthony Townsend and Dr. Stephen Lorimer (2015) describe these plans as “[...] attempts to mobilize local stakeholders around visions, goals, and road maps to adapt to [the] external technological and economic pressures, within local social, economic, and political constraints.”

Essentially, a comprehensive DMP will layout an approach for building an intelligent community.

Intelligent communities

Similar to a smart city, an intelligent community leverages technology to improve services. However, unlike a smart city, technology is not the driver of solutions, but rather the community. Building an intelligent community happens from the ground-up, empowering citizens without technology pushing the agenda.

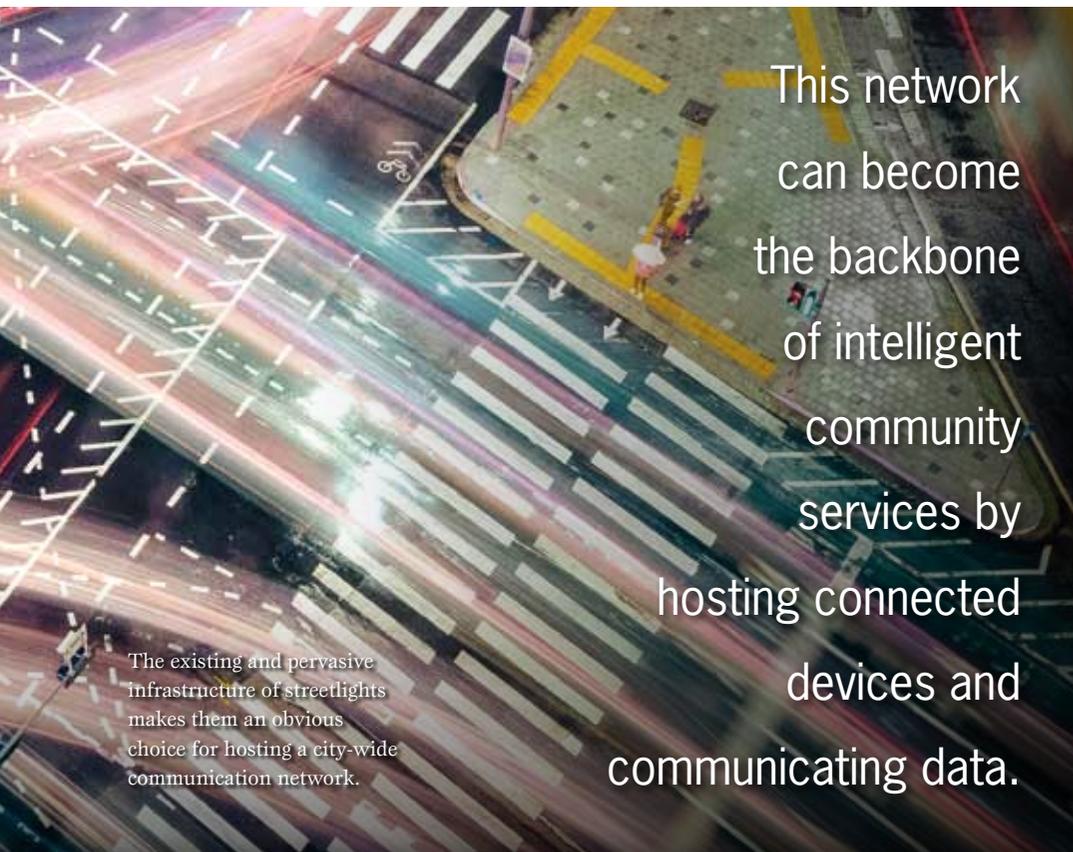
Defined by the LSNetwork, The CUI program that has supported the transition to networked LED streetlights for nearly a decade, the term intelligent community

is generally used to refer to applying the Internet of Things (IoT) through the built environment to improve the overall quality of life for people at home, work, and play. The technology is used to provide opportunities for economic development and to enhance urban services, resource conservation, and cost effectiveness. Key focus areas include: fostering innovation in industries and neighbourhood communities; creating and attracting talent; advancing urban infrastructure, transportation, and utility performance; and improving community services.

Developing and implementing a Digital Master Plan for an intelligent community is likely not driven by potential short-economic returns, as it will require significant additional funding, resources and often in-house capacity building. So what makes it worth it? The social and environmental returns that will improve the economy and community in the long-term are the real drivers.

Building an intelligent community engages a diverse and extensive stakeholder group, including municipal agencies, industry insiders, academia, community leaders, and others. A DMP Plan unifies these separate groups, breaking down information silos. This allows thorough exploration of the potential social and environmental benefits.

LSNetwork summarize many of these applications (that cities are already implementing) under seven categories:



This network can become the backbone of intelligent community services by hosting connected devices and communicating data.

The existing and pervasive infrastructure of streetlights makes them an obvious choice for hosting a city-wide communication network.

1 Streetlights

The existing and pervasive infrastructure of streetlights makes them an obvious choice for hosting a city-wide communication network that can be leveraged as the backbone for applying intelligent community solutions. As street lighting networks are usually evenly deployed throughout a municipality, they provide one of the most equitable means of deploying technology. This network can also be used to monitor and control street lighting to reduce maintenance and electricity costs.

2 Traffic and parking

Traffic and parking optimization leads to reduced time-on-road for cars and the corresponding greenhouse gas (GHG) emissions reductions. Sensors of real-time traffic can be used to control smart traffic signals to increase travel speeds and reduce intersection delays. Data from parking sensors can direct drivers to empty spaces via mobile apps, while informing law enforcement of parking infractions.

3 Environmental

For environmental monitoring, there is a wide-range of options with current technology. Sensors are able to monitor and report weather conditions, air quality (i.e. various pollutants), ground conditions, and noise. This data can benefit citizens, policy makers, and researchers by providing information on the health and environmental risks of ambient conditions.

4 Safety and security

There are also extensive intelligent community applications available for safety and security. One commonly mentioned by suppliers is gunshot detection. This type of sensor can be used to trigger image capture in the area when a shot is heard and alert emergency responders who can be directed by flashing street lights.

5 Connected services

Waste management, road salt applications, flood management, and utility efficiencies have shown to be improved through networked sensor technology. For example, by optimizing water and electricity use with smart meters, minimizing salt use by applying based on ground temperatures or emptying waste bins when full with optimized collection routes.

6 Revenue generation

As one way to offset the costs of deploying new technology, cities can look for additional revenue generation opportunities. Some already being used include fees for Wi-Fi hotspots and electric vehicle charging stations.

7 Community empowerment

Through open data and inclusion efforts, these intelligent community applications can more deeply connect citizens to their community and to each other and support better informed citizens to make better decisions.

Who's done it?

The extent of possibilities intelligent communities offer is overwhelming for many of us. However, over the past 10 years, select global cities have tackled this challenge with Digital Master Planning. City governments and urban planners now become leaders in the technology revolution.

Barcelona

Barcelona was a pioneer of digital master planning and IoT solutions. The City's first Smart City Strategy was a top-down approach involving major urban infrastructure projects in street lighting, transportation, energy, and water. By 2014, Barcelona was saving \$58 million a year from its smart water initiative, had increased parking revenues from multi-story car parks by \$50 million, and created 47,000 jobs.

But not all projects were successful. Occupancy sensors put in street parking were found to be triggered by underground subways and ultimately unused by drivers. By continuously reviewing and revising its plan, Barcelona is now approaching its strategy with a citizen-centric focus—what can technology do for the people.

Dublin

The City of Dublin published its first Digital Master Plan in 2013 with a vision to position Dublin as a global leader in technology innovation to drive “economic competitiveness and a cohesive and sustainable society.” Its initiatives focused on empowering citizens using technology, such as providing fibre to every home.

In 2016, Smart Dublin was launched as an initiative of the four local authorities, including City of Dublin. Continuing with a citizen-centric approach, attempts to consolidate the digital efforts of each authority, and engage solution providers and researchers with the community to improve city life.

Vancouver

Vancouver's Digital Strategy, also developed in 2013, reviews the City's current digital maturity, identifies goals and outlines a three-year action plan roadmap. It positions data as the architect of an intelligent community that connects citizens, businesses, and governments. Vancouver completed extensive consultation with stakeholders to drive a citizen-centric plan that promotes widespread adoption.

Following the action plan, Vancouver is now in a two-year technology transformation phase with the ultimate goal of becoming a “smart, intelligent, connected, green city.”

An aspiration for all our future cities in this digital age. 🌱

Submitted by the Canadian Urban Institute.

TOOLS FOR SUCCESS

New FCM resources help overcome asset management challenges.

By Donna Chiarelli

The Federation of Canadian Municipalities (FCM) has released new resources that will help municipalities build long-term thinking into decisions about infrastructure and services, and better integrate economic, social and environmental goals: a guide for municipal practitioners on how to develop an asset management policy, strategy, and governance framework; and a shorter, companion guide on asset management, geared toward elected officials and senior staff. They are based on best practices developed by 17 municipalities across Canada involved in FCM's Leadership in Asset Management Program (LAMP).

LAMP, a pilot initiative of FCM's Green Municipal Fund (GMF), ran from September 2015 to December 2017. GMF provides funding and knowledge services to support sustainable community development. The Fund supports partnerships and leveraging of both public and private-sector funding to reach higher standards of air, water and soil quality, and climate protection. GMF is funded through a Government of Canada endowment currently valued at \$500 million. An additional \$125 million top-up to this endowment was announced in Budget 2016.

Two cohorts were selected for the pilot. The first involved 12 English-speaking municipalities, which began working together in November 2015. A second cohort of five French-speaking municipalities from Quebec and New Brunswick joined LAMP one year later and built on the knowledge and lessons identified by the first cohort.

The 17 municipalities involved in the program were (includes pop. based on 2016 census):

British Columbia

City of Nanaimo	92,004
Township of Langley	117,285
City of Vancouver	631,486
City of Revelstoke	6,719

Alberta

City of Airdrie	61,581
City of Edmonton	932,546

Saskatchewan

City of Melville	4,562
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Ontario

Municipality of North Grenville ..	16,451
City of Ottawa	934,243
City of Windsor	329,144

Quebec

City of Bromont	3,895
City of Joliette	45,508
City of Plessisville	7,195

New Brunswick

City of Dieppe	25,384
City of Saint-Quentin	2,194
City of Fredericton	58,220

Nova Scotia

County of Kings	60,600
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LAMP sought to address a gap in municipal asset management practice that FCM had identified while designing the program. While many municipalities across Canada had begun to develop asset management plans to better inform investments in their core infrastructure assets (like roads, bridges, water and wastewater infrastructure) far fewer had embedded asset management as a strategic business process to guide infrastructure decisions from the top

down and across all municipal departments.

Municipal asset management policies, strategies and governance frameworks can help drive a consistent approach to decision-making across the whole municipality. They are key tools for ensuring that the tactical decisions municipalities make about infrastructure and services are well-aligned with their other strategic plans and goals, including those related to building sustainable communities and becoming more resilient to climate change.

The first new FCM guidebook, *How to Develop an Asset Management Policy, Strategy and Governance Framework: Set Up a Consistent Approach to Asset Management in Your Municipality*, explains how the LAMP municipalities have done this through their work together and with a team of leading experts in asset management and sustainability.

Although the LAMP municipalities were located all across Canada, had varying levels of experience in asset management, and ranged in size from under 5,000 people to Canada's biggest cities, they were able to develop a common language and agree on common principles. They developed a set of five key guiding principles that should be included in an asset management policy to ensure that infrastructure decisions reflect a long-term approach and support municipalities in becoming more sustainable and resilient:

- **Service delivery to customers** captures the idea that service delivery is the key purpose of municipal assets. Decision-making should be focused on delivering defined levels of service that reflect customer expectations and balance risk and affordability.
- **Long-term sustainability and environmental adaptability** captures the idea that services and infrastructure assets should be socio-culturally, environmentally



Asset management strategies can drive real and tangible improvements in evidence-based decision-making and enable more reliable financial forecasting and planning.

and economically sustainable over the long term. Achieving this involves long-term planning that incorporates triple bottom line considerations, climate change awareness, and the development of resilience.

- **Holistic ‘big picture’ approach** captures the idea that encouraging holistic thinking and collaborative asset management decision-making across departments and disciplines will help municipalities realize maximum value for the communities they serve.

- **Fiscal responsibility and asset management decision-making** captures the idea that financial challenges and constraints are a reality for municipalities, and robust asset management decision-making processes are required to make the best use of available funds to deliver services to communities.

- **Innovation and continuous improvement** captures the idea that a culture of continual improvement will help municipalities increase their asset management maturity and deliver services to the community and stakeholders more effectively and efficiently.

The guidebook also shares the LAMP municipalities’ experience in developing asset management strategies, which outline the key practices, processes, tools and documents that municipal staff will use to implement the asset management policy and adhere to its principles. Asset management strategies can drive real and tangible improvements in evidence-based decision-making and enable more reliable financial forecasting and planning.

The guidebook contains several examples from the LAMP municipalities’ own policies, strategies and governance frameworks. It is geared toward municipal asset management practitioners from any discipline, including engineering, finance and planning, who would like to embed asset management as a formal business process in their municipality.

FCM has also developed a shorter, companion guide called Building Sustainable and Resilient Communities with Asset Management: An Introduction for Municipal Leaders, that is geared toward municipal elected officials and senior staff who would like to learn about the linkages between asset management and sustainability. ❁



This article was prepared by Donna Chiarelli for the Federation of Canadian Municipalities.

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The 1,800-kilometre transmission line will provide clean power to 22 First Nations communities.

2018 Top100 Projects Rank: 40
Value: \$1.6 billion

Federal funding secured for Wataynikaneyap Transmission Project

The Government of Canada and the Government of Ontario have announced funding for the Wataynikaneyap Power Transmission Line Project in the aggregate amount of \$1.6 billion. The funding framework allows for a viable transmission business with First Nations and Fortis Inc. participating as the equity investors. The project will connect remote First Nations in Northwestern Ontario to Ontario's power grid.

The funding announcement is the culmination of years of on-going negotiations and discussions since area Chiefs were mandated with the investigation of connecting remote communities to the provincial transmission grid, premised on eventual 100 per cent First Nations ownership.

"The federal government is proud to support this historic Indigenous-led transmission project. This project became a reality because of the leadership of Wataynikaneyap Power and the federal and provincial commitment to work with First Nation communities to improve health and socioeconomic outcomes," said Jane Philpott, minister of Indigenous Services Canada. "This will provide a future of positive change for these communities alongside a cleaner and more reliable energy supply."

The Wataynikaneyap Power partnership consists of 22 First Nations who are leading this project and equally own 51 per cent, while industry partner, Fortis Inc., owns 49 per cent of the project. Seventeen of the 22 First Nations Wataynikaneyap Power communities currently rely on diesel generators which have become financially unsustainable, environmentally risky, and inadequate to meet community needs. A majority of the remote communities are at capacity with their diesel generators or face electrical load restrictions limiting the construction of homes and other critical infrastructure that would support community growth.

The funding framework goals include connection of remote First Nations communities, capacity building and the establishment of a viable transmission business to be eventually owned and operated 100 per cent by First Nations.

In addition to the significant savings associated with the avoided cost of diesel generation, the project is estimated to create 769 jobs during construction and nearly \$900 million in socio-economic value. These include lower greenhouse gas emissions (more than 6.6 million tonnes of CO2 equivalent GHG emissions are estimated to be avoided), as well as improved health of community members, and ongoing benefits from increased economic growth. The project is set to be completed by the end of 2023.



Looking down at Tunney's Pasture, one of five sites that are part of the ESAP project.

2018 Top100 Projects Rank: 45
Value: \$1.2 billion

Two teams pre-qualify for ESAP contract

Following a Request for Qualifications, Innovate Energy and Rideau Energy Partners have successfully pre-qualified to compete for a contract with the Government of Canada to modernize five heating and cooling plants in the National Capital Region.

"The Energy Services Acquisition Program is part of the government's plan to reduce greenhouse gas emissions," said Carla Qualtrough, minister of public services and procurement. "Modernizing the heating and cooling systems is a key part of the roadmap to a carbon-neutral future."

The members of the teams are:

Innovate Energy

- Black & McDonald Capital Limited
- Black & McDonald Limited
- ENGIE Services Inc.
- PCL Constructors Canada Inc.
- PCL Investments Canada Inc.
- WSP Canada Inc.

Rideau Energy Partners

- NRG DG Development LLC
- Pomerleau Inc.
- SNC-Lavalin Capital Inc.
- SNC-Lavalin Construction (Ontario) Inc.
- SNC-Lavalin Inc.
- SNC-Lavalin Operation & Maintenance Inc.

Once their proposals are submitted, Public Services and Procurement Canada will consider elements that extend beyond cost. For instance, the firms will have the opportunity to demonstrate that their technologies can reduce greenhouse gas emissions beyond targets set by Canada. They will also have to provide innovative design features for the Cliff Heating and Cooling Plant, which is located along the Ottawa River and bordered by parliamentary buildings.

The request for proposals was released to pre-qualified companies on February 5, 2018.

This procurement process will result in a public-private partnership, and a contract is expected to be finalized with a private sector partner in the spring of 2019.

APPOINTED



Stephen Schaller

Stephan Schaller has begun in his role as head of the Corporate Board of Management (CEO) at Voith GmbH & Co. KGaA.

He succeeds the long-serving head of the Board of the international technology company, Dr. **Hubert Lienhard** who, at the age of 67, has retired. Schaller has supported Voith since 2015 as a member of Voith's Shareholders' Committee.

In the first weeks after assuming the role, Voith's new CEO wants to get to know his team and the company in particular. "Voith is a very diverse international company. I will therefore take however long is necessary to get to know the company, and above all the employees."

Schaller has many years of international experience in various sectors and industries outside Voith. In the course of his career he has been employed in multiple management and leadership positions at Linde, Schott, and Volkswagen. Schaller, who studied mechanical engineering, was previously responsible for the motorcycle division of the BMW Group before he joined Voith.



John Stephenson

The Ontario Association of Architects (OAA) has announced that **John Stephenson** has been elected to serve as OAA president for a second one-year term.

Stephenson joined OAA Council in 2013. He had originally served a term in the early 1990s, continuing to volunteer with the Association afterward. Since then, he has participated in several committees, task forces, and executive roles, serving as senior vice president and treasurer for the two years prior to becoming president.

Stephenson is one of the founding partners of FORM Architecture Engineering, the largest architectural practice in Northwestern Ontario, established in 1986 as Kuch Stephenson Architects.



Chris Traini

Chris Traini has officially taken over as president of the Ontario Good Roads Association.

As the county engineer for the County of Middlesex, Traini brings years of experience and knowledge to the Board and the Association as president.

Traini was elected to the Board in 2014 to serve as director and represent the Southwestern Zone. He has lent his expertise to OGRA in many areas but in particular has been closely involved with the Minimum Maintenance Standards (MMS).



Zay Emir

The Canadian Construction Association (CCA) has appointed **Zey Emir** as chair of the 2018 board of directors at its annual general meeting. She takes over the position from

Chris McNally, director of C & M McNally Engineering Corp.

Emir is president of Revay and Associates Limited, a dispute resolution and project management provider to the construction industry in Canada and internationally.

She has over twenty-five years of experience specializing in construction claims and dispute resolution as well as contracting strategies. Emir has also developed and presented training programs for the construction industry and is a frequent lecturer at several universities.

Emir joined the CCA board in 2009 and has chaired the CCA Manufacturers, Suppliers and Services Council and has been the vice-chair of the CCA Standard Practices Committee. She joined the CCA executive in 2010 and is a past board member of the Canadian Construction Innovations (CCI).



Gregg Lintern

The City of Toronto has announced that **Gregg Lintern** has been appointed as its new chief planner.

Lintern has had a long-term history of working in municipal planning. His career of more than three decades started in the City of Etobicoke in 1984 and has taken him across the city to other communities. He rose through the ranks to become a director of community planning for the Etobicoke York district in 2005 and the Toronto and East York district in 2011. Lintern was also acting chief planner and the executive director of the City Planning division in 2012 and since September 2017.

Lintern's initial priority areas will include transit network expansion, affordable housing, improvements to the development review process and implementing Ontario Municipal Board reform. He began his new role on April 9.



Emmanuel Jaclot

The Caisse de dépôt et placement du Québec has announced the appointment of **Emmanuel Jaclot** as senior vice-president, infrastructure.

Jaclot will manage the Caisse's entire infrastructure portfolio, whose assets total more than \$ 16 billion. He will also be responsible for CDPQ Infra, a subsidiary

of the Caisse responsible for the development and operation of infrastructure projects.

The arrival of Jaclot follows the appointment of **Macky Tall**, who until now has been responsible for the Infrastructure portfolio, as head of liquid markets and Metropolitan Express Network.

Prior to joining the Caisse, Jaclot held key positions at Schneider Electric and EDF Energies Nouvelles, EDF's renewable energy subsidiary. His role has been to manage major M & A transactions around the world and to develop expertise in both investment and post-trade asset management. Jaclot takes over his new position on June 1, 2018.

AECOM announced the appointment of **Pierre Tremblay** as president and chief executive officer of its Canada Nuclear Operations. Tremblay will focus on expanding the firm's expertise and service delivery in the Canadian nuclear power market. He will work to achieve these goals by driving performance; maintaining client, community and regulatory authority relationships; and diversifying the firm's project portfolio.

Tremblay brings a wealth of nuclear power plant operations experience to this new position. His knowledge is complemented by his past leadership roles in training, maintenance, and nuclear waste management. An inducted fellow of the Canadian Academy of Engineering, Tremblay is the former chief nuclear operating officer for Ontario Power Generation (OPG), Ontario's largest power utility. He was also formerly a president of OPG's wholly-owned subsidiary, Canadian Nuclear Partners.

RESIGNED



Jenny Gerbasi

After five terms on Winnipeg City Council, **Jenny Gerbasi** has decided not to run in the October 2018 municipal election. Gerbasi was first elected to municipal council in 1998 to represent Four Rouge East Fort Garry. She currently serves as deputy mayor of the council.

Gerbasi is well known on the national scene for her role on the board of the Federation of Canadian Municipalities since 2007. Gerbasi is the current president of FCM, with her term coming to an end in June. At that time, she will continue in the role of past-president. She has also represented Winnipeg Transit on the Canadian Urban Transit Association (CUTA) Board Members Committee for over 10 years.

"It is gratifying to be part of national efforts and see groundbreaking results from successful advocacy to the federal government for municipal priorities such as housing, infrastructure, transit funding and so much more," said Gerbasi.



Carlo Crozzoli, senior vice president of corporate business development and strategy at Ontario Power Generation.



A full house for the discussion on new private sector opportunities in energy, hosted by the Toronto Region Board of Trade.

Photos: ReNew Canada

NEW PRIVATE SECTOR OPPORTUNITIES IN ENERGY TORONTO, ONT.

The Canadian energy landscape is undergoing a period of great change, as the move from coal to renewables and the rapid pace of innovation is causing new strategies to emerge for providing power to communities across the country.

An expert panel provided its outlook on how this new age of energy development will provide new private sector opportunities in the industry at an event hosted by the Toronto Region Board of Trade.

“We are embarking on an exciting new age in the energy sector,” said **Carlo Crozzoli**, senior vice president of corporate business development and strategy at Ontario Power Generation. That new age includes a nuclear industry that is driving innovation, continued expansion of wind and solar assets, and an evolving battery storage industry.

But to date, there hasn't been a large amount

of private sector investment in energy, and there are two important reasons why: ownership and scale. According to **Kyle Walker**, managing director, power, utilities, and infrastructure at RBC, the majority of energy infrastructure assets, at the scale needed for pension funds to invest, are owned and operated by municipal and provincial governments. But there may be a different route for involving private sector investment as Walker notes, which is to engage them to help finance the upgrade of the grid to the newer technologies.

The potential of energy storage could create significant new opportunities from economic, generation, and investment perspectives. Economically, battery storage technology is an accelerating market in Canada. As the technology is refined, Canadian companies will have the opportunity to become a global leader in the market, create a manufacturing industry

with the capacity for thousands of jobs. That manufacturing could support a large demand for power generation through energy storage. **Tom Timmons**, partner at Gowling WLG and chair of CanSIA, posed the question of the economic and generation impact if a Made-in-Ontario storage system were attached to each of the 26,000 solar microfit projects currently active in the province as of December 2017.

Carlyle Coutinho, president and chief operating officer for the East Region at Enwave Energy Corporation suggested that his company is investigating the opportunities surrounding energy storage solutions, and the opportunity to expand its use. He suggested that a primary difficulty with the emerging technology is the question of how to integrate it into large urban centres, where physical footprint provides a significant challenge for its use at its current scale.



Antoine Belaieff, director of regional planning at Metrolinx.



Bill Hutchison from The Munk School for Global Affairs moderates a discussion on redefining smart for our future cities.



Terry Stuart, chief innovation officer at Deloitte.

Photos: ReNew Canada

RSI 2018 LEADERSHIP SUMMIT TORONTO, ONT.

What does smart really mean in the context of building the ‘smart’ cities of the future in Canada? If you ask **Paul Dowsett**, co-founder of Sustainable.TO Architects, the answer is simple.

At the RSI (Rethink Sustainability Initiatives) 2018 Leadership Summit in Toronto, Dowsett was part of a discussion looking at how new thinking can build smarter, greener, more connected communities. And for Dowsett, it starts with the understanding that ‘simple’ is the new ‘smart’.

In his presentation, he stressed the need to ensure that buildings constructed today need to be able to sustain the catastrophic weather events that are becoming more frequent due to the changing climate. And doing so means taking a more simplistic approach to the design: the right amount of the right material in the right place.

Building simple also means factoring in passive technologies, working with nature instead of working to combat it, as has been the traditional approach in years past. This includes incorporating windows and natural assets in a

way that will provide a net positive benefit on the household, keeping buildings cooler in the summer and warmer in the winter.

In the construction of the building itself, Dowsett points to three key factors to building a simple home: airtight, insulate, ventilate. Building with these three factors in mind allows heating and cooling mechanisms to enter the building, stay in the building, circulate through the building, and leave the building in an energy efficient manner.

To learn more about the RSI 2018 Leadership Summit, visit rethinksustainability.ca.

Photos: ReNew Canada



Marcius Extavour, senior director of the XPRIZE Foundation during a Spark Talk in the Expo.



Mike Gerbis, CEO of GLOBE Series, opens the Innovation Expo.



ReNew Canada publisher Todd Latham speaks with Kevin Bossy, CEO of Bishop Water Technologies.

GLOBE FORUM 2018 VANCOUVER, B.C.

With a theme like “Disrupting Business as Usual,” you’d expect some eye-opening features and thought-provoking speakers. And, as it has for the last 28 years, GLOBE delivered again with its high calibre gathering of industry leaders, unique insights into best practices, and engaging views from a broad swath of business sectors devoted to clean capitalism and a low carbon economy.

Under the leadership of **Mike Gerbis**, **Nancy Wright**, and **Christopher Henderson**, the bi-annual event purposely sets out to “break and re-make the mold for how businesses make decisions, develop

products and services, and engage with customers and constituents on the road to the clean economy.” And they’ve done that again in 2018—bringing together business, government, and civil society leaders from around the world who are at the vanguard of sustainability and innovation.

The GLOBE Innovation Expo included a number of cleantech service ‘clusters’ this year including Smart Grid/Micro-Grid, High Performing Buildings, Sustainable Mobility, Water Innovation, Carbon Capture, Utilization and Storage, and Advanced Manufacturing. The conference format was

equally varied with a mix of roundtables, formal and informal sessions, debates, B2B Matchmaking, SPARK talks, and of course, lots of receptions and parties. The BASF reception was a favourite with an exclusive live performance from Canadian rock musician **David Usher** and his discussion on creativity and innovation with BASF president **Marcelo Lu**.

Regardless of how good the tradeshow or sessions are, and no matter how deep the program is, GLOBE is ultimately all about the networking—the who’s who of the industry always attends.

Photos: ReNew Canada



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1 The panel discusses solutions for reducing emissions in the Pearson Eco-Business Zone. 2 Region of Peel Public Works Commissioner Janette Smith with Pembina Institute Executive Director Glen Murray. 3 Environmental Commissioner of Ontario Dianne Saxe with Pat Neville, vice president of airport planning and technical services, GTAA.

THE FUTURE OF CLEAN TRANSPORTATION MISSISSAUGA, ONT.

How do you solve the transportation emissions issue plaguing the Greater Toronto Area? That was the question at the top of the minds of the panellists invited to discuss the future of clean transportation.

Hosted by Partners in Project Green (PPG), a community brought together by the Greater Toronto Airport Authority (GTAA) and the Toronto Region Conservation Authority (TRCA) to develop the Pearson Eco-Business Zone into, among other things, an eco-friendly business climate.

But as local and regional operations like the GTAA and Region of Peel release their long-term transportation plans, there was an opportunity to discuss what needs to be done in order to reduce the emissions that these plans will create in the Pearson Zone.

“When we unpacked the emissions

profile, within transportation we found that emissions from the freight sector are going up and it’s the only sector within transportation that is,” said **Dianne Zimmerman**, senior manager of Partners in Project Green.

With a strong manufacturing presence, and Canada’s largest international airport both part of the Pearson Zone, freight emissions are a significant concern that has yet to be addressed with a viable solution.

The subject was one of the primary forces behind the panel discussion on the future of clean transportation at the PPG event. Environmental Commissioner of Ontario **Dianne Saxe**, the moderator for the discussion, emphasized that freight emissions is our biggest challenge in reducing GHG emissions. Transportation, she noted, is the biggest source of GHG emissions in Ontario right now, and

that solving the freight issue needs to come through technology and innovation.

But **Glen Murray**, executive director of the Pembina Institute, noted that there are some practical solutions that can help address the issue, especially in the short-term as new innovations are developed. The ‘low-hanging fruit’ includes things like maximizing the capacity of the trucks sent out on the road, re-designing truck beds to allow for different types of goods movement within the same vehicle, as well as the re-localization of the some of the products produced locally. Those initiatives can help to reduce emissions now, while advancements in fuel switching and vehicle electrification progress.

For more information on the work being done by Partners in Project Green, visit partnersinprojectgreen.com



Competitions, like the XPRIZE, help unite corporate and government teams in an effort to build new innovations to benefit all Canadians.

GOING FOR THE PRIZE

By Todd Latham

Spurring innovation can be a challenge, literally. Transformational change requires a higher level of recognition, inspiration and motivation than other mortal efforts. The run-of-the-mill grants, loans and venture capital deals typical for project financing also have their place in pushing us to find solutions to the world’s greatest challenges, but there is nothing more exciting and press release-inducing than winning a grand prize in carbon, a global award for water, or a big infrastructure challenge competition.

XPRIZE, the “world’s leader in designing and operating incentive competitions” recently announced five finalist teams who will share a \$250,000 Water Abundance XPRIZE award on in their journey towards the \$1.5 million grand prize. The competition asked teams to create and develop pioneering technologies that can extract a minimum of 2,000 litres of water per day from the atmosphere using 100 per cent renewable energy, at a cost of two cents per liter. Ninety-eight teams made submissions. That’s a lot of new intellectual property to apply to water shortage problems.

The bigger NRG COSIA Carbon XPRIZE is \$20 million recently announced its finalists who have a similar cadre of amazing ideas and innovations that “will challenge the world to reimagine what we can do with CO2 emissions by incentivizing and accelerating the development of technologies that convert CO₂ into valuable products.” Identified to help inspire other investment and focus in areas of need, the XPRIZE organization has seven other groups including the Future of Housing, Ocean Health, and Aging.

Even traditional industry awards that don’t have cash components such as FCM’s Sustainable Communities Awards, Canadian Water Summit’s Water’s Next or CaGBC’s Leadership and Green Building Excellence Awards are big confidence boosters that can incent teams and move the needle on innovation.

In an era when policy and consumers are not moving fast enough to address and adopt to the existential challenges we face, prizes and awards are exciting momentum-builders for clean capitalism and low carbon

serious phosphorus water pollution is. And last October the Boston Consulting Group (BCG) launched the CanInfra Challenge, to “seek out innovative ideas for transformational infrastructure in Canada.” The final ten contenders were announced on April 23 and the winner will take home a \$50,000 grand prize in May.

But not everything needs to be a prize. When I spoke with Marcius Extavour, senior director of XPRIZE at the recent GLOBE Forum in Vancouver (*see page 33*) he said, “the XPRIZE is not a replacement for

Prizes and awards are exciting momentum-builders for clean capitalism and low carbon economics.

economics. Governments also want in on the trend to give out splashy cash prizes for doing cool stuff. Infrastructure Canada is in the midst of a \$75 million Smart Cities Challenge, and not to be outdone, the Ministry of Environment and Climate Change recently announced the \$500 million Low Carbon Economy Challenge that will “leverage Canadian ingenuity to reduce emissions and generate clean growth.”

There are awards, prizes and challenges popping up all over the place. Earlier this year, the AquaHacking Challenge was announced which will award \$50,000 (plus office space with top incubators) for its winning teams. The Everglades Foundation is dedicating four years and a grand prize of \$10 million to show the world just how

traditional funding. That needs to be there to support the work we do to drive the most critical breakthroughs.”

We think ReNew Canada readers are winners in their professions already, but if you are looking for more than a pat on the back and want your organization to be further inspired, then get a team together and nominate yourselves for an award or participate in a competition. Apply today at a website near you—go for the prize! 🍀

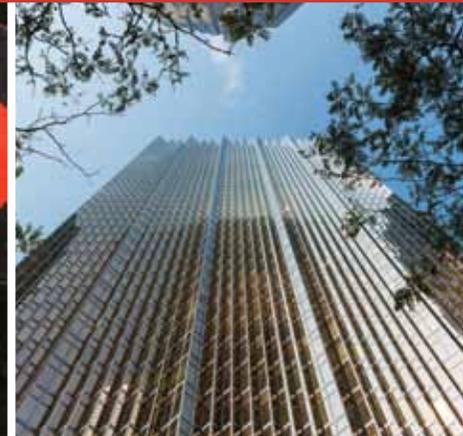
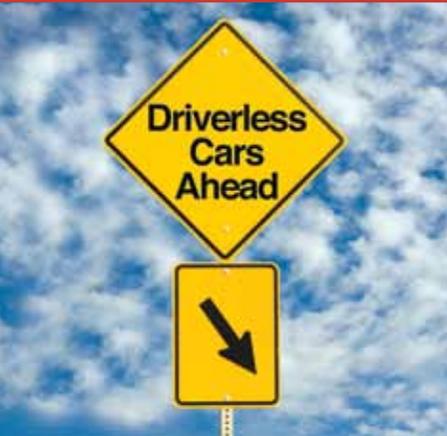


Todd Latham is the founder of ReNew Canada and has a triathlon podium finish prize as motivation to train like crazy in 2018.



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Ontario and municipal elections: let's promote good infrastructure

The Ontario government has been making significant investments in infrastructure and is moving toward the development of a comprehensive long-term plan for the spring of 2019. The interim report, "Building Better Lives," was released in November and stressed that infrastructure must be more resilient and adaptable to future changes.

On June 7, people across Ontario will head to the polls to elect the provincial government; Oct. 22 will see elections for Ontario's 444 municipalities. Both dates will be critical for the future of the province's infrastructure, often only top of mind when talk turns to traffic congestion, crowded public transit, potholes, washed-out bridges, and boil water advisories.

Infrastructure is viewed by all parties as vitally important, but our political leaders must demand and use the best available evidence to support important infrastructure decisions.

Since its founding in 2005, the Residential and Civil Construction Alliance of Ontario (RCCAO) has been a strong advocate for infrastructure investment. We have commissioned 46 independent research reports related to planning, financing and building infrastructure, removing regulatory impediments, evaluating the risks and benefits of infrastructure investment, and improving government procurement practices.

RCCAO would like to enlist your help to ensure that all political candidates understand the critical need for ongoing infrastructure investment. We need you – any user of public infrastructure – to promote a meaningful election dialogue around infrastructure needs and to ensure promises become deliverable actions.

Here's what you can do:

- Meet local candidates at campaign offices and community events.
- Ask them their positions on continued infrastructure spending levels and long-term planning.
- Refer them to **rccao.com** and our many research reports on infrastructure issues.
- Attend candidates debates; publicly ask what commitments each candidate and party are willing to make for a consistent, ongoing program of infrastructure investment.
- Use conventional and social media to make infrastructure a priority election issue.

To maintain and expand high-quality infrastructure, both above and below ground, we need two things:

- 1 a commitment to a steady stream of long-term infrastructure spending.
- 2 incorporation of business principles like asset management planning, scheduled maintenance/reinvestment, and full lifecycle costing into public infrastructure programs.

Let's make sure those messages are not ignored!

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We think we can.

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