May/June 2019

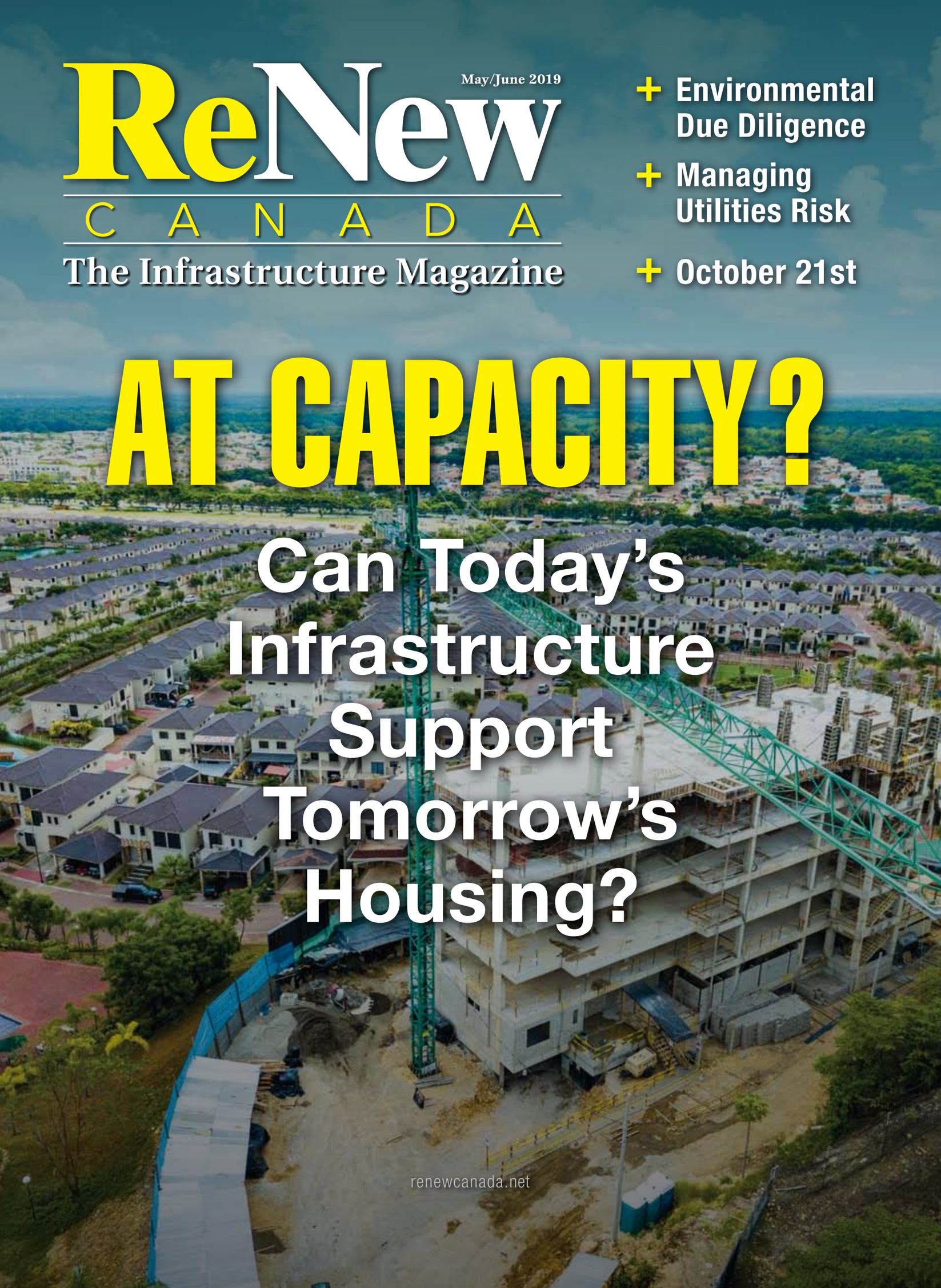
ReNew CANADA

The Infrastructure Magazine

+ Environmental Due Diligence
+ Managing Utilities Risk
+ October 21st

AT CAPACITY?

Can Today's Infrastructure Support Tomorrow's Housing?



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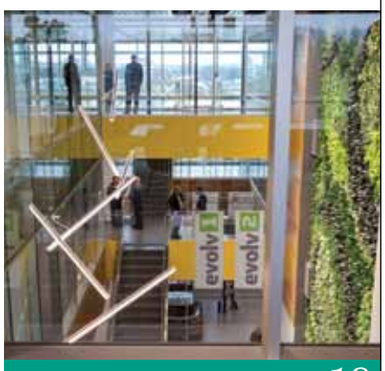

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RISK MANAGEMENT

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CAN WE BE TRANSFORMATIVE?

By Andrew Macklin

In 1886, the first train crossed Canada. The trip started at Dalhousie station in Montreal, Quebec and ended at Port Moody in British Columbia. Despite the controversy it generated along the way, it remains the most transformative piece of infrastructure in our nation's history.

Now 133 years later, communities struggle to maintain roads and sewers while urban metropolises stare down billion-dollar infrastructure deficits. Our provincial and federal governments also face the impossible task of finding enough funds to support fixing what exists and building for the future.

The funds we spend today, both preventative and reactive, remain our top priority. They are sound decisions in terms of their return on investment, the community understands the need for the expense (even if they don't like paying for it), and they improve the quality of life in the here and now.

When the Canada Infrastructure Bank (CIB) was announced a few years, it felt as though we were finally going to be able to look at projects at the next level; aspiring to build those projects that define us as a nation, much as we did in the 19th century. But as of early April, the CIB had still yet to provide support for anything more than the Réseau express métropolitain (REM) project in Montreal announced months ago.

It makes me wonder if we struggle to look beyond innovation or aspiration in order to achieve transformation. What I mean is, looking beyond the ability to build an innovative or new version of the things the industry already builds and, instead, build that thing that will solve a need but seems almost imaginary or unattainable.

That was where our minds went when, a few years ago, the Canadian Northern Corridor project became public. It represented the opportunity to provide a transportation link from coast-to-coast-to-coast at the cost of a *mere* $100 billion. Maybe that's a little too rich for the public and private sector to invest in, but it isn't the only nation-building idea of its kind. I think you could debate the merits of the proposed hyperloop from Toronto to Montreal as a project that could be transformative in nature.

There is one current project that perhaps qualifies as transformative in the grandiose sense that I am discussing, which is the Wataynikaneyap Transmission Project in Northern Ontario. At a cost of $1.6 billion, it will connect 24 communities to the power grid, provide real economic opportunities, and will eventually be 100 per cent owned by the communities it serves. And there is now talk of a new project, the Kivalliq Hydro-Fibre Link, that could similarly link communities in a way that until recently looked unattainable.

As we look towards solving some of our country's biggest existing and emerging infrastructure issues such as clean energy, 5G connectivity, and climate resilience, we should expect to be innovative and aspire to be transformative.

Andrew Macklin is the managing editor of ReNew Canada.

andrew@actualmedia.ca

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MANAGING EDITOR	Andrew Macklin
GROUP PUBLISHER	Todd Latham
PUBLISHER	Nick Krukowski
DIRECTOR OF BUSINESS DEVELOPMENT	Elena Langlois
ART DIRECTOR AND SENIOR DESIGNER	Donna Endacott
ASSOCIATE EDITOR	Simran Chattha
CONTENT AND MARKETING MANAGER	Todd Westcott
CONTRIBUTORS	Pamela Cameron, Jesse Gardner, Phill Gillies, Yasmin Glanville, Bern Grush, Thomas Kolodziej, Carroll McCormick, Sharon Vogel
ADVERTISING	Elena Langlois elena@actualmedia.ca
ADVISORS	Nick Reid, James Sbrolla

actualmedia

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ABOUT THE COVER

Housing experts suggest mid-size housing is needed in existing urban neighbourhoods. But what impact will that have on the existing infrastructure? Learn more on page 10.

CONTRACTS AWARDED FOR WEST CALGARY RING ROAD

Contracts have been signed for two segments of the West Calgary Ring Road project, with construction to begin this spring.

"This project is something the people of this city have been asking to have completed for nearly 50 years," said Brian Mason, minister of transportation.

The 11-kilometre project is divided into three segments: the south one that connects with the Southwest Calgary Ring Road, the north one that meets the Trans-Canada Highway, and a new bridge across the Bow River.

The north segment, running between Old Banff Coach Road and the Trans-Canada Highway, will be constructed by EllisDon. The project was tendered at a cost of $463 million. The West Bow River Bridge twinning project will be built by Flatiron and Aecon and has been tendered at a cost of $89 million.

The Request for Qualifications for the south segment of the West Calgary Ring Road, between Highway 8 and Old Banff Coach Road, will be issued in the coming days. A contractor is expected to be in place for the 2020 construction season.

The West Calgary Ring Road will be open during fall 2022, one year following the expected completion of the Southwest Calgary Ring Road project. When complete, the entire Calgary Ring Road will provide travellers with 101 kilometres of free-flow travel.

NEXT ISSUE: JULY/AUGUST
THE ENVIRONMENT ISSUE

Nunavut Energy
Clean energy solutions for the territory.

Redefining Sustainability
Why the language we use needs to change.

Stormwater Solutions
Solutions for urban stormwater diversion.

MAJOR EXPANSION PLANNED FOR CAPE BRETON REGIONAL HOSPITAL

Health and Wellness Minister Randy Delorey announced that the Cape Breton Regional Hospital is getting a new emergency department, critical care department, and cancer centre as part of a major expansion. The expansion is part of the CBRM Health Care Redevelopment Project and will transform the way health care is delivered, improving access to care and creating more reliable, sustainable services.

All three services will be part of the new 190,000-square-foot building to be constructed at the back of the Cape Breton Regional Hospital. It will be connected to the existing hospital building via pedway.

A request for proposals for design services was issued in late March.

The new emergency department will be twice as large as the current one, with more exam and patient rooms, as well as teaching and education space for staff and students.

The new critical care department will more than triple in size and have the intensive care, coronary care and intermediate care units all under one roof. There will also be more patient rooms and new family and support spaces.

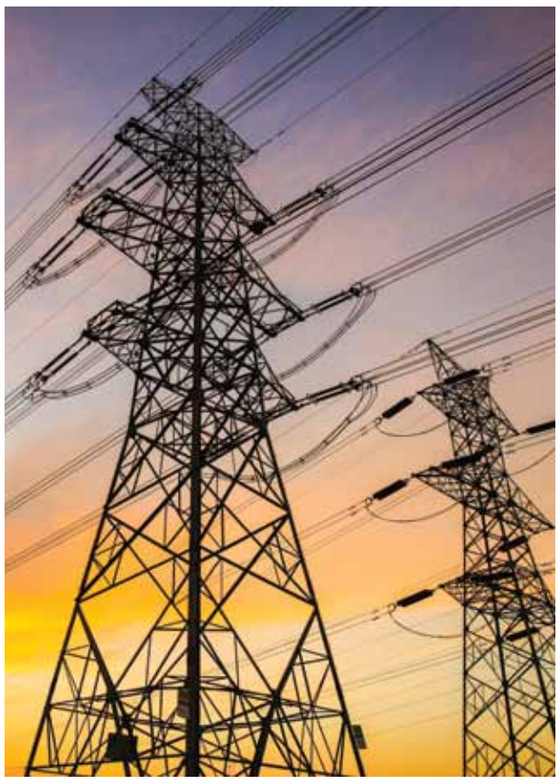
The Cape Breton Cancer Centre is now serving more than double the patients it was built for in 1998. The new centre will more than double in size, with twice as many chemotherapy seats and new space for counselling and group sessions.

Government recently approved $8.1 million for the redevelopment project, which will go toward completing the early design phase. More funding will be approved as the project moves forward.

The CBRM Health Care Redevelopment Project also includes:

- Renovating and revitalizing the Glace Bay Hospital emergency department.
- Building new, modern community health centres and new long-term care facilities, in North Sydney and New Waterford, to replace the New Waterford Consolidated and Northside General hospitals.
- A new Community-Based Paramedic Program in Cape Breton Regional Municipality (CBRM) where paramedics and telecare nurses provide care after a patient is released from hospital. This program, which aims to reduce return trips to the emergency department, started rolling out at the Cape Breton Regional Hospital emergency department in December 2019.
- Building a new laundry centre in North Sydney to replace aging equipment and to continue to serve health care facilities in CBRM.

For more information about the project, visit *healthredevelopment.novascotia.ca/cbrmhealth*.



CIB Studying Kivalliq Hydro-Fibre Link?

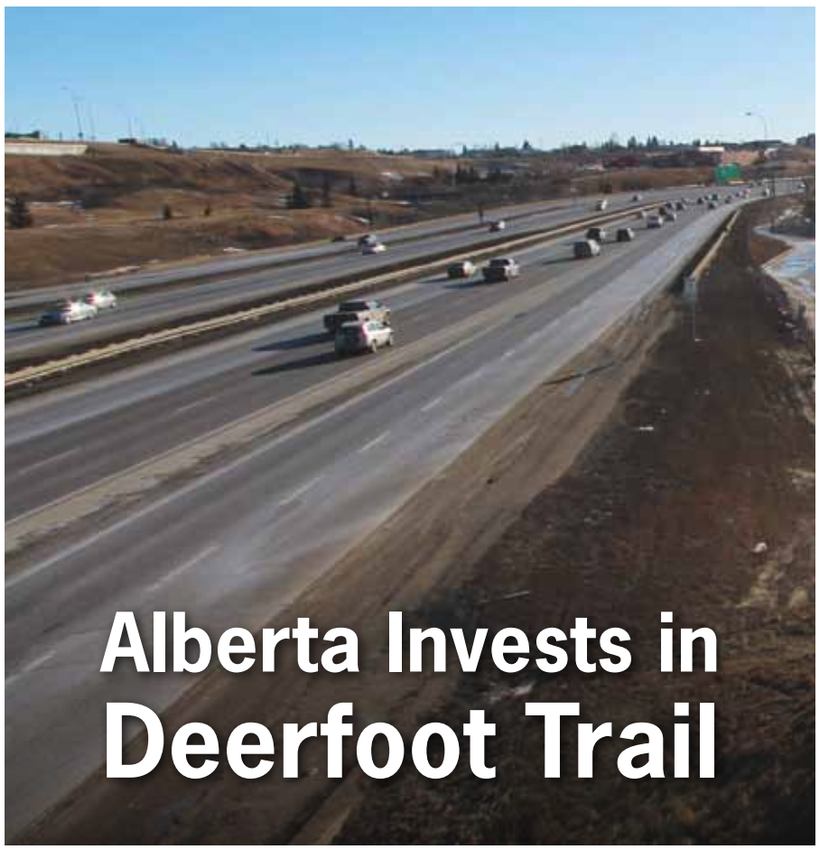
The Kivalliq Hydro-Fibre Link could soon receive a much-needed financial boost, as it is believed to be one of the projects being studied for support from the Canada Infrastructure Bank (CIB).

In an article from the National Post on March 22nd, a person familiar with the discussions suggested that the bank has been in talks with the proponents involved in delivering the project. The estimated $1.2-billion project would involve the construction of a 900-kilometre transmission line from northern Manitoba to Nunavut.

On February 25, Yvonne Jones, parliamentary secretary to the minister of intergovernmental and northern affairs and internal trade, announced over $1.6 million to fund the Kivalliq Hydro-Fibre Link study a two-year technical and feasibility work study. The Kivalliq Inuit Association and Anbaric Development Partners, a Massachusetts-based firm, are contributing an additional $818,168.

The studies will look at the feasibility of a 230-kilovolt main, up to 1200 kilometres of electric transmission line, several shorter medium voltage transmission lines, and a fibre optic line. These lines would connect from Northern Manitoba and serve five Kivalliq communities as well as Agnico Eagle Mines, a major employer in the region. The project work being supported includes gathering technical data, conceptual design work, impacts costing, required permits, and government and stakeholder engagement.

The Kivalliq Inuit Association represents Inuit in the region, from the communities of Arviat, Whale Cove, Rankin Inlet, Chesterfield Inlet, Baker Lake, Naujaat, and Coral Harbour.



Alberta Invests in Deerfoot Trail

The Government of Alberta has announced funding for significant upgrades to Calgary's Deerfoot Trail.

Deerfoot Trail is the busiest roadway in Alberta with an average of 175,000 vehicles travelling on it every day. The province is adding both northbound and southbound lanes to 21 kilometres of Deerfoot Trail between Beddington Trail and Anderson/Bow Bottom Trail, to improve traffic flow and ease congestion.

Multiple interchanges will also be upgraded with additional lanes at Memorial Drive, 17 Avenue, Glenmore Trail, Southland Drive and Anderson/Bow Bottom Trail to reduce commute times at key bottlenecks.

This major expansion builds upon work already underway to optimize traffic flow on Deerfoot Trail. In early 2019, the province issued a Request for Proposals for engineering of a new Intelligent Transportation System to help ease congestion by employing variable speed limit technology and new message boards to alert commuters of expected travel times and incidents ahead.

An initial study released in 2017 made recommendations for short-term improvements to Deerfoot Trail, including:

1. **New Intelligent Transportation System**
2. **New interchange improvements at:**

- McKnight to 64 Avenue ramp connection;
- 11 Street northbound connection to Deerfoot, north of Beddington; and
- Southland Drive to Anderson/Bow Bottom Trail.

In early 2019, the Government of Alberta issued a Request for Proposals for engineering and design work for short-term improvements to Deerfoot Trail.

The Government of Alberta and the City of Calgary are engaged in a long-term study of Deerfoot Trail that will be finalized this year. The core initial findings suggest:

- Additional lanes northbound and southbound between Beddington Trail and Anderson/Bow Bottom Trail are required to meet growing traffic demands.
- Major interchange improvements are required at Memorial Drive, 17 Avenue, Glenmore Trail, Southland Drive, and Anderson/Bow Bottom Trail to reduce commute times and improve traffic flow.

A total $478 million has been allocated in the Capital Plan for the project.

Eglinton Crosstown LRT
Toronto, ON, Canada

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Credit: ReNew Canada

Lyash has directed OPG through the early stages of the $12.8-billion refurbishment of the Darling Nuclear Generating Station.

IN RETROSPECT

Jeff Lyash's legacy at OPG.

By Andrew Macklin

On July 22nd, 2015, Jeff Lyash was named as the new president and CEO of Ontario Power Generation (OPG). Lyash had previously served as the president of the power business unit for Chicago Bridge & Iron (CB&I) in Charlotte, North Carolina.

At the time of the hiring, then board chair Bernard Lord said of Lyash: "We are fortunate to have secured someone of his talents and know-how, particularly when it comes to nuclear energy. His work on complex engineering projects will help ensure OPG's refurbishment of Darlington Nuclear is delivered on time and budget."

Fast forward less than four years, and Lyash has chosen to return to the United States and taken over the role of president of the Tennessee Valley Authority.

On his second last day, I caught up with Lyash following his presentation at the Fortis Energy Exchange in Toronto to learn more about his nearly four year reign at the helm of OPG.

Looking back

We started our conversation by discussing what he was thinking about when he accepted the job, and what it was like to be in that role.

"I was excited about it at the outset because my view was OPG had such huge potential as a company and such a huge potential to have a positive impact on Ontario. […] That was the opportunity. If I had doubts, it was really about how well will I be accepted, how well will I be supported, how well will I interface with the government as a shareholder, and will I be able to be effective and make things happen. And I've got to tell you, the support I got from the workforce, from the leadership team, from the industry, and from the government has been outstanding. It's really put me in a position to deliver some things for OPG and to set the company in the direction that I think will really benefit Ontarians."

Biggest accomplishment

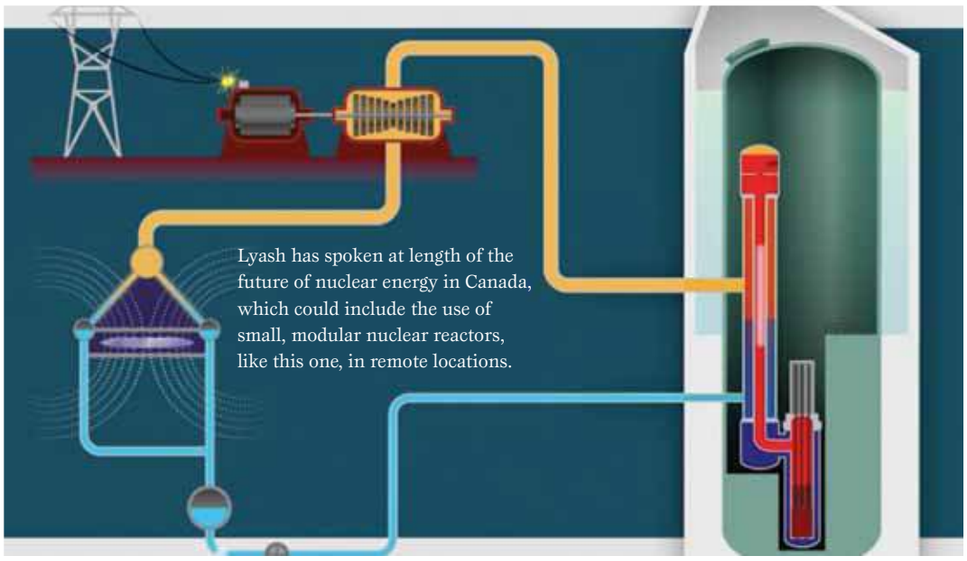
As our conversation continued, I asked Lyash about his biggest accomplishment. Admittedly, the expected answer was the Darlington Refurbishment, as the project has been the most public of all of Lyash's accomplishment while in charge. But while his answer got there, eventually, there were a few others that came up in our conversation first.

"I'm not sure I could pick one thing. When I got here at OPG, I met with 28 First Nations Chiefs before I met with a single mayor or other elected official because I wanted to understand these communities' issues because they are important partnerships. I am very glad I did that. And I am very proud of the business partnerships we have with First Nations. I think it's going to stand the company well in the future.

"The second thing I would point to is instilling in the company a sense of competitiveness, innovation, and business discipline. OPG's challenge is it has to run like a Fortune 500 company. It has to be as good or better than any company in this business. But at the same time, it has a higher social purpose because it's public power. And getting that correctly balanced is not easy. But I think the company is of the mindset now that we can produce the cleanest, safest, most reliable, lowest cost power in the energy sector, and we can do it with a sense of social responsibility.

Russia's floating nuclear technology, introduced by Russian nuclear giant Rosatom, in port for testing before heading to Pevek.

Credit: Rosatom/AP



Lyash has spoken at length of the future of nuclear energy in Canada, which could include the use of small, modular nuclear reactors, like this one, in remote locations.

Credit: Holtec International

"Then the third thing I am very proud of is what our team has done with this Darlington Refurbishment. […] The first unit at Darlington is going to be returned to service in the first quarter of 2020. It's going to be on time and on schedule. And I think people will be amazed at how much more successful the second nit will be because of the lessons learned program we implemented."

Future Opportunities

During his presentation on the morning that we spoke, Lyash again raised the subject of the use of small modular nuclear reactors in the future. He cited how the technology has the potential to be used in locations where significant power generation is needed for a short period of time. Lyash also talked about the potential role of technology where the current power grid cannot reach sites that need power generation, such as mining projects.

As this is an emerging technology, one that has not been brought online in the Canadian market, I asked Lyash if he thought any barriers existed that would prevent the technology from becoming part of the energy supply mix in this country.

"Generally the answer is no. I think there's no immovable object in the path of this. The biggest accelerator would be if the federal government and the Ontario government drew a clear nexus between GHG-free nuclear energy and the 2050 Climate Change Action Plan goals. I think it's imperative to preserve (existing) nuclear and eventually build new to be able to hit those numbers. The single biggest thing that could happen is a clear acknowledgement of that.

"Beyond that, I think the second thing that's got to happen is to get clarity around the business model used to make this investment {in small-scale nuclear power). If OPG were to build small modular reactors, my view is we should do it as a lead plant for what is really a pan-Canadian effort to build the standard design and demonstrate that it can be done effectively. And if we are going to do that, we have to be able to involve partners—other potential owners, the government, and the supply chain—into that effort. I think that's the second big thing.

"The third is just time for the technology to develop. I'm reluctant to be serial number one on anything. So I'd really like to see Ontario-Canada-OPG to be a fast follower on this. Get in early, but perhaps not be the first one."

On February 13, 2019, the board of OPG announced that chief financial offer and senior vice president finance Ken Hartwick would be taking over as president and CEO effective April 1st.

> I am very proud of the business partnerships we have with First Nations. I think it's going to stand the company well in the future.

Andrew Macklin is the managing editor of ReNew Canada.

Credit: Scott Roogeneon

Infrastructure in some of the GTHA's downtown cores will not be able to support a population increase. At the same time, there are areas within the GTHA where infrastructure is underutilized.

Credit: Jesse Roberts

Alternative solutions are available in the short-term to increase the availability of affordable housing in existing neighbourhoods without overburdening infrastructure. For example, there may be opportunities for younger families to move into homes owned by seniors that have kids who moved out.

Credit: RCCAO

Adding missing middle housing to traditional neighbourhoods could necessitate the needs for millions of dollars of investment in underground infrastructure.

Sewers in Toronto are facing capacity issues, according to Giovanni Cautillo, executive director of OSWCA. As a result, we need to look at ways to eliminate the combined sewer systems that exist because problems arise when we have precipitation events.

THE MISSING MIDDLE

How will the addition of medium-density housing in urban centres impact infrastructure?

By Simran Chattha

Increasing medium-density housing is one of the solutions that is being discussed by experts to address the housing crisis in major urban centres across Canada. Medium-density housing includes dwellings such as townhouses, stacked townhouses, and smaller apartment complexes that fit the housing space between single-family homes and condominiums.

While there has been a lot of discussion around the need for more medium-density housing, there is one piece that is 'missing' from the conversation: what impact will this have on infrastructure? In other words, if more residents are living in neighbourhoods, what impact will the higher population density have on infrastructure such as roads, sewers, and watermains?

The need for 'middle' housing

The housing market in the Greater Toronto and Hamilton Area (GTHA) is becoming more polarized, with low-density housing increasing at one end of the spectrum and lots of high-rise housing on the other end.

This was one of the key takeaways from a report titled The GTHA's UnBalanced Housing Stock: Benchmarking Ontario's New LPAT System. The report was commissioned by the Residential and Civil Construction Alliance of Ontario (RCCAO) and prepared by the Canadian Centre for Economic Analysis (CanCEA) in December 2018.

"Of all the existing housing stock across the GTA [Greater Toronto Area], only 15 per cent was of the medium-density or missing middle variety," according to Andy Manahan, executive director of RCCAO. "It really is a challenge. Even if you were to create larger condominiums, or event larger apartment building spaces, the rent or mortgages would be too high for the medium-income person to be able to afford."

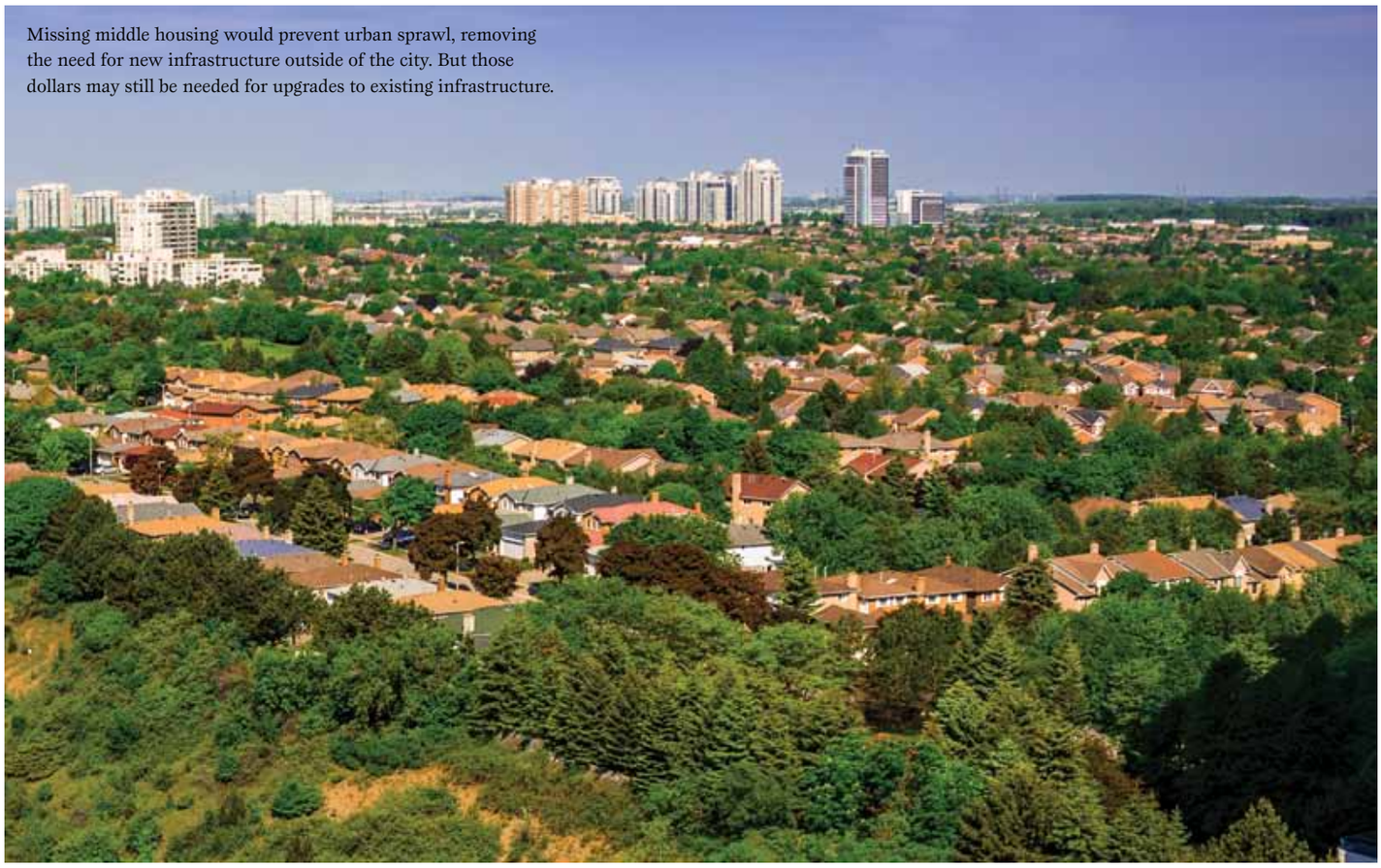
The polarizing housing market is one of the reasons why there is a severe lack of middle housing in the GTHA. Middle housing could be the key to meeting the need for affordable housing. A key question still remains though: what impact will an increase in middle housing have on infrastructure in the GTHA?

How middle-density housing will impact infrastructure

The addition of middle density housing will affect urban centres differently depending on where it is being built.

There are areas within urban centres where the infrastructure will not be able to support a higher population density without upgrading existing infrastructure.

"I do not believe that the current infrastructure in downtown cores can support an increase in population based on capacity," says Giovanni Cautillo, executive director of the Ontario Sewer and Watermain Construction Association (OSWCA). "I do believe that capacity must be increased, and systems need to be redesigned and changed in order to support the new systems. It may be as simple as keeping the existing pipe that is there and supplying a secondary pipe to take some of the load."



Missing middle housing would prevent urban sprawl, removing the need for new infrastructure outside of the city. But those dollars may still be needed for upgrades to existing infrastructure.

There are also areas where existing infrastructure is not being used to its full potential and could support an increase in population density.

"Depending on where in the region you are talking about, it can be done very efficiently without a lot of dollars going into new infrastructure," says Ed Sajecki, partner at Sajecki Planning. "There are areas within the built-up area of Toronto, and I would include in that Mississauga and other parts of the region, where the infrastructure is already there and it is to some extent underutilized. You might have an existing shopping mall that now has surplus lands, meaning you have stores closing because of e-retailing. There, you probably do not need new infrastructure."

What does this mean for infrastructure maintenance and upgrades?

In areas where middle density housing is being added to neighbourhoods, municipalities will need to ensure that infrastructure upgrades, as well as long-term maintenance, are funded appropriately. This is because while a higher population density will lead to higher revenues from taxes for municipalities, the increase will not cover the cost undertaking repairs and upgrades.

"There is a shortfall because depending on where the increased population is, that puts pressure on community centers," said Sajecki. "You may need a new fire hall. Then you are increasing transit service and you have to staff up [...] so your labour costs go up and on and on and on. So there really is the need for infrastructure to be supported from senior levels of government."

As far as the cost of upgrading the infrastructure goes, it will be contingent on the capacity of housing that is built. "It depends on if you are talking about ten-story wood frame structures that, in 10 years or so, could have 100 people added to it," Cautillo said. "That's not as bad as having an 87-story high rise building."

Where do we go from here?

With respect to infrastructure delivery, an evidence-based approach is needed to ensure that infrastructure investment will meet the needs of future growth. "What are the future growth patterns going to be?" asks Manahan. "Where do you want to direct growth to? From an engineering side, what are the best solutions?"

"What you do not want is an oversized a pipe where it does not need to be oversized and keep a pipe undersized where it needs to be upgraded," adds Cautillo. "You need to assess the situation […] we have to look at it holistically in order to figure out what fits for our future."

The future also opens opportunities to find innovative solutions that will increase population densities in existing neighbourhoods. According to Manahan, some of the research he has come across shows that we have an aging population in the GTHA. Many of the individuals in this age group are empty nesters who have extra bedrooms in their house because their kids have moved out.

"Are there ways we can provide incentives where seniors can remain within their neighbourhoods that could be a medium-density retirement kind of housing form with all the amenities they need?" wonders Manahan. "This would then open up the existing housing to younger families that need the extra space. That probably does not help us as builders. Some people might think that you should only be interested in building new, but I think you have to be creative with how you use the existing housing assets you already have."

One thing is clear: a lot more still needs to be done to increase the amount of affordable housing that is available for medium-density households in major urban centres.

Simran Chattha is the associate editor of ReNew Canada.

One of the potential impacts of improper risk assessment could be congestion worse than the levels we see now in Canada's largest urban centres.

IGNORING CURRENT NEEDS?

Understanding the risks of automated vehicle infrastructure and deployment.

By Bern Grush

Most expectations for the pending arrival of automated vehicles (AVs) involve increases or decreases in personal risks such as safety, security, cyber-hacking, or privacy. These expectations generally revolve around the vehicle technology and direct human interaction. Much less attention is paid to the urban and infrastructural risks related to the deployment of AVs that will be providing ride services via multiple large commercial fleets of robotaxis.

In a recent discussion paper regarding the infrastructure requirements of Canada's 21st-century economy, Michael Fenn et. al. developed six categories to describe the major risks involved in large infrastructure projects. The categories include: political and regulatory risk, governance risk, funding and financing risk, siting, industry capacity, and innovation and technology. Because of the extent and scope of the changes needed for—and expected from—vehicle automation, these risk categories are pertinent for AV infrastructure deployment.

While Fenn identifies these risk categories as universals, there is an important three-part context of risk related to the complex and challenge-filled period of transformation to AVs:

- Rapid private sector innovation is yielding testing and trial deployment of new mobility services that are overwhelming governments' ability to react with sensible regulations and other public policies to serve the public interest.
- The massive installed base of automobile-related technology, infrastructure, policy, regulations, standards, funding structures, change processes, social norms, habits, and expectations constitutes a significant barrier to broad and large-scale change.
- Human and societal responses to new technology applications generate unintended consequences.

Political and regulatory risk related to deployment of AVs initially appears inconsequential. As of February 2019, Bloomberg Philanthropies has tracked 123 cities engaged in pilots or studies as they prepare for the arrival of AVs, but each of these are exploratory or in early study phases. One of the more advanced programs is looking into urban preparation is Toronto's. Until now, few risks have been taken; and governments make even fewer decisions.

One indirect risk that has not been addressed however, is that these pilots and studies may prematurely inhibit ongoing, critical expansion, and maintenance of current transportation systems. The promise of AV technology causes some to question how or whether to invest in legacy road and transit infrastructure.

The nature of vehicle automation means that its first significant introduction in the public sphere will be large commercial fleets of geofenced, automated taxis, and shuttles. Challenges of congestion and curb management, as well as the erosion of funding sources such as parking fees, will create political friction and engender regulations that will most often be stop-gap guess work. Commercial operators will be challenged to decide how to invest in these fleets and the apparatus to manage, power, maintain, and store vehicles. As municipalities grapple with understanding and regulating these new fleets, every political and regulatory quarrel will mean risk for these private investors.

For these reasons, municipalities should

guide gradual fleet growth via regulations, taxes, user-fees, and infrastructure plans. Predetermined triggers for such guidance should be based on pre-agreed demand targets. Such plans need to be transparent and stable to avoid the circumstance of Toronto's Car2Go service suspension in May 2018. This is critical because the investment in vehicle storage, distribution, charging stations, and loading/unloading bays and zones required to introduce a fleet large enough to manage just 10 per cent of GTHA's travel requirements would approach three orders of magnitude more than the investment Daimler would have made in its Toronto Car2Go fleet. Furthermore, such an investment would be provided by multiple operators that compete amongst themselves, and with traditional transit. This new competition is another source of political and regulatory risk.

Governance risk in the deployment of urban changes for vehicle automation will be manifold. Deployment projects will include preparing areas for storage, staging, and charging as well as modifying streets to accommodate robotaxi loading. These projects, sparse at first, will become numerous and grow to larger areas competing more intensely with taxi, transportation network company (TNC), and private-vehicle use. Ideally, they will be integrated with transit systems meaning the restructuring and expansion of loading areas around transit stations where legacy transit can holds its own in this new marketplace. Alternatively, existing transit facilities may be decommissioned in those cases where transit contracts.

Project selection will be challenging as there will be many voices each asking for projects to be sited nearby and enabled as a priority (First In My Back Yard or FIMBY). But each of these projects is equally likely to have Not In My Back Yard or NIMBY voices protesting the siting, or event the existence of such projects altogether. There will be multiple, optimal ways to organize projects from planning and engineering perspectives, but the FIMBY-NIMBY forces may often prevent the application of this logic.

At the same time project delivery will be problematic because so many projects will need concurrent attention over fairly broad areas as the technology reaches an acceptable level of service reliability. Fleet operators will undoubtedly lobby to deploy thousands of AVs in commercially viable areas.

Faulty project selection or project delivery increases costs and lowers acceptance, threatening public and private investment. As well, project selection and delivery holds social welfare risks. Private operators and investors will prefer projects that will turn more profits and leverage incremental business. Public investment might be directed more toward the mobility disadvantaged: those living in transit deserts, those who cannot afford these services, and groups such as seniors or disabled who may have difficulty using automated services.

Funding and financing risk increases with the novelty of any infrastructure project and the ability to forecast its usage. Projects that are not properly scaled or expandable mean underutilized or overcrowded facilities. New infrastructure for automated fleets will compete for an under-supply of public money or look to private investment in P3 arrangements. Furthermore, AV fleets are forecast to reduce revenue from parking fees and fines, vehicle registration, gas taxes, and traffic fines. New forms of revenue will be needed in environments where tax change is difficult. Replacing gas tax revenue with road pricing has met with little success in North America. Perhaps it will be easier to replace parking fees with curb fees, but this remains to be seen.

Siting is another risk. An area that is optimized for robotaxis might attract more development, and hence could soon be overwhelmed, needing to be changed again. The opposite occurs if an area becomes over-built for AV use. The problem is less about building for an ideal target, but more about all the interim stages before the horizon goal is reached.

Industry capacity risk might seem slight from a build perspective, as each project—street, curb, and charging station—is modest. But after an initial period we can expect many projects. In cases of street and curb reconfiguration these will be staged over long time spans while handling existing traffic that mixes automated and non-automated vehicles.

Many cities have experienced limited success in managing large numbers of concurrent construction projects—especially cities with sharply defined seasons. Hence, while industry capacity may not be strained, the demand for numerous, concurrent projects increases risk.

Innovation and technology risk is more with the incoming vehicles rather than from novel infrastructure. As of this writing, there are no vehicles in commercial, passenger service that operate without a responsible human in its cabin. Such a total lack of experience means any infrastructure project designed and scaled today for significant, driverless fleets would be at high risk.

Once vehicle technology is proven to operate commercially without an onboard attendant, the focus of innovation would be about service excellence—will people elect to use these machines? Until we understand these two unknowns, innovation and technology pose a risk to successful deployment.

Environmental sustainability and climate change risk seem unlikely for AVs, given the potential for vehicles to be electric and shared. But there are knock-on risks of worsening congestion and outward urban growth as an outcome of increased driving and the ongoing popularity of suburban living. While environmental and climate risk might not be a direct outcome of the deployment infrastructure per se, it could well be a secondary risk as consequences of deployment.

In conclusion, provincial governments and their municipal jurisdictions need to focus more on the six areas of AV deployment risk outlined, and less on the technical, safety, and weather issues that the OEMs are motivated to solve themselves. Most of the risks have strongly regional aspects, and cannot be addressed profitably by automotive OEMs. However, the technical, safety, and weather issues the government currently focuses on are shared by many dozens of countries and must be firmly addressed by the OEMs if they intend to sell these new fleets north of the sunbelt.

> Much less attention is paid to the urban and infrastructural risks related to the deployment of AVs.

Bern Grush is the co-founder of Harmonize Mobility.

A proactive approach to environmental due diligence helps the various stakeholders in the transactions to determine whether the environmental risks associated with a property are acceptable based on their risk tolerance.

ENVIRONMENTAL DUE DILIGENCE

Does your environmental consultant understand the regulatory regime, your needs, and the stakeholders' risk tolerance?

By Pamela Cameron and Thomas Kolodziej

Virtually all real estate transactions involving commercial or industrial properties, whether they are owned by public entities (e.g. municipalities) or by private owners, involve some level of environmental risk. The key to a successful transaction is to identify all of the significant potential and/or actual risks associated with these properties, and to collect sufficient information about these properties early in the due diligence period of a transaction.

In Canada, the environmental due diligence process is completed in accordance with standards developed by the Canadian Standards Association (CSA). These include the Phase I Environmental Site Assessment (ESA) Standard CSA Z768-01 (Phase I Standard), and the Phase II Environmental Site Assessment Standard CSA Z769-00 (Phase II Standard). In addition, many jurisdictions (e.g. provinces, municipalities), as well as some corporations (e.g. lenders), have developed their own guidelines and best management practices for completing environmental due diligence that go beyond the minimum requirements of the CSA Standards.

A proactive approach to environmental due diligence helps the various stakeholders—including the property owners, sellers, buyers, and/or lenders—involved in the transactions to determine whether the environmental risks associated with a property are acceptable based on their risk tolerance. This knowledge allows them to then develop a strategy for managing these risks, both during the contract negotiations prior to acquisition and after the transaction is complete.

The environmental due diligence projects are typically completed by assessors, a third-party role usually fulfilled by environmental consultants. The CSA Standards state that, "the assessors shall possess knowledge based on an appropriate combination of formal education, skills, experience, and training." CSA Standards also state that assessors should "be familiar with applicable federal, provincial, territorial, and local legislation and published guidelines used to evaluate the actual or potential presence of contamination on a property."

However, in addition to the knowledge of the regulatory regime, technical training, and practical experience, the assessor must also understand the business reasons for undertaking the due diligence process. To maximize the chances of a real transaction being successful, the assessor must be part of the 'deal team'; he or she must understand the business drivers and business reasons for doing the due diligence.

A lack of understanding of their client's/stakeholders' business needs can lead even the most technically qualified and experienced assessor to produce a report that is detrimental to the deal. This is not because there is environmental risk associated with a property. Instead, it is because the assessor failed to take into consideration the clients'/stakeholders' risk tolerance and their business needs, instead using his or her own

risk tolerance to determine the significance of this risk associated with a property.

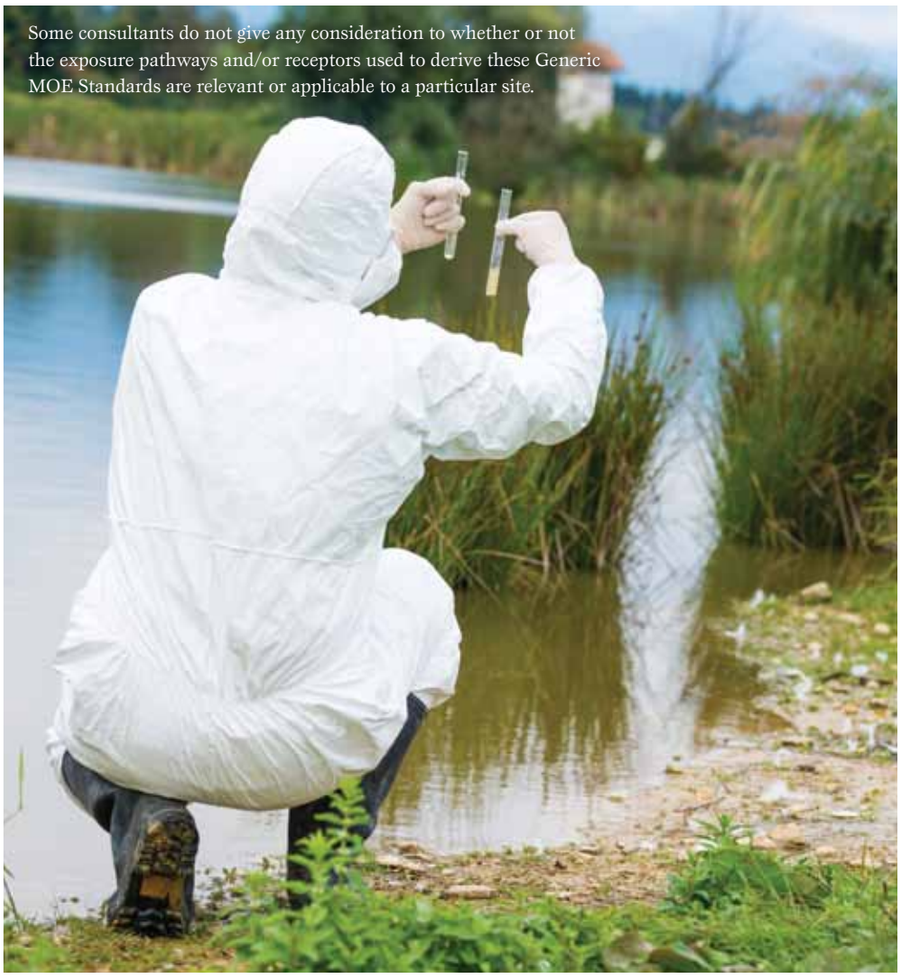
Does your environmental consultant understand the regulatory regime?

Although the following discussion uses an example specific to Ontario to illustrate the too common problems with how environmental due diligence is completed, these issues are applicable to other jurisdictions in Canada.

The overall objective of the due diligence process is to reduce uncertainty about environmental liabilities associated with a property. The purpose of a Phase I ESA is to determine if a property is, or may be, subject to potential or actual contamination. However, a typical Phase I ESA does not include intrusive investigations, collection of samples, or laboratory testing. As such, a Phase I ESA, in most cases, can only identify the potential or actual sources of contamination and the likelihood of a contamination being present or absent on a property. In order to confirm presence or absence of contamination on a property, a Phase II ESA is completed. The purpose of a Phase II ESA is to further investigate, qualify, and quantify the potential or actual contamination identified during Phase I ESA.

The Phase I Standard defines contamination as "the presence of a substance of concern, or a condition, in concentrations above appropriate pre-established criteria in soil, sediment, surface water, groundwater, air, or structures". The Phase I Standard also indicates that prior to the commencement of the Phase I ESA, the client and the assessor shall establish the criteria to be used for the purpose of assessing the presence/absence of the contamination.

In Ontario, environmental due diligence can also be conducted following protocols for completing Phase I and Phase II ESAs specified in Ontario Regulation (O. Reg.) 153/04 - Records of Site Condition. O. Reg. 153/04 establishes a rigorous site assessment process to ensure the protection of human health and the environment. From a regulatory standpoint, the Phase I and Phase II ESAs must be completed when a property/land use is changed to more sensitive use (e.g. from industrial or commercial to residential). Typically, O. Reg. 153/04 Phase I and Phase II ESAs are completed in order to obtain a Record of Site Condition (RSC). However, O. Reg. 153/04 Phase I and Phase II ESAs can be, and sometimes are, completed on a 'voluntary' basis for due diligence purposes to support a transaction.



Some consultants do not give any consideration to whether or not the exposure pathways and/or receptors used to derive these Generic MOE Standards are relevant or applicable to a particular site.

The mandatory and strict minimum requirements for completing Phase I ESA and Phase II ESA are provided in O. Reg. 153/04 and the associated guidance documents published by the Ontario Ministry of the Environment, Conservation and Parks (MECP). There are various numeric criteria that can be used to assess environmental conditions under O. Reg. 153/04. These effect-based criteria, which have been derived by MECP through a risk assessment using chemical toxicity data, different exposure pathways and duration times for human and various ecological receptors, were published by MECP in a document titled Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. The most stringent criteria derived for each chemical listed in the MECP Rationale Document were selected and published by MECP in a document titled Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. These standards, dated April 15, 2011, are commonly referred to as the Generic MECP Standards.

Over the last few years, more and more environmental due diligence projects have been conducted based on a hybrid approach, where consultants selectively pick and apply sections of the CSA Standards and O. Reg. 153/04. However, the growing popularity of the hybrid approach amongst some consultants is not necessarily a good thing, and has resulted in some really bad advice being given to clients.

Here is the problem: the CSA Standard-based environmental due diligence process is substantially less prescriptive than the one based on O. Reg. 153/04. This is because there are no pre-determined, default conclusions that must be reached based on specific findings. Under the CSA-based process, the conclusions regarding the presence/absence of potential or actual contamination being associated with a property, or the significance of contamination, if present, depend on a few factors. These include: the buyer's/lender's risk tolerance; the nature of the transaction; and the anticipated future use of the property rather than being based on pre-determined rules and the mandated use of Generic MECP Standards.

Unfortunately, some consultants use the Generic MECP Standards by default when conducting the hybrid due diligence. Some consultants do not give any consideration to whether or not the exposure pathways and/or receptors used to derive these Generic MECP Standards are relevant or applicable to a particular site. They also do not give

any consideration to the stakeholders' risk tolerance, the nature of the transaction, or the anticipated future use of the property.

Here is an example of how this could play out. An owner of a commercial/industrial property was required by his lender, as a condition of refinancing, to complete a Phase I ESA. The Phase I ESA, which was completed in general accordance with the CSA standard, identified an adjacent (up-gradient) industrial property as a potential source of impacts to the subject site. This conclusion was made based on the nature of historical operations conducted on this adjacent property, which included, among other things, the use of chlorinated solvents. Based on the findings of the Phase I ESA, the consultant recommended completion of a Phase II ESA.

The Phase II ESA was completed by taking the hybrid approach discussed earlier and involved assessing the groundwater quality using the Generic MECP Standards. The consultant stated that given the site and the surrounding properties are used for commercial and industrial purposes, and the groundwater is officially not used for potable purpose, the Generic MECP Standards Table 3 (non-potable groundwater) criteria for industrial/commercial land use is applicable. To be more conservative, the consultant elected to use the more stringent criteria for coarse-grained soil, even though the on-site soils were determined to be fine-grained (clayey silt).

After justifying the use of the Generic MECP Standards Table 3 criteria as applicable, the consultant stated that this Phase II will also use potable groundwater criteria for assessment purposes. This was to be consistent with the historical investigation, which assessed the groundwater quality using potable groundwater criteria. The overall conclusion of this Phase II was that the site was contaminated because the groundwater concentrations of some chlorinated compounds (PCE, TCE, and DCE) were above the Generic MECP Standards Table 2 (potable groundwater) criteria for coarse-grained soil. For the record, all but one sample was reported to have concentrations of the PCE, TCE, and DCE below the Generic MECP Standards Table 3 criteria for fine-grained soils.

The report also included recommendations for additional investigations, delineation, and subsequent remediation. This report was submitted to the lender who, although agreed to provide the financing, withheld a significant portion of the loan. The lender also required the borrower to complete the additional investigation and remediation activities, as recommended by the borrower's consultant.

Here is the problem. Since the due diligence work was being completed on a voluntary basis for refinancing purposes, the conclusion should have been that the detected concentrations of PCE, TCE, and DCE were not considered to represent significant human health or environmental concerns. The PCE, TCE, and DCE would also not affect the ongoing use of the property for continued commercial/industrial land use. As well, there was no need for recommending any additional work, including site remediation.

The reasons why the conclusions and recommendations should have been as stated above are as follows:

- Since the due diligence work was being completed for refinancing rather than RSC purposes, there was no regulatory requirement to use Generic MECP Standards.

- It was not needed or required by the stakeholders (property owner or the lender) to use Generic MECP Standards for assessing environmental conditions on the subject site, or to select the more stringent Generic MECP Standards (Table 2, for coarse-grained soils, vs. Table 3 for fine grained soils).
- Generic MECP Standards of 1.6 µg/L (both Tables 2 and 3, coarse-grained soils) for PCE, TCE, DCE are based on migration of vapours to indoor air on a residential property, which is not the actual land use on-site or in the vicinity of the site.
- The subject site and the surrounding properties are all used for commercial or industrial purposes only.
- The groundwater in the area of the site is not used as a source of potable water. The source of potable water in the area is Lake Ontario.
- The MECP's actual applicable criteria for commercial/industrial land use in a non-potable groundwater setting are 30 µg/L for coarse-grained soils, and 230 µg/L for medium/fine-grained soils. These settings are based on migration of vapours to indoor air on commercial/industrial properties.
- The detected groundwater concentrations of PCE, TCE, DCE were one order of magnitude lower than 30 µg/L and two orders of magnitude lower than 230 µg/L.

As shown in the example, the use of the Generic MECP Standards is often unnecessarily conservative and restrictive. This is because the standards are up to two orders of magnitude lower (more stringent) for assessing environmental conditions on properties for which an RSC is not being sought. Also, the use of the Generic MECP Standards for non-RSC projects, can and often does result in new costs associated with implementing recommendations for unnecessary additional site investigation/delineation and remedial activities. This results in additional time needed to complete the due diligence process and ultimately, unnecessarily complicates the transaction.

It should go without saying that those undertaking due diligence projects should start by understanding the needs and risk tolerance of their clients and other stakeholders. They should also understand the nature of the transaction and the current and anticipated future use of the properties before working with their clients and other stakeholders to apply the most appropriate solution.

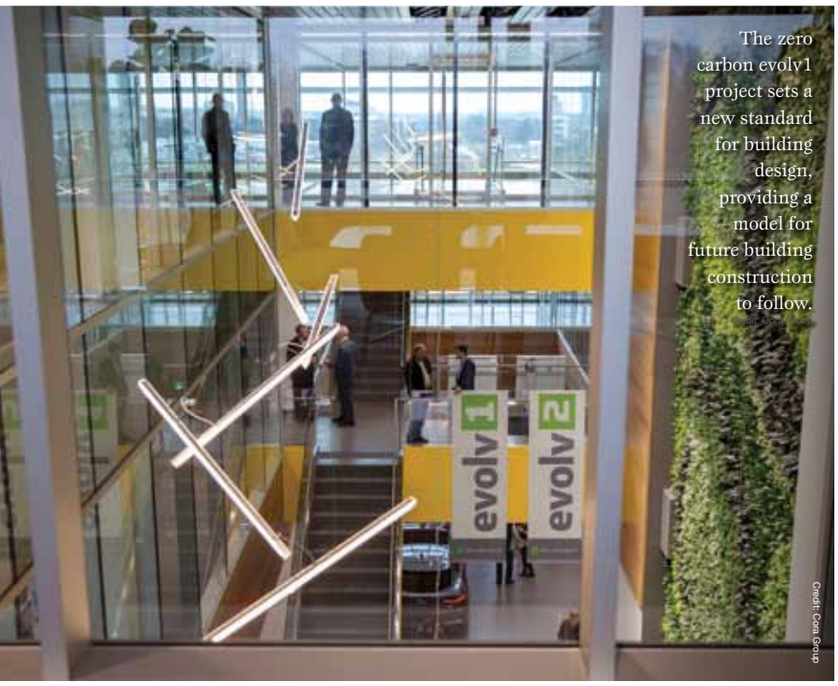
So here is the question again: Does your consultant understand your risk tolerance and your business needs? Or will the individual use his or her own risk tolerance, use unnecessarily conservative and restrictive assessment criteria, and settle you with extra costs associated with conducting additional site investigation, delineation, and/or remedial activities that you do not need?

Pamela Cameron is a senior project manager at XCG. Thomas Kolodziej is the operations leader of the site assessment group at XCG.

The Egale Centre incorporates sustainable design principles, including a deep energy retrofit and mechanisms for improved air quality.

Credit: Sustainable

The frequency of extreme weather events, such as the 2013 flood in Calgary, is forcing the need to build more resilient infrastructure.



The zero carbon evolv1 project sets a new standard for building design, providing a model for future building construction to follow.

Credit: Cora Group

FUTURE PROOFING

How do future-proof buildings and communities prepare us for a world of exponential change?

By Yasmin Glanville

The complexity, reach, and negative effects of natural and human-caused disruptions have reached an all-time high. With no quick way to predict or avoid such problems, the best solution for every community is to join forces and work together to future-proof our world. This involves increasing resilience, which is an adaptive state of readiness that provides the ability to bounce back from disruptions by developing systems to respond to reasonably foreseeable events. For a community, building, or operation to be resilient, it must first be sustainable—it must be capable of maintaining a minimally-functional operating state.

Too much CO_2 in the wrong place

The biggest threat to our climate, and leading source of global greenhouse gas (GHG) emissions today, is carbon. Burning fossil fuels raises carbon dioxide levels in our atmosphere and increases the atmospheric temperature of the earth, which can lead to more extreme weather events.

A number of extreme weather events have occurred in Canada over the last few years, including the wildfires that occurred in Fort McMurray in 2016, the flooding in Toronto and Calgary in 2013, and heatwave-related deaths that occurred in Montreal in 2018. While these individual extreme weather events cannot directly be linked to climate change, it is likely to increase the frequency and severity of these types of events.

The United Nations warns we now only have 11 years to radically reduce GHG emissions in order to cut the risk of extreme heat, drought, floods, and poverty for hundreds of millions of people worldwide. Thus, it is critical that we undertake immediate action to reduce carbon emissions wherever we can.

As this crisis unfolds, one of our first priorities should be to reform urban infrastructure and buildings—today's leading source of GHG emissions. Our built environment (buildings and infrastructure) accounts for at least 40 per cent of human-made carbon emissions. This includes all of the materials and energy used in the construction (the embodied carbon) and over the life-span (the operational carbon) of the built environment.

"Buildings represent one of the big keys to future-proofing cities and supporting exponential change and disruption," says Russell Richman, associate chair of graduate studies in building science at Ryerson University.

Recognizing that an increase in carbon emissions that can lead to global warming, a growing number of Canadian leaders in business, academia, and government are working to accelerate the transition to future-proofing approaches in design, construction, and management of buildings and communities.

At Sustainable, an award-winning building science-led architecture firm founded by principal architect Paul Dowsett, every new building and community design project aims to minimize embodied and operational carbon emissions through design. Building science is the key differentiator.

Why building-science-led design?

Kathleen Narbonne, building scientist at Sustainable defines building science as: "The study of energy flows through buildings and the material components used in construction. At Sustainable, we use building science to influence design in an effort to improve occupant health and comfort, energy-efficiency, durability, sustainability, and overall resilience to extreme events."

Even though it has been recognized since the 1950s, building science has evolved relatively slowly. "Building science is gaining global recognition," says Richman. "As an integral component for predicting and optimizing the performance, sustainability, and resilience of buildings, building science will guide the design of new techniques and technologies. Building science has been successfully used in countless projects to create low energy/low carbon building standards that routinely reduce energy use and carbon emissions by 75 per cent to 90 per cent."

"In order to get everyone on board with our building science-led approach to design, construction, and operation," says Dowsett. "We must work together."

Collaboration is the key

"Buildings and cities need to be viewed as interconnected systems instead of as isolated parts," says Dowsett. He believes that a whole-systems, multi-disciplinary approach is required to reduce our dependence on carbon-based materials and fossil fuels in the design, construction, and operation of buildings and cities. "The good news," he adds, "is that designing systems for resilience doesn't need to cost any more than building for obsolescence."

Narbonne notes another advantage of collaboration: it enhances commitment. "By engaging in the project from early in the design process, stakeholders are part of the decision-making process and are more interested in pursuing sustainable measures."

Planning resilience into design

The next sustainability imperative is to incorporate resilience planning into the design of buildings and communities. According to Alec Hay, a risk, resilience, and security expert with the consulting firm Southern Harbour, we need to implement resilient building practices and processes to reduce damage from extreme weather events.

> The diagnosis sounds alarming: we have to change the way we design and interact with buildings and cities as living systems.

Some risks are easy to manage like installing a backup electrical supply in case of a power outage or moving a business out of a floodplain. But in a disaster, can employees still get to work? What if they get stranded at work, and are unable to get home? Such ancillary concerns can account for half of the risks inherent in living in certain areas. Understanding all of our inherent risks allows us to design for sustainability and resilience, with the assurance (as with insurance) that at some point our preparations will pay for themselves.

Benefits of integrated design and retrofit

Today, sustainable architecture offers the tools to balance multiple, conflicting factors in system's design. The Egale Centre exemplifies the benefits of integrated design.

The Egale Centre is a counseling centre and transitional shelter for street-involved LGBTIQ2S youth that offers an inclusive, energy-efficient and future-proofed building for all its clients and guests, while addressing a rising issue of youth homelessness in Toronto. It is estimated that 25 per cent of Toronto's homeless youth identify as LGBTIQ2S. Many find themselves forced to leave their family homes, only to find most shelters are not prepared to address their sexual identity.

To determine how the new building should look and function, Sustainable conducted rigorous design exercises with the youth, the community, and with Egale staff. This collaborative approach supported the project mandate to create a safe, sustainable, and inclusive facility. It also illustrates how an adaptive-reuse project incorporating a deep-energy retrofit can deliver substantial carbon reduction.

"It is often said that 'the greenest building is the one that already exists'," says Dowsett. "To get to green you've got to minimize carbon. By adaptively reusing existing buildings, any project starts with a definite embodied-carbon advantage. The operational energy-efficiencies of the renovated building, over its lifespan, will continue this carbon advantage into the future."

Sustainability and resilience features of the Egale Centre include:

- **Retrofit versus New:** Sustainable retrofitted two existing buildings, with a deep energy retrofit, reducing embodied carbon through construction and reducing operational carbon through energy-efficiency.
- **Indoor Air Quality:** Superior air-tightness, continuous thermal insulation and triple-pane windows create comfortable, safe, and healthy interiors. Vertical Fan Coil Units (VFCs) in each residential unit enable individual control. Natural and low VOC interior materials minimize harmful off-gassing and maintain a cozy, home-like feeling.
- **Exterior Shading: S**trategic solar shading enhances occupant comfort, while reducing unwanted solar heat gain and cooling load in the summer.
- **Uninterrupted Power Supply:** While the high-performance building enclosure reduces the energy required for the building's heating and cooling loads, in the event of a power failure this enclosure will also maintain a comfortable interior longer than typical 'code-minimum' buildings. Battery backup is used to maintain core functions, such as the security system and emergency lighting.


Credit: Cora Group

The zero carbon evolv1 project.

Although it is important to ensure that new buildings operate as efficiently as possible, it is even more vital that existing buildings be upgraded or retrofitted for energy efficiency. Conventional energy retrofits focus on isolated electrical or mechanical system upgrades (e.g. lighting, heating, or air conditioning). But now that we understand the limitations of our carbon future, it is essential that retrofits undertake a whole-systems, deep energy approach that include the building envelope. This approach can retain the existing building's embodied carbon and transform how a building operates, to realize deep energy savings.

"The production and use of energy represent 81 per cent of Canada's GHG emissions," notes energy consultant Peter Love. "As these emissions have been conclusively proven to result in climate change, we need to focus on the type of energy we use and how much we use." Love says the most effective way to cut GHG emissions is to first reduce energy consumption, and then seek out non-carbon sources to meet the remaining needs.

Technology solutions for buildings of the future

Another future-proofing imperative is understanding and leveraging the benefits and risks of new technologies in construction and operation of the built environment. Fast-growing technologies such as the Internet of Things (IoT), artificial intelligence (AI), building automated systems (BAS), and building information modelling (BIM) are changing the way we design and occupy buildings and cities.

As they pick and choose from this grab-bag of new technologies, architects, engineers, and builders should focus on new technologies and systems that support connectivity and openness. Connection is the backbone of today's smart buildings and of tomorrow's smarter cities. According to Martin Canning, executive director of the Smart Cities program at Toronto-based Evergreen Canada, "the future smart city will be open, connected environments that harness the power of diverse new technology tools and disciplines to predict, prepare for, and respond to major events." These tools, he says, include "technological networks, data science, application programming interfaces (APIs), design/systems thinking, the Internet of Everything, building and infrastructure design, among other things. Since the primary nodes of connectivity in future smart cities will be open, we need to invest in open-technology systems that support this growing need."

When extreme weather events or power outages strike, they affect everyone and everything in the vicinity. Solving the many interrelated problems that result requires an open, responsive, information-sharing system, based on a platform of open standards and connectivity. Canning continues, "Cities need to stay flexible and prepare for a future based on open standards and connecting interfaces."

Building the future in Waterloo

Cora Group is a developer and manager of office properties in Waterloo, Ont. Adrian Conrad, Cora's chief operating officer, is personally committed to reducing GHG emissions. The symbol of his commitment is evolv1: a three-story, 110,000-square-feet office building that recently opened in Waterloo's "Idea Quarter," next to the University of Waterloo.

As the first Canadian multi-tenant building designed to achieve a net-negative carbon output, evolv1 proves that new developments can be aggressively sustainable, economically-viable, and delivered at market rates.

The vision for evolv1 began with developing a building that would be energy net-positive and operates with zero carbon. Four years in the making, evolv1 was developed in collaboration with architects, engineers, trades and tenants. "To be future-aligned," says Conrad, "we collectively examined the issues of climate change and the environment and pushed the boundaries of conventional construction to create a sustainable and resilient building."

Development of evolv1 involved energy modelling to evaluate the building's performance and to inform follow-up decisions throughout the design process. The results speak for themselves. Heated and cooled through a geothermal system buried 150 metres under the building, evolv1 is Canada's first project to receive a Zero Carbon Building – Design certification. The next target for evolv1 is LEED Platinum certification. Looking ahead, the Cora Group envisions an industry shift to developing more sustainable, resilient, and responsive buildings and cities. Plans to develop evolv2 are already underway.

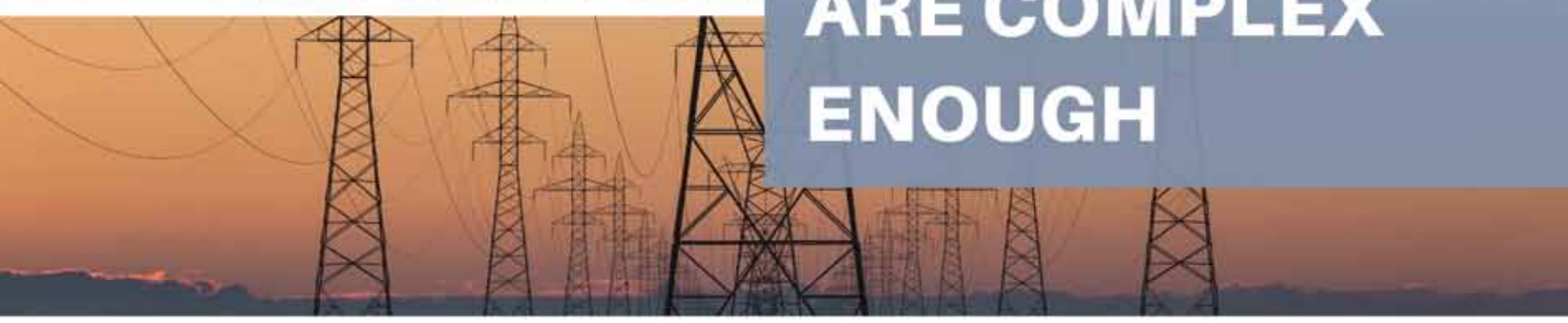
Key Takeaways

The message for architects, engineers, builders, owners, policymakers, and business leaders—and all concerned citizens—is clear. Start now to prepare for a future of complex challenges and integrated solutions. But you don't try to figure them all out yourself. The future of communities is collaborative. Working with all stakeholders will truly future-proof your projects, by building community support, sharing relevant data, better understanding the ever-changing risks, and leveraging new resources and technologies.

The future has arrived, with truly golden opportunities to create a better, cleaner, and more resilient world. The diagnosis sounds alarming: we have to change the way we design and interact with buildings and cities as living systems. But the results will justify the effort if we truly understand the risks of inaction and engage all stakeholders to explore the best ways to achieve our creative visions in an era of continuing uncertainty.

Yasmin Glanville is the founder and a board director of RethinkSustainability.ca.

YOUR PROJECTS ARE COMPLEX ENOUGH



People are key to project success.

Strong plans and local experience with communities and stakeholders are essential to prevent costly delays in construction projects.

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Empowering the Sun

Ontario Power Generation's first solar power project, installed on the site of a former coal power plant. **— Staff**

Credit: Ontario Power Generation

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

NUCLEAR PERSPECTIVES

The United States, much like Canada, has focused its recent nuclear power investments on refurbishing current assets in order to stabilize the national clean energy mix.

How Canada fits in the global nuclear energy landscape.

By Andrew Macklin

With nearly $26 billion being invested in the refurbishment of Ontario's nuclear assets, it's clear that the province values the energy resource as part of its low-carbon future.

And while Ontario currently stands alone in its investments into nuclear energy (New Brunswick does not have need for large-scale re-investment in its current nuclear assets at this time), it is by no means the only market globally to be investing in nuclear. In fact, 2018 saw the highest level of new gigawatt capacity come online, on the global scale in the past three decades.

Where is the investment?

"A lot is happening outside of North America," says Agneta Rising, who is the director-general of the World Nuclear Association, based in London, England. "Asia is the region where most of the developments are happening."

As of December 2018, there were 54 new nuclear reactors under construction. China, Russia, India, and the United Arab Emirates are the countries where the majority of these investments are being made. In those countries, nuclear is replacing high-carbon emitting power, namely coal, and in turn, improving the overall air quality in those regions

The plants being constructed in those regions are comparable or larger to the ones currently in the North American market, as many of the plants are serving cities and regions that are experiencing significant population growth.

In Europe and North America, where several countries had previously invested in nuclear energy, very little new nuclear energy is coming online. But that doesn't mean those countries aren't investing in nuclear. Instead, the focus has been on refurbishing existing assets to keep them producing for decades into the future, like what is happening in Ontario. In the past few years, multiple countries have also restarted idled or temporarily shut down reactors, including Switzerland and Belgium.

Disposal of waste

One of the struggles surrounding the production of nuclear power in Canada has been the disposal of waste. The Deep Geologic Repository project has been discussed for several year, and has been subject to significant resistance from neighbouring communities and Canadians across the country. Current Minister of Environment and Climate Change Catherine McKenna has yet to make a decision on the future of the Ontario Power Generation-led project, despite an independent federal joint review panel recommendation to grant a license to construct in May of 2015.

The repository concept for waste disposal has decades of research supporting it, and the method has been used already in other jurisdictions.

"There are countries that have made real progress," says Rising. "One of these progresses is the Swedish method which has been developed over 30 years with a lot of research and a lot of different countries involved. That method […] is now implemented in Finland. They were probably the first to have a waste repository for the spent nuclear fuel that is the most radioactive."

In Sweden, there was even a competition between two cities, both vying to be the home of the nuclear repository. The cities of Östhammar and Oskarshamn both lobbied to be the home of the high-level storage repository for more than seven years. The two communities have six reactors between them. In 2011, the Swedish Nuclear Fuel and Waste Management Co. (SKB) ultimately filed applications to build the facility in Forsmark. That repository is located 50 metres below the Baltic Sea seabed.

But as Rising suggests, it takes communities and policy makers to get on board with allowing the facility to move forward, something that has yet to happen in Canada. Until that point, the spent fuel sits in cooling ponds, holding there until a better, safer solution is adopted.

The future of nuclear power

The repositories will continue to be necessary, especially if Rising is right in her analysis of the future role that nuclear will play in the global energy mix.

"For a sustainable future, we need to have nuclear. That is totally clear." She cited prior statements that have emerged from IEA, COP24, and IPCC discussions on the low-carbon energy future, all of which maintain that nuclear energy needs to be present.

But will all future nuclear development be at the scale of what we have seen in Ontario and New Brunswick, or even larger than what is being currently built in the aforementioned Asia-Pacific markets? Not necessarily.

"We need the large scale," Rising explains. "We need these because of the large demands on the big grids. But then we have small modular reactors that can power smaller grids, or grids that are not connected to a larger grid."

Smaller reactors, like the ones discussed in Canada by former Ontario Power Generation CEO Jeff Lyash, could be the real opportunity for this country to again be in the business of building new nuclear power. The mobility of modular reactors, and their ability to reach communities not supported by an existing power grid, could provide an opportunity to reduce diesel-generated power where solar, wind, and geothermal are either not viable or perhaps not as cost-effective.

One version of the modular nuclear reactor already developed is the floating reactor, which has been developed in Russia. The two-reactor floating plant is currently lying in Mormansk, where the first reactor was fired up in 2018 and is currently undergoing tests. The second reactor will then be tested and, once both reactors are ready, the reactor will be moved to the community of Pevek. Pevek is a community located in the north of Russia, in the Arctic Circle on the southeast corner of the East Siberian Sea, 5,579 kilometres northeast of Moscow. The reactors will supply both heat and electricity to the community.

There is also ongoing development of next-generation or advanced reactors. These reactors operate at a higher temperature, which can then be used to replace the fossil fuels used in some industrial processes.

"We think that there is an electric future," says Rising. "And the more you use electricity, the more you need a clean and reliable energy source that can deliver 24 hours a day, seven days a week."

The future seems bright for nuclear power in the global market, at least in the short term. And with the future going modular, and being a viable alternative for diesel-power generation in remote communities, we could see a nuclear renaissance here in Canada.

Andrew Macklin is the managing editor of ReNew Canada.

THE POWER OF RENEWABLE ENERGY

Credit: SkyFire

A 280kW solar PV system on Fenlands Banff Recreation Centre.

Barring political reversals, Alberta's renewable electricity generation capacity is set to at least triple in the next decade.

By Carroll McCormick

By 2030, 30 per cent of the electricity consumed in Alberta will come from renewable sources such as solar, wind, and hydro if the government's Renewable Electricity Program (REP), announced this February 26, unfolds unimpeded. Coal pollution will cease, and electricity currently generated from renewable sources will triple, regardless of whatever else the renewable energy sector does outside of the REP.

On February 26, 2019, the Alberta government announced a plan to set a "30 by '30" renewable energy target and eliminate coal pollution. Under the above-mentioned REP, part of the government's 2015 Climate Leadership Plan, 5,000 megawatts (MW) of electrical capacity in coal-fired plants would be replaced by electricity from renewable sources. (According to the Alberta government, 12 of the 18 coal-fired generating units in the province are slated to retire by 2030. The remaining six, where economically viable, will be permitted to convert to natural gas.)

As of March 2019, coal-fired plants were the province's top electricity producers. They accounted for 5,722MW of the 16,106MW of installed capacity, according to the province's power utility, the Alberta Electrical System Operator (AESO).

Wind and hydro currently produce 8.97 per cent and 5.55 per cent of AESO power, respectively, or about 2,338MW of the province's installed capacity. Other renewable sources, such as solar and biomass, are presumably sweepings into the "other" category, which accounts for 2.72 per cent of AESO's electrical production.

All wind farms, they nearly equal the province's current installed capacity for wind energy—1,483MW according to the Canadian Wind Energy Association (CanWEA) and 1,444.71MW according to AESO.

While REP is not a coal-to-wind program, wind currently offers a lower cost per megawatt hour for utility-scale projects, defined as more than five megawatts of nameplate capacity (less then five megawatts is micro-gen) than does either solar or biomass.

> Wind, solar, and biomass are the three horses to watch right now. And the economic benefits are substantial.

The AESO—not a monopoly provincial utility, which Alberta does not have, but rather, the manager and operator of the provincial power grid—has already completed three bidding rounds for renewable energy projects totaling 10 projects and 1,358MW worth of nameplate capacity projects.

Renewable energy sources include wind, solar, biomass, geothermal, hydro, fuel from crops—any source that can be renewed. But even though there is still hydro potential in Alberta, new projects do not, to say the least, turn on a dime. Geothermal, despite the hoopla around a planned project in Hinton and ideas to draw heat from tapped out oil

Credit: Lethbridge Biogas

A 2.8MW biogas facility in Lethbridge.

wells, is just not in the picture yet.

Wind, solar, and biomass are the three horses to watch right now. And the economic benefits are substantial. The REP is expected to be attract $10 billion in private investment to the Alberta economy, says the government, and create 7,000 jobs in the construction phases.

Capital Power, headquartered in Edmonton, was one of three Round 1 winners. It began its 201.6MW, 56-wind turbine Whitla Wind 1 project, 60 kilometres southwest of Medicine Hat, in 2017. It is slated to begin commercial operation in Q4 2019. It is entirely funded by Capital Power, says Brian Vaasjo, the president and chief executive officer of Capital Power. "One of the things that differentiates us from some of the new and old winners is that we will be financing it ourselves."

Its $315- to 325-million cost gives a taste of the economic value of such projects. A CanWEA document called Alberta Wind Market Profile sees wind projects under the REP driving $8.3 billion of investment, $3.6 billion in local spending, and 28,000 job-years of employment by 2030.

"A 250-megawatt site can have 100-200 workers during construction, including cement workers, electricians of various types, iron workers, millwrights, carpenters, riggers, crane operators, and wind turbine technicians," says Colin Wynder, an instructor in the School of Renewable Energy at Lethbridge College. Add to that, for example, the trucks - about a dozen tractor-trailers per wind turbine - drivers, et cetera, required just for the highway portion of wind turbine transportation.

The School of Renewable Energy graduates around 48 wind turbine technicians a year—over 600 since it opened in 2006. "Once the site is up, the company takes over and hires as many technicians as needed to keep the [wind farm] going. The ratio is one technician to 6-10 wind turbine generators," Wynder says.

"With the renewables projects in Alberta [employment opportunities are] looking good. In the next couple of years, we will be seeing a big boom on the construction side. Our demand, with the construction, will go up considerably," Wynder adds.

While noting that the REP is subsidizing winning projects in the form of guaranteed revenue, Vaasjo expects the wind industry to grow even if some future government discontinues guaranteed revenues. "Wind is getting closer to grid parity [here meaning competitive with the cost of new natural gas generation] with electrical generation in Alberta. We may well proceed with Whitla Wind Phase 2 as a merchant project, without subsidy, depending on the nuances of the current or new government. It is entirely possible to see merchant farms. If we stick with the existing governments, I wouldn't think the REP would change, but it should become obvious that the subsidy is not needed."

While solar is still small, as utility-scale players go, it still generates around 27MW of microgeneration projects in Alberta, and one utility-scale outlier, the Elemental Energy Inc. 17MW Brooks Solar project in Newell County, Alberta, according to David Kelly, the CEO of Calgary-based SkyFire Energy Solar Energy Systems. More is coming.

"There are over 4,300MW of solar projects in the AESO queue. These are all distribution projects. The largest is 400MW," Kelly says. This is the $500M Greengate Power Corporation project in Vulcan County, one of the largest solar projects in North America, according to Greengate. Construction is expected to begin this year.

Is solar competitive with wind? Yes, says Kelly. Referring to three contracts Canadian Solar recently won to provide 135,000 MWh a year with a 94MW system to the Alberta provincial government, Kelly says, "Canadian Solar is offering [the power] at $48/MWh. This is lower than the current grid price, which is about $53/MWh. Wind came in at $39 MWh for the last two contracts for the Alberta grid."

While large infrastructure projects

Alberta's wind power capacity will boom in the next decade.

Credit: Lethbridge College

typically get the glory, small solar projects, of which there are hundreds, add up to a lot of installed capacity and economic value. For example, Jayman Built, a Calgary-based home builder, decided to make solar panels a standard feature on all of the homes it builds, as of 2019. "SkyFire is supplying all the solar to these homes," Kelly says.

"The solar industry is hiring people, growing and expanding," Kelly says. "Solar delivers energy when we need it in Alberta. In Alberta solar is going to play a bigger role everywhere."

While solar is often poo-pooed as too expensive or unsuited for Canada, research puts the lie to this. In November 2018 Solas Energy Consulting updated a document called Alberta's Solar PV Value Chain Opportunities, in which it notes that Alberta provides a solar resource similar to that of Rio de Janeiro. Who would have thought? It put the deployed solar capacity at 42.7MWdc, the number of Alberta-based member companies of the Solar Energy Society of Alberta at 278, and the province's solar PV market value at $4.1B, with 3,261 MWdc between 2019 and 2030.

While noting that solar and biomass have so far not been competitive in the REP bidding projects, Vaasjo says that Capital Power has solar aspirations in Alberta. "We have just recently acquired a solar development site just east of Calgary. At some time, the economics and what it does to the grid will line up to make a good project. We don't anticipate that we'd necessarily need a government subsidy related to it."

Sixteen of Canada's 61 operational biogas facilities (digesters, landfill gas and wastewater treatment plants) are in Alberta, with a combined nameplate capacity of something over 39MW, according to the Canadian Biogas Association.

There are technological, political and regulatory hurdles to advancing the biogas industry, according to the Canadian Biogas Association. There is however, optimism that there will be more biogas development in Alberta.

Lethbridge Biogas opened in 2013, with two, 1.425MW combined heat and power units producing electricity for the Alberta grid. "Historically, biogas facilities have predominantly looked at biogas-to-electricity. What we see for sure is that in Alberta there are more and more restrictions put on landfill organics. If you don't allow the organics in the landfill you are implying that there are other uses, and that is a positive thing [for biogas producers]," says Stefan Michalski is director of operations, as well as the director of the Canadian Biogas Association.

> Coal pollution will cease, and electricity currently generated from renewable sources will triple, regardless of whatever else the renewable energy sector does outside of the REP.

Interest in biogas-to-gas in British Columbia could also positively affect Alberta's biogas industry, Michalski says. "The RNG avenue, where you upgrade your biogas to a pipeline-quality gas, could trigger some new development. It has generated some interest. But this is not an Alberta policy [and] there is no project yet that has gone that route."

Carroll McCormick is a freelance writer based in Montreal, Quebec.

RESIDENTIAL AND
CIVIL
CONSTRUCTION
ALLIANCE OF
ONTARIO

RCCAO

Constructing Ontario's Future

Download MCEA Reports and Submission Letters at rccao.com

This and the bottom two photos show the upgrade to the Collingwood Street Bridge in Creemore, Ont.

REFORM MCEA NOW!

RED TAPE CAUSES YEARS OF UNNECESSARY DELAY TO MUNICIPAL INFRASTRUCTURE PROJECTS

Ontario's Municipal Class Environmental Assessment (MCEA) process for the construction of infrastructure desperately needs to be streamlined. It is costly, inefficient and causes unnecessary delay.

RCCAO will release a new report this spring to demonstrate, through actual case studies, how problematic the process has become and how urgently the MCEA system needs to be reformed.

Over the past decade, RCCAO has published independent reports which have found duplication in the MCEA system. For example, municipalities are required to hold separate public consultation meetings under both Planning Act and MCEA requirements — for the **same project**. This kind of red tape can delay approvals to begin construction on infrastructure projects by an average of 27 months. This includes bridge replacements, better storm sewers, new bike paths and other transportation improvements. The Part II Order, or "bump-up" process, also adds months and often years to the timeline because municipalities must wait for the Minister of Environment, Conservation and Parks to decide on whether a local project should be subject to a higher level of review.

One of the projects in RCCAO's 2014 report authored by lawyer Frank Zechner was the Collingwood Street Bridge in Creemore, Ont. The original one-lane bridge, built in 1913 and refurbished in 1980, was corroding and needed replacement. The MCEA process lasted **30 months**, ending in 2012, which in turn was followed by many bump-up requests to retain the iron truss structure. Responding to these requests added another year to the timeline. That's almost four years of delay to address whether a "heritage" bridge was worth preserving, rather than dealing with environmental matters.

In early 2017, RCCAO and the Municipal Engineers Association submitted a joint Environmental Bill of Rights application to undertake a formal review of the legislation and MCEA processes. Earlier this year, the Ministry announced that the review process had ended and that instead a discussion paper on EA reform would be released this spring. The Government of Ontario has advised that it wants to modernize approvals. To help convince the government to take immediate action, we want to provide further evidence of projects that have been subject to delays and additional cost pressures as a result of the current MCEA system to include in our spring report.

If your municipality has recent examples relating to the cumbersome MCEA process, please email media@rccao.com.

p: 905-760-7777
e: media@rccao.com

rccao.com

@_RCCAO

Credit: STM

OCTOBER 21ST

If the Conservatives defeat Prime Minister Justin Trudeau in October, the REM project seen here could be the only one to receive funding from the Canada Infrastructure Bank.

Credit: Government of B.C.

Should a solution for the Massey Tunnel Replacement be reached, like the originally proposed bridge seen here, a party could sway the vote in a local riding with the promise of federal funding.

What's at stake on election day.

By Andrew Macklin

Less than six months remain before Canadians go to the polls to elect the next federal government.

In this article, we will attempt to answer some of the key questions leading into the heart of the campaign, which will likely kick into high gear following the dog days of summer on the Tuesday after the Labour Day weekend.

But first, let's provide some context for this discussion. As of March 31st, the Liberals held 179 of the 338 seats in the House of Commons. 170 seats are needed to form a majority government. The Conservatives sit second with 97, the NDP are third with 41, and the Bloc Quebecois hold 10. Other parties, independents, and vacancies make up the remaining 11 seats.

Across Canada's 13 provinces and territories, there are four Liberal-led governments, three led by the Progressive Conservatives, two led by the NDP (as of press time), the CAQ in Quebec, the Saskatchewan Party in Sask., and independents in Nunavut and the Northwest Territories.

Let's start with the budget. How much will that impact the vote in October?

This year's federal budget did not provide any significant expenditures aimed solely at winning over voters in the fall. It was very much business as usual, targeting the middle class voters that got them elected in the first place.

Where the budget could play into the election is in response to the aggressive Conservative push to balance the federal budget. The Conservatives have argued the merits of balancing the budget from an economic standpoint. The Liberals could turn to programs funded in their budget that the Conservatives could cut, using it as an argument as to why a vote for the Liberals is a vote to support something you care about.

What about the SNC-Lavalin situation? Could that still resonate with voters in the fall?

In a word, yes. Definitely in the ridings of the MPs that were in the spotlight as it played out in the media in February and March.

Realistically, how much more of an election issue it becomes really depends on what happens over the next few months. If this situation causes people to lose their jobs in any part of the country where SNC-Lavalin has a presence, then it will definitely be an election issue in those ridings. It's a similar situation to what happens when a manufacturing plant has layoffs or shuts down entirely. That situation becomes a hyper-local election issue that could also get province-wide or even national attention.

It is also likely that the situation will be brought up by the opposition parties as a credibility issue.

What about infrastructure spending? How will plans for infrastructure differ from the commitment made by the current Liberal government?

That's a question we may not have an answer to until after the election is over. If infrastructure does not become a substantive issue during the campaign, then funding

promises for the file might not emerge.

However, if infrastructure stays in the spotlight after Labour Day, we could start seeing some grandiose promises from all of the parties. If that occurs, watch for the parties to play towards their traditional base. The Conservative Party will likely lean towards projects that provide some sort of tangible economic benefit like port infrastructure to improve the movement of goods and services. The NDP would likely lean towards infrastructure that has a strong social benefit (the party has been very vocal about increasing funding for affordable housing). Meanwhile the Liberals could look at key assets that will build on current investments using the green lens established in the Pan-Canadian Framework.

Are there any cities where a promise for infrastructure funding could sway the vote?

That's always a distinct possibility. Where this could play out most is in communities where one level of government has already committed funding to a significant infrastructure project, but the federal government has yet to commit its share of the funding.

One example that immediately comes to mind is London, Ontario as its proposed bus rapid transit (BRT) plan. There is enough money in the public transit and transportation funding allotment to use to pay the federal share of the project, but a separate block of federal funding for the BRT could go a long way in swaying some votes. In B.C., a federal party could put funding on the table for the next iteration of the Massey Tunnel Project. And in Montreal, would one of the parties consider backing Mayor Valerie Plante's plan for the Pink Line? It doesn't have provincial support, but federal funding could make a difference.

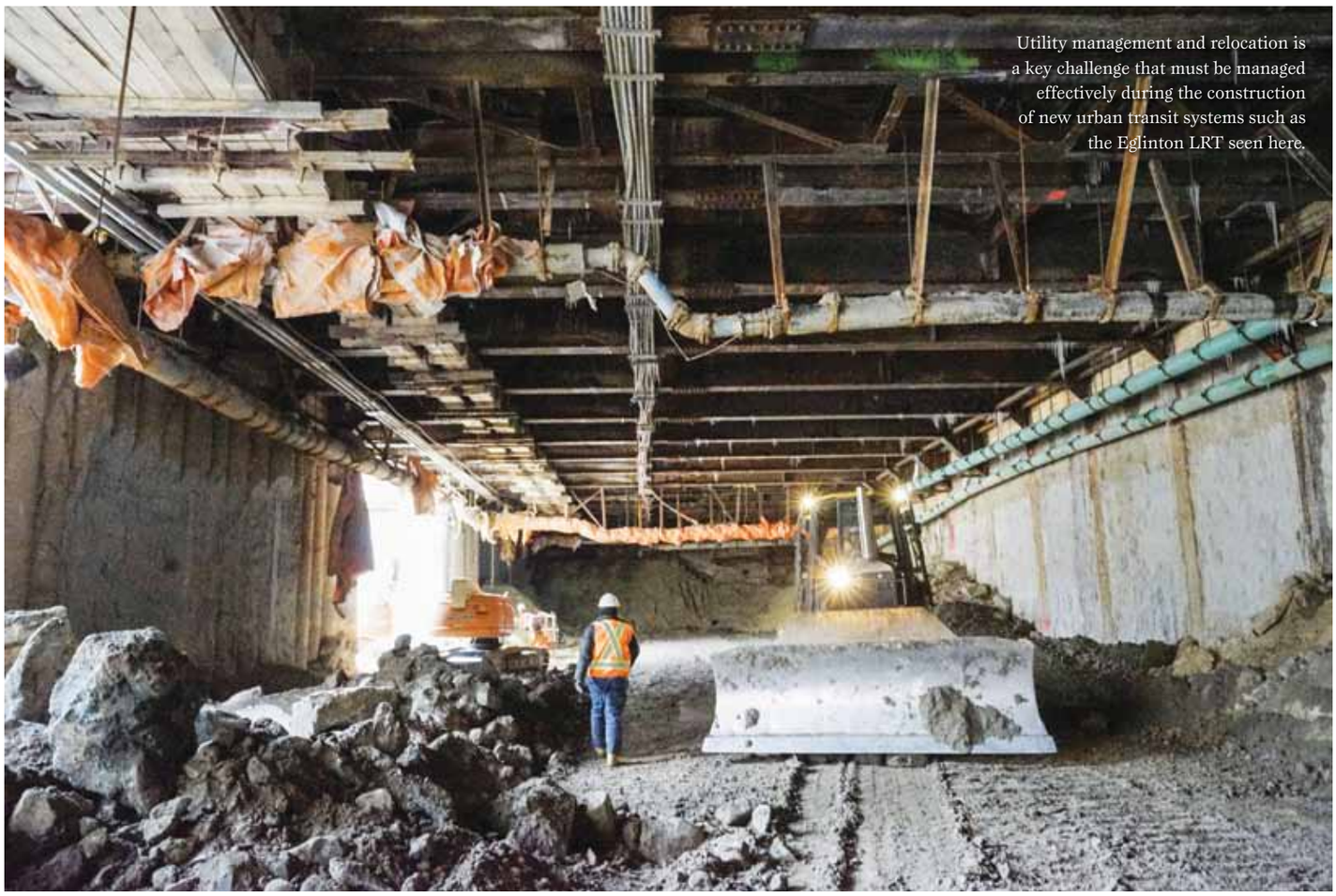
What will happen to the Canada Infrastructure Bank post election?

If the Liberal government returns to power, then the bank will continue. But if Andrew Scheer and the Conservative Party take power, expect it to disappear. Scheer has been very vocal that he does not support it, once calling it a "$35 billion boondoggle waiting to happen."

As for the NDP, they haven't made it clear if they will proceed with the bank should they find a way to form government in the fall. In late January, NDP Infrastructure Critic said that the bank has a "track record of secrecy and inadequate public engagement." She also noted that "we need to ensure that infrastructure projects actually meet the Canadian public's infrastructure needs and not the private sector for their revenue-generating potential." Expect a firm commitment to keep or scrap the bank to be made known in the coming months.

In the months ahead, infrastructure has the potential to swing the vote in multiple ridings across Canada. Stay tuned to ReNew Canada's website and social media channels for industry-focused coverage of the 2019 federal election.

Andrew Macklin is the managing editor of ReNew Canada.



Utility management and relocation is a key challenge that must be managed effectively during the construction of new urban transit systems such as the Eglinton LRT seen here.

Credit: Crosslinx Transit Solutions

MANAGING UTILITIES RISK

Appreciating the impacts to urban transit infrastructure development.

By Sharon Vogel and Jesse Gardner

As cities and provincial governments across Canada increase spending to update and expand urban transit networks, both owners and contractors must grapple with the complexities of addressing utility relocations. The ever-increasing density of major urban areas and the corresponding decrease in available space within municipal lands can make such relocations challenging.

For an urban transit infrastructure project, the effective management and coordination of utilities such as telecommunication networks, gas lines, watermains, and hydro lines is key. The financial and scheduling consequences of inadequate contractual planning by the owner and contractor with respect to utility relocation can result in significant cost overruns and years of delays to projects.

When negotiating major infrastructure contracts involving utility relocations, the focus of the parties is often on items such as milestones, compensation and relief events, payment structure and substantial completion. This is rather than on technical issues, such as specific design requirements, allocation of responsibility, and equivalent relocation versus modernization of services.

A thorough and proactive approach to understanding the risk that utilities pose to major urban transit infrastructure projects is important to the cost-effective and timely delivery of these transit networks. Given the long-term nature of such projects, planning ahead and anticipating the problems posed by utilities relocation is critical to success.

Owners and contractors must strive to anticipate problems and address them in the drafting of the contract.

The problems posed by utilities relocation are layered and dependant on the nature of the contemplated transit system. For example, subsurface projects such as subway expansions and underground light rail transit (LRT) systems will require significant geotechnical investigation, while surface level projects such as rapid bus lanes or streetcars may require the expansion of existing roads or highways in densely populated areas, which has a ripple effect on the surrounding utility networks.

Perhaps the most difficult factor that sets utility relocation apart from other challenges to major infrastructure projects is the trifurcated or three-party division of responsibilities. Generally speaking, major

projects involve an owner and a contractor or design-builder and the obligations of these parties are set out within some form of construction contract. However, when undertaking a major utilities relocation, the owner and contractor will work with and rely upon third-party utility companies (electrical, gas, water, telecom, etc.) to complete design and construction work.

The obvious question becomes: how do the contractor and/or owner ensure that the utility companies complete their design and construction work correctly and within the timelines anticipated in the contract in circumstances where the utility companies are not parties to the construction contract?

Contractual relationships may exist between the owner and the utility companies in the form of pre-existing Municipal Access Agreements, which may be outdated and non-project specific. These agreements usually include cost sharing arrangements such as those articulated in Ontario's Public Service Works on Highways Act pursuant to which the owner and Utility Companies share the design and construction costs for relocating utilities.

In some cases, owners will attempt to motivate the utilities by increasing the owner's financial contribution to a higher percentage than that statutorily mandated or will cover the cost of providing additional design resources.

However, practical problems may arise from this division of responsibilities including:

- A lack of design and construction staff resourcing by the utility companies;
- Unexpected upgrades and/or increases to capacity;
- A lack of clear, binding and realistic timelines, agreed upon by all three parties for the utility companies to complete their work; and
- Potentially a lack of enforcement mechanism for the contractor to hold the utility companies to agreed upon timelines.

In some cases, utility companies, understandably, use the opportunity of an infrastructure project to upgrade their facilities and equipment. If these plans are not communicated properly to the contractor, who may be expecting an equivalent relocation of utility services, the result can be delays and significant cost increases. That said, experienced contractors who work on these mega-projects are well aware that utility companies may replace decades-old utility services.

Clear timelines and practical enforcement are necessary elements of a successful contract between utilities companies, owners and contractors to ensure projects stay on time and on budget

Universal to any major utilities relocation project is the need for a precise and complete allocation of contractual responsibilities, which includes clear timelines and practical enforcement mechanisms. Precision is critical in that any lack of clarity with respect to a design, construction, or timing obligation may well result in the parties pointing fingers at one another while project delays continue.

Similarly, the allocation of responsibilities must be complete in that there should be no contractual gap between the owner, contractor, and utility companies. In particular, if the contract between the owner and the contractor states that a utility company is responsible for a given task or timeline, a corresponding contractual agreement with the utility company is helpful.

The case law in this area has not developed significantly for a number of reasons, primarily because most construction disputes settle in private mediation or arbitration. Further, case law often develops years after a new legal issue arises.

Owners and contractors must strive to anticipate problems and address them in the drafting of the contract. Some owners have taken the approach of either entering into direct contracts with the utility companies, or requiring the contractor to enter into direct contracts with the utility companies, which are project specific and are drafted in tandem with the prime contract so that obligations are clearly defined and enforceable between the parties. However, this may not be possible in every case and may present its own set of challenges.

Even slight contractual modifications which shift key responsibilities or solidify certain obligations can assist the parties in avoiding multi-year delays. For example, the owner and its engineer may consider issuing technical guidelines, may assign additional staff to the utility companies from the outset, or expressly describe any utility upgrades.

The Transportation Association of Canada (TAC) sets out the guidelines for the coordination of utility relocations, which provides public agencies with guidance with respect to developing a process for the coordination of utility relocations. While the guidelines and flowchart provided by TAC reflect the ideal process and provide helpful information with respect to the technical interrelationships between the parties to a utility relocation, such processes must be clearly defined within a binding contractual framework which sets out the responsibilities of the parties.

Canadian transit infrastructure is set to develop significantly over the next few decades. This period of development presents an opportunity for industry players to develop new processes to coordinate and manage these complex projects. The approach taken by owners and contractors in structuring contracts to account for the work of the utility companies will be important to ensuring the success of these projects.

Sharon Vogel is a partner at Singleton Reynolds. Jesse Gardner is an associate at Singleton Reynolds.

THE GOVERNMENT VERSUS SNC-LAVALIN

Credit: Government of British Columbia

Depending on how SNC-Lavalin reacts to any sort of penalty issued by the federal government, procurement of projects like the Pattullo Bridge Replacement could be negatively impacted.

Understanding how the fall out could impact infrastructure development in Canada.

By Andrew Macklin

After months of discussion, it feels like we are no closer to understand both the political and industry fall out of the situation involving SNC-Lavalin and the federal government. But as the business of infrastructure carries on, getting those answers would go a long way to understand how the landscape could change in the years to come.

No matter how much we speculate, none of us can crawl into the minds of the senior executives at SNC-Lavalin to know what they are thinking. None of us have the ability to make decisions for them.

But there are some questions that the industry can still try to understand, and they are questions that we best keep in the back of our heads as the fallout from this continues.

What happens if SNC-Lavalin is banned from bidding on federal government contracts?

Without question, it will mean some amount of lost business for the company. Using ReNew Canada's Top100 Projects report as a reference for this discussion, SNC-Lavalin has three projects on that list, of the company's 26, that directly involve federal procurement: the new Champlain Bridge, the expansion of CFB Trenton, and the A and B Jetty Recapitalization at CFB Esquimalt. So the company has had some recent success in landing business with the federal government.

Currently, there is one significant federal contract there are involved in bidding on, as they are part of one of the two consortiums being considered in the RFP stage of the ESAP Energy Services Modernization, which is a $1.2 billion contract.

There are also expected to be a few more federal government projects of considerable magnitude over the next decade: the Supreme Court rehabilitation, further work on the Parliamentary Precinct rehabilitation, potentially the St. Lawrence Seaway modernization, and likely some more work upgrading and updating both military and port installations.

So yes, should SNC-Lavalin be suspended from bidding on government contracts over the next decade, it is easy to assume that it will impact their bottom line That being said, they would obviously focus their efforts elsewhere and could land enough business elsewhere in the country to make up for it.

What if SNC-Lavalin decides to pull their business from Canada?

To start, you would have to believe that it would be too costly to remove itself from all of its current contracts. I am not a business expert by any stretch, but it's tough to imagine a business case for pulling a company of that magnitude off of all of its current work.

They could however, decide to take the company and move it to London, as has been mentioned by senior brass at the company. Would they consider removing themselves from bid teams they are currently part of? I don't have the answer to that. But knowing they are part of consortiums in the RFP stage of the aforementioned ESAP project and the Pattullo Bridge replacement to name a few, I think there could be some legal repercussions if they extracted themselves from the active bids.

If SNC-Lavalin were to leave, what would it mean to infrastructure development in Canada?

It would reduce competition for major projects in Canada, and that isn't a good thing. We have heard from project owners that past few years that have been lamenting the fact that not enough qualified consortiums are bidding on major projects. We traditionally see three proponents selected for the RFP stage of major projects, but are starting to see just two on a frequent basis (ESAP and Eglinton LRT to name a few).

Reducing competition on project bids can have two negative impacts of significance:

a rise in project cost and a reduction in innovation. It's pretty simple, less competition means less variation on cost. And clearly, based on the fact that SNC-Lavalin is part of 26 projects on this year's Top100 projects report, the company is a fierce competitor on project cost. Without their involvement, project costs could foreseeably rise. In addition, engineering companies bring a great deal of innovation to the table during the proposal process. With absolutely no slight to the other companies in the same space as SNC, a given project owner could prefer the company's innovative ideas versus another in a proposal. The lack of that input could lead to a project that isn't as innovative as it could be.

The news keeps talking about 9000+ jobs leaving the country if SNC-Lavalin leaves Canada. Is that realistic?

It may not be probable, but it is possible. There are a lot of factors at play that would determine the actual answer to this question, or more to the point, just how many of those jobs would indeed leave:

- Is there enough business for SNC-Lavalin outside of Canada to command the need for those 9,000 jobs in other global markets?
- Would those 9,000 families be willing to move with the company?
- Would other companies in the space in Canada have the capacity to take on those people who don't want to leave the country?
- Would SNC-Lavalin's reputation, within the industry, be so tarnished by the current situation that there would be no partners willing to work with them anywhere in this country?

Without appreciating the answers to those questions, it's impossible to know just how many jobs could leave Canada if SNC packed up and left the country.

There are still so many questions left unanswered as the fallout of the SNC-Lavalin situation continues. It is important to ask questions to better understand how this could impact infrastructure development in Canada, but it is just as important to appreciate that we no one truly has the answers. At this point, we all need to stand back, observe, evaluate, and prepare for what comes next.

Andrew Macklin is the managing editor of ReNew Canada.

Credit: City of Ottawa

Top100
Canada's Biggest Infrastructure Projects

For additional details on this year's Top100 report, visit top100projects.ca

Stage 2 Ottawa LRT
2019 Top100 Projects Rank: #18
Value: $4.657 billion

Ontario pledges $1.2 billion to Ottawa Stage 2 LRT

Premier Doug Ford and Minister of Transportation Jeff Yurek announced that the Ontario government will provide the City of Ottawa with a maximum of $1.208 billion to build the Ottawa Stage 2 Light Rail Transit (LRT) project.

"Building a quality transit system is a big step forward in making sure Ottawa is open for business and open for jobs," said Ford. "The people of this great city deserve a world-class transportation system that gets both them and the economy moving. This investment puts people first."

The Ottawa Stage 2 LRT project will be capable of reaching a future capacity of up to 24,000 passengers per hour, each way during peak periods.

"I am very appreciative that the Government of Ontario is investing with us to make Stage 2 LRT a reality for the residents of Ottawa," said Mayor Jim Watson. "Stage 2 will extend our LRT network to communities farther east, west and south. It will bring 77 per cent of Ottawa residents within five kilometres of fast, efficient, clean and reliable rail service."

The Stage 2 LRT project will add 44 kilometres of new rail and 24 new stations, and consists of three light rail extensions:

- Confederation Line east to Trim Road;
- Confederation Line west to Moodie Drive and southwest to Algonquin College; and
- Trillium Line south to Limebank Road, with a spur to the Ottawa Macdonald-Cartier International Airport.

The Trillium Line south extension is scheduled for completion in 2022, and the Confederation Line east and west extensions are scheduled for completion in 2024 and 2025, respectively. Through earlier investments, the Ontario government also committed up to $600 million toward the Ottawa Stage 1 LRT project.

Credit: Government of Alberta

Springbank Off-stream Reservoir
2019 Top100 Projects Rank: #94
Value: $432 million

Canada pledges funding to Springbank Off-stream Reservoir

François-Philippe Champagne, Minister of Infrastructure and Communities, announced funding for the Springbank Off-Stream Reservoir project in Calgary, Alberta.

In June 2013, communities in southern Alberta experienced devastating effects of flooding caused by heavy rainfall. To better protect these communities from future flooding events, the Government of Canada is supporting the construction of an off-stream storage reservoir in Rocky View County.

This will divert extreme flood flow from the Elbow River to a reservoir where it would be contained temporarily until the flood peak has passed. Once completed, these measures will help protect thousands of people and their homes, schools, and local businesses, and ensure that southern Alberta communities remain safe for decades to come.

"Taking concrete steps to adapt to the impacts of climate change is more and more essential to ensuring a safe prosperous future for our kids and grandkids," Champagne said. "By investing in the Springbank Off-Stream Reservoir project, we are helping Alberta get ahead of the problem, and protect Calgarians and communities to the south from the heavy personal and economic costs of increasingly threatening weather events."

The Government of Canada is contributing $168.5 million to this project through the Disaster Mitigation and Adaptation Fund (DMAF). DMAF is a $2-billion, 10-year program to help communities build the infrastructure they need to better withstand natural hazards such as flooding.

Credit: ReNew Canada

Fort McMurray West Transmission Project
2019 Top100 Projects Rank: #40
Value: $1.6 billion

Fort McMurray West Transmission Project completed

The Fort McMurray West 500-kV Transmission Project was energized three months ahead of schedule and on-budget. This 508-kilometre transmission line, running from Wabamun, Alta., just west of Edmonton, to Fort McMurray will provide essential electricity, greater reliability, and enhance the transmission system to meet growing demands in northern Alberta.

Valued at $1.6 billion, the project was financed through the largest public-private-partnership (P3) bond in Canadian history. It is also the longest 500-kV AC transmission line in Canada and was ranked among the top 50 infrastructure projects in Canada.

"In 2014, we competed against global proponents to win the bid for this critical piece of electricity transmission infrastructure. Today, along with our partner Quanta Services, we successfully completed construction on this project ahead of schedule and on-budget," said Wayne Stensby, managing director of electricity at ATCO. "We take pride in the genuine, heartfelt engagement and trust that we have built with all communities and indigenous peoples along the route. The success of this project would not have been possible without these strong, mutually beneficial relationships."

Alberta PowerLine, a partnership between Canadian Utilities Limited (80 per cent), an ATCO Company, and Quanta Services Inc. (20 per cent), was selected in 2014 by the Alberta Electric System Operator through a competitive global process to develop, finance, design, build, own, operate and maintain the line. Following extensive consultation, the final route was approved by the Alberta Utilities Commission in February 2017, and construction began shortly thereafter.

Route 389 Improvement project
2019 Top100 Projects Rank: #89
Value: $468 million

EA approved for Route 389 Improvement Project

Minister of Environment and Climate Change Catherine McKenna has announced that the proposed Route 389 Improvement Project between Fire Lake and Fermont is not likely to cause significant adverse environmental effects when the mitigation measures are taken into account. In reaching her decision, the Minister considered the Comprehensive Study Report, as well as comments received from First Nations and the public.

The $468-million project consists of improving Route 389 between Fire Lake and Fermont in order to increase road safety and the flow of traffic. The project will also improve the link with Newfoundland and Labrador and facilitate access to natural resources.

The project was assessed as a comprehensive study under the former Canadian Environmental Assessment Act (updated in 2010). The Minister has referred the project to the responsible authorities, Fisheries and Oceans Canada, and Infrastructure Canada. The responsible authorities will ensure that all necessary mitigation measures and follow-up programs, as described in the Comprehensive Study Report, are implemented.

Mitigation measures include the use of trucks with retractable tarpaulins to limit dust emissions during the transportation of granular materials, and the avoidance of all activities (deforestation, stripping, mowing, etc.) that could hinder bird nesting.

APPOINTED

John Bockstael

The Canadian Construction Association (CCA) has appointed **John Bockstael** as 2019 chair of its board of directors at its annual general meeting. John takes over the position from **Zey Emir**, president of Revay and Associates Limited.

Bockstael is president & chief executive officer of Bockstael Construction Limited, a fourth-generation company and one of Manitoba's largest regional general contractors. He is a professional engineer, Gold Seal Certified, and holds an ICD.D designation from the Institute of Corporate Directors.

Bockstael joined the CCA board in 2005 and has chaired the CCA General Contractors Council and Standard Practices Committee, joining the executive in 2010. He has also served 14 years on the board of the Winnipeg Construction Association including two as president, and is the outgoing chair of Canadian Construction

Craig Applegath

Craig Applegath has accepted the role of acting chair of the Mass Timber Institute Leadership Council. The Mass Timber Institute is looking to the Leadership Council for strategic advice on bridging the gap between the practical needs of architects, engineers and construction companies, among others interested in mass timber building, and the broad range of mass timber research that is being conducted across Canada and elsewhere.

An architect, urban designer, and a leader in the planning and design of zero-carbon buildings and campuses, mass timber buildings, climate adaptation, and regenerative cities, Applegath is a Principal and founding partner of DIALOG's Toronto studio.

Since graduating from the Graduate School of Design at Harvard University with a Master of Architecture in Urban Design, he has focused on leading complex, sustainable planning, and design projects, and is internationally recognized for his design and advocacy of zero-carbon regenerative buildings and cities. His area of practice at DIALOG includes the master planning and design of institutional and mixed-use projects.

Mike Cautillo

Mike Cautillo has joined StrategyCorp as a senior advisor after forty years in the transportation and infrastructure industries. He is a seasoned infrastructure and procurement expert who has deep knowledge and experience developing infrastructure projects from concept to completion, including designing innovative public-private partnership procurements.

Before joining StrategyCorp, Cautillo was the president and CEO of the Windsor-Detroit Bridge Authority, helping to create the Crown corporation overseeing the construction of the Gordie Howe International Bridge project.

A civil engineer and former senior executive in both the Ontario and federal governments, Cautillo has more than 40 years of experience working in the private sector and for all three levels of government, including more than a decade as a partner with Deloitte's Financial Advisory Services group.

Eric Muller

Eric Muller has welcomed to the QUEST network as its new senior lead for Central Canada.

Muller will provide industry insights and direct support to QUEST's Community Energy Planning Implementation Network and Distributed Energy working groups, develop the themes and topics for the upcoming QUEST*talks*: Policy in Toronto in June, and engage policymakers on the issues that are important to subscribers in Ontario and across Canada.

He comes to QUEST from Ontario's Independent Electricity System Operator (IESO) where he worked in its Innovation, Research and Development group. He has comprehensive expertise in the areas of conservation, regulatory affairs, stakeholder relations, and communications from across both the IESO and the former Ontario Power Authority (OPA).

Joe Oliver

Ontario's Minister of Energy, Northern Development and Mines **Greg Rickford** announced the appointment of **Joe Oliver** as a member of the Independent Electricity System Operator (IESO) board of directors.

Oliver served as the federal Minister of Finance from 2014-2015 and federal Minister of Natural Resources from 2011-2014, and Member of Parliament for the riding of Eglinton-Lawrence from 2001-2015. He is a past president and CEO of Investment Dealers Association and former executive director of the Ontario Securities Commission. He also held senior positions in investment banking operations at Merrill Lynch Royal Securities, Nesbitt Thomson, and BMO Nesbitt. Oliver is currently the Chairman of the Board of Echelon Wealth Partners.

Stéphanie Vaillancourt

SNC-Lavalin announced that **Stéphanie Vaillancourt** has been appointed executive vice-president of Capital for the investment and management arm of the company. The appointment is effective immediately. Along with her current role as treasurer of SNC-Lavalin, she will report to Sylvain Girard, executive vice-president and chief financial officer.

Vaillancourt has 20 years of experience in treasury, risk management, and corporate finance. She joined SNC-Lavalin in 2016 after 12 years in treasury with Bombardier Recreational Products (BRP). During her time with BRP, she held a series of roles of increasing responsibilities up to vice-president treasury and capital allocation. She also held positions at Hydro-Québec and GE Capital Canada.

Vaillancourt holds a Master of Science, Finance from HEC Montréal and holds the Chartered Professional Accountant, Certified General Accountant designation.

Yuvbir Singh

SUEZ has announced the appointment of **Yuvbir Singh** as CEO of the water technologies and solutions (WTS) division.

Singh is a graduate of the University of Pune with a Bachelor of Engineering degree in electronics. He joined General Electric (GE) in 1995 and held various engineering, sales, and marketing roles.

Between 2004 and 2015, Singh worked for GE Water where he gained extensive knowledge of the water industry, played an integral role in a series of transformative acquisitions. In 2015, Singh was promoted to vice president of the global locomotive business for GE Transportation, and as the vice president of equipment in 2018.

Singh will succeed **Heiner Markhoff**, who has made the personal decision to step down as CEO, effective March 30, 2019.

Brownie Awards 2019

Recognizing Excellence in the Remediation and Redevelopment of Brownfield Sites Across Canada

Tuesday, November 26
Reception: 5 p.m.
Dinner: 6 p.m.
Delta Toronto Hotel
75 Lower Simcoe St.,
Toronto, ON

All Photos: Actual Media


BROWNFIELDER OF THE YEAR.


Chris De Sousa celebrates with his parents.


BEST LARGE PROJECT AWARD


BEST OVERALL PROJECT AWARD


REPROGRAM AWARD


REMEDIATE AWARD


REINVEST AWARD


REACH OUT AWARD


RENEW AWARD

REBUILD AWARD

The 2018 Brownie Award winners were recognized at a gala event in Toronto on November 21. Originally begun by the Canadian Urban Institute (CUI) in 2000, the awards are now presented by the Canadian Brownfields Network (CBN) in partnership with ReNew Canada's parent company, Actual Media. 52 nominations were received and 10 projects and individuals were recognized for their achievements:

REPROGRAM: Legislation, Policy & Program Initiatives
WINNER: Excess Soils Bylaw Tool – Ontario

REMEDIATE: Sustainable Remediation and Technological Innovation
WINNER: Cates Landing – North Vancouver, BC

REINVEST: Financing, Risk Management and Partnerships
WINNER: The Bentway – Toronto, ON

REBUILD: Redevelopment at the Local, Site Scale
WINNER: Pier Development – North Vancouver, BC

RENEW: Redevelopment at the Community Scale
WINNER: Greystone Village – Ottawa, ON

REACH OUT: Communication, Marketing and Public Engagement
WINNER: Carcross-Tagish Management – Carcross, YT

BROWNFIELDER OF THE YEAR
WINNER: Chris De Sousa, Ryerson University – Toronto, ON

BEST SMALL PROJECT
WINNER: East Village Junction – Calgary, AB

BEST LARGE PROJECT
WINNER: Zibi – Ottawa/Gatineau

BEST OVERALL PROJECT
WINNER:
- ERASE CIP 2018 – Hamilton, ON
- Kingston Failed Tax Sale Properties – Kingston, ON

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FCM Federation of Canadian Municipalities / Fédération canadienne des municipalités
Willms & Shier Environment Indigenous Energy Law
ReNew Canada

For further information on the 2019 Brownie Award dinner, visit **brownieawards.ca**


Green Roofs for Healthy Cities CEO Steven Peck poses the question: what could we do with $1 billion in dedicated green infrastructure funding?

DIALOG's Craig Applegath discusses how to adapt future building and site design for the impacts of climate change.


Former Environment Commissioner of Ontario Dianne Saxe talks about the need to reduce the energy footprint of the existing building stock.

Photos: ReNew Canada

GREY-TO-GREEN CONFERENCE TORONTO, ONT.

Close to 200 leaders in the green infrastructure sector gathered in Toronto for a discussion on how the built environment is adapting to climate change.

During the discussion at the seventh annual Grey-to-Green conference, Green Roofs for Healthy Cities founder and chief executive officer **Steven Peck** used the perspective of what one billion dollars buys in terms of grey infrastructure assets, and then posed the question of what that same investment could build in terms of green infrastructure.

When **Craig Applegath** joined the discussion, the founding principal of DIALOG's Toronto studio laid out where the opportunities lie to incorporate environmentally beneficial design elements into new projects, elements that apply to all forms of built infrastructure:

- Highly Insulated Buildings
- Natural Light
- Natural Ventilation
- Energy Resilience
- Water Storage
- Building Height
- Flood Adaptation (buildings)
- Flood Adaptation (landscape)
- Wind Storm Adaptation
- Urban Food Production

Building on Peck's point, a billion dollar investment in these building elements would reduce energy demand, improve building resilience, and help built infrastructure adapt to the changing climate.

That same investment, and more, is needed to improve the current existing building stock's energy efficiency, which former Environmental Commissioner of Ontario **Dianne Saxe** noted as an important step in reducing Canada's emissions and improving its energy resilience. Saxe cited Sweden as providing an example to follow, as the country has reduced its building energy footprint by 86 per cent in the past decade or so.

What would one billion dollars committed strictly to green infrastructure do for the Canadian environment? If the experts presenting at Grey-to-Green are right, it could go a long way to reducing Canada's energy demand, improve community resilience around food and water resources, and potentially save the country billions of dollars in future costs resulting from the overall impact of the changing climate.

For more information, visit *greytogreenconference.org*.


The keynote panel discussed how to finance infrastructure that lasts throughout the 21st century.


According to Beck, greater involvement from the private sector is key to building infrastructure assets that are sustainable long-term.


Moderated by Shawn McCarthy of The Globe and Mail, leaders throughout the sector debated how best to capitalize on the transition to the infrastructure assets of tomorrow.

Photos: ReNew Canada

GLOBE CAPITAL 2019 TORONTO, ONT.

The 2019 edition of GLOBE Capital brought leaders in the cleantech, finance, and infrastructure industries together to discuss strategies for financing the 21st century. The two-day discussion followed key themes such as sustainable finance, advancing Canada's resilient infrastructure, and infrastructure for the new urban economy.

The theme of the conference was the focus of one of the keynote discussion, which featured three senior industry leaders bringing different perspectives to the conversation: president of Schneider Electric **Susan Uthayakumar** (the supplier), founder and executive chairman of Aecon Group Inc. **John Beck** (the builder), and managing director and global head of sustainable finance at JPMorgan Chase & Co. **Matt Arnold** (the financer).

Moderated by Bloomberg anchor **Amanda Lang**, part of the conversation centered around how to convince governments to invest additional revenue into new infrastructure projects in order to alleviate significant costs that are decades away.

According to Beck, the solution is to allow for "more private sector development as opposed to just government funding. The private sector borrows at higher rates than governments do, but they're much more efficient in the delivery of infrastructure wand they can manage the process more than the government itself can manage. Public-private partnerships is the solution to that."

The problem lies with educating project owners of the long-term benefit of public-private partnerships and how they can result in assets that are developed with long-term goals in mind. Beck suggests that it is the responsibility of all project stakeholders, including the general public, to make the case for developing assets that are best poised for long-term sustainability.

For more information on GLOBE Capital, visit *globeseries.com*.

Photos: ReNew Canada

Fortis Inc. president and CEO Barry Perry.

The panel discusses global opportunities for the Canadian energy sector.

Canadian Council for Aboriginal Business CEO J.P. Gladu introduces the panel on the role of utilities in socio-economic development of rural Indigenous communities.

FORTIS ENERGY EXCHANGE TORONTO, ONT.

Leaders from across the North American energy sector gathered in Toronto for the Fortis Energy Exchange, focused on fostering dialogue on the industry's biggest opportunities and challenges.

Ontario Power Generation outgoing president and CEO **Jeff Lyash** joined BC Hydro president and COO **Chris O'Riley** and ITC Holdings president and CEO **Linda Apsey** for a conversation on opportunities to share Canadian power generation with global markets, primarily the United States. In his remarks, Lyash suggested that there are economic benefits in cross-border markets, maximizing the payback for energy production by establishing a new customer for the production volumes not used by Canadian consumers.

That cross-border connectivity has real potential between two markets on the west coast of North America, British Columbia, and California, according to O'Riley. With the Site C Clean Energy Project (and big hydro in general) providing a good investment in the backbone of the energy system in B.C., according to O'Riley, the chance to share some of that baseload with California when renewable resources are not providing the needed generation.

Exporting energy is not new for Canada. Canada already exports approximately 11 per cent of electricity, second only to Germany globally. And there are several power sharing projects in the pipeline currently, including the Manitoba-Minnesota Transmission Link, the Lake Erie Connector, and the New England Clean Power Link. That's in addition to the ongoing plans to ship Liquified Natural Gas (LNG) to markets in Asia, specifically to Japan.

But there are also opportunities to share in the development of new energy technologies as well, ones that could be beneficial across the globe, according to Lyash. Work is being done on the development of small modular nuclear reactors, ones that could support such consumers as mining operations and small communities currently using diesel power generation. Lyash suggested that these are the kinds of next-generation energy technologies that provide an opportunity for experts in both Canada and the U.S. to work together.

For more information on the speakers and subjects featured at the Fortis Energy Summit, visit *fortisenergyexchange.com*.

Photos: ReNew Canada

MPP David Piccini discussed the importance of expanding opportunities to engage students about the skilled trades.

Dr. Jon Callegher of Job Talks explained the results of the skilled trades survey, and what the industry should take away from the data it provided.

RESCON president Richard Lyall explains how the residential construction industry alone will need to recruit 103,900 skilled workers by 2028 to meet industry demands.

RETAINING EMPLOYEES IN THE SKILLED TRADES TORONTO, ONT.

The Residential Construction Council of Ontario released the results of a construction skilled trades survey conducted in the Greater Toronto Area during a keynote presentation at the Toronto Region Board of Trade.

"Skilled trades plays such an important role in our economy," said **David Piccini**, parliamentary assistant to the Minister of Training, Colleges and Universities.

The survey, conducted by Job Talks, provided some positive insight into how current workers feel about the industry. More than two-thirds of those surveyed stated that they were comfortable in the role they are currently in. The feedback provided suggested that better job opportunities, company advancement, and becoming entrepreneurs are the positive reasons why those same employees move on from those positions, although employer problems and stress on the body were cited as reasons to leave those same jobs.

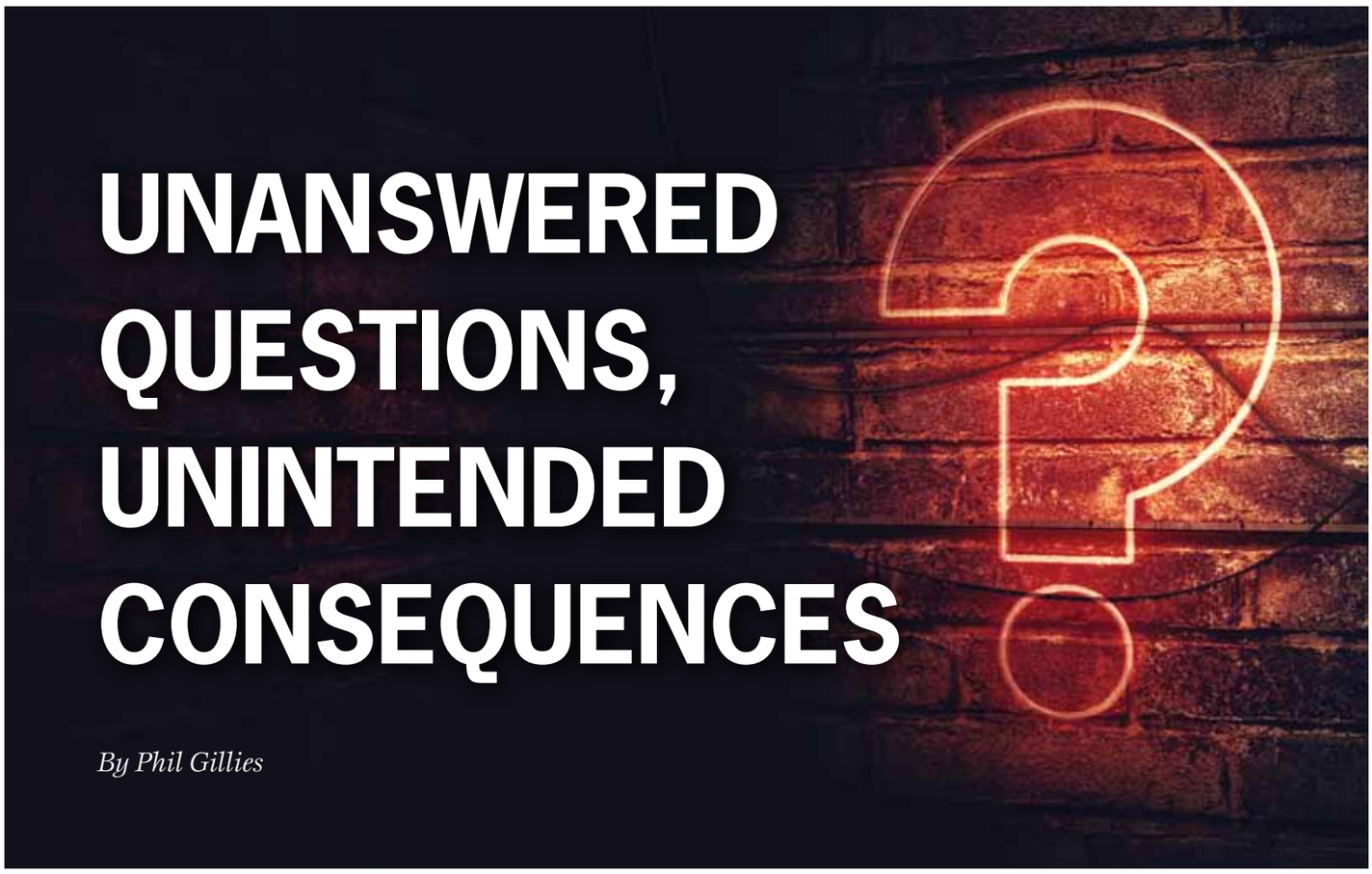
The survey also presented a number of key statistics regarding how workers got into the skilled trades, and what their views of the industry are:

- Just eight per cent were influenced to join the skilled trades by a school counsellor, versus 73 per cent influenced by friends and family;
- 65 per cent would strongly recommend their job to a young person;
- 69 per cent believe that there is a shortage of workers in the field;
- 96 per cent attributed shortages in the field to negative stigmas or parental influence; and
- 70 per cent believe that people lack knowledge about the benefits of working in the trades.

The survey provided four key recommendations:

- Leverage the industry's network for recruitment;
- Integrate construction early in the education system;
- Invest in high quality media production to promote the industry; and
- Mobilize companies and associations to address retention.

For more information on the results of the survey, visit *rescon.com*.



UNANSWERED QUESTIONS, UNINTENDED CONSEQUENCES

By Phil Gillies

The Government of Ontario's Bill 66 changes the rules surrounding the contract agreements between the province's construction unions and public sector employers. With the passage of this legislation, many public sector employers such as municipalities, school boards, hospitals, and universities are no longer bound to construction union contracts.

Bill 66, under Schedule 9, says that public bodies are now deemed to be "non-construction employers." The new arrangement, open shop tendering, would allow any (presumably qualified) contractor to bid on the construction of public buildings. Proponents of open shop say it will open bidding up to many more players and, as a result, project costs will drop.

In the last issue of ReNew Canada, procurement expert Stephen Bauld's article, Opening Pandora's Box, raised concerns about the government's approach in Bill 66. In particular, he was concerned that he had not seen any fact-based research showing tremendous savings related to implementing Schedule 9. Mr. Bauld went on to state, correctly in my view, that we need to continue to attract the high standard of qualified contractors we presently have, both union and non-union.

The Bill 66 Mr. Bauld wrote about has changed through an amendment in General Government Committee of the Legislature. So, what happened and what effect will the new Bill 66, Schedule 9 have?

Bill 66 as introduced last fall would have simply ended the union contracts with the municipalities and other public bodies across the province and come into effect upon passing the Legislature.

When the Legislative Committee was reviewing Bill 66 on March 19, 2019, the government moved to amend it to allow for a 'local option' under which employers will be allowed to decide whether to stay under the umbrella of the collective agreements, or to opt out. Cities, hospitals, and boards would be given three months to decide after Bill 66 becomes law.

Is this an improvement over the previous version? I'm of two minds on this. The amended Bill doesn't tear up all the agreements across the province, at least not right away. The decision will now have to be made by each municipal council and board employer. There will be localized fights across the province. Toronto, Hamilton, Waterloo Region, and Sault Ste. Marie are thought to be the big battlegrounds.

What will happen across the province remains to be seen.

Unintended Consequences

There are two issues that readily come to mind that I don't think were top of mind at Queen's Park.

Many of the union members who work for the public sector bodies have their benefits and pensions through the union—not the employer. The Carpenters Union, for example, manages these programs for hundreds of their members working for the City of Toronto, Toronto Community Housing, and the Canadian National Exhibition (CNE). What is to become of these benefits the day their contract is torn up? Does the employer step up and take on the responsibility? Or are the workers just out of luck?

Another looming problem—the Building Trades Council and the Carpenters Union both testified before the General Government Committee that they will take legal action to have Bill 66 struck down in the courts. Before Bill 66 was amended, this would have been a direct battle between the unions and the province. But with the amendment in place, the municipalities and other employers will be making the decision whether to stay under the collective agreements or not. Will they now become parties to the litigation? Might Bill 66 be exposing the cities, school boards, and hospitals to millions of dollars in legal fees?

These important questions need to be answered as Bill 66 becomes law.

Phil Gillies is a former Progressive Conservative MPP and the current executive director of the Ontario Construction Consortium.

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