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Catherine McKenna Leads Ambitious Recovery Plan

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JULY/AUGUST 2021

GOVERNANCE 8 Infrastructure Leadership

Catherine McKenna, Federal Infrastructure Minister, is constructing a cleaner, more inclusive Canada. *By Connie Vitello*

DIGITAL

14 The Digital Age of Construction Technology is moving infrastructure projects forward. *By John Tenpenny*

18 Cyber Safety

Cyber security is finally emerging as a priority for Canadian municipalities. By Glenn Miller

FINANCE

24 Asset Management Lethbridge County brings its asset management to life with a clear strategy. *By Michael Bly*

WATER INFRASTRUCTURE

28 Rehabilitation Decisions

Survey says environmental considerations are a major factor for asset renewal strategies in Canada. By Simran Chattha and Connie Vitello

ENERGY

32 Power Forward

Nova Scotia town pairs renewable power with world class battery storage. *By Zack Metcalfe*



TRANSIT

35 Asset Stewardship Value-based decisionmaking supports TransLink's vision *By Llewellyn Fonseca*

TOP100 PROJECTS

38 Top100

Projects Update Réseau express métropolitain heads to airport and major construction for Broadway Subway Extension.

DEPARTMENTS

4 Editor's Note

The need to protect the cyber systems that underpin Canada's energy and water infrastructure and services has never been greater. *By John Tenpenny*

5 Front

GTHA transit infrastructure gets big boost, UBC smart energy district, and more.

22 Panorama

The Réseau express métropolitain (REM) light metro transit system is the largest public transit project in Quebec in the last 50 years.

40 People

Appointments and announcements of the infrastructure industry's movers and shakers.

42 Closing Shot

The Toronto Island Airport ferry goes green. *By Robert Poirier*

View this year's Top100 Projects at top100projects.ca

For details regarding our annual celebration visit renewcanada.net/top100-projects



PROTECTING CRITICAL INFRASTRUCTURE

By John Tenpenny

S afety in the infrastructure sector is not always something you can see or touch. It's not just wearing a hard hat—or a mask—on a construction site or ensuring a new hospital or school has a sprinkler system in case of a fire.

Much of Canada's infrastructure is critical in nature, such as electricity grids and water systems, which in the 21st century are vulnerable to breaches and attacks, not only physical ones, but cyber attacks that you can't see coming.

That reality hit home in May when the largest pipeline network in the U.S. was shutdown after a ransomware attack. Colonial Pipeline halted 2.5 million barrels per day of shipments of gasoline, diesel and jet fuel after what was referred to as "the most disruptive cyberattack ever on U.S. energy infrastructure."

The need to protect the cyber systems that underpin Canada's energy and water infrastructure and services has never been greater. These threats evolve with today's fast-changing technology and have the potential to not only disrupt our daily lives but also put our national security and economic well-being at risk.

A report last fall from the Canadian Centre for Cyber Security warned statesponsored actors are likely developing the ability to launch cyber attacks against the country's infrastructure and that hacked systems present the most pressing threat to Canadians' physical health.

The report, entitled National Cyber Threat Assessment 2020, stated that "(s)tate-sponsored actors are very likely attempting to develop cyber capabilities to disrupt Canadian critical infrastructure, such as the supply of electricity, to further their goals."

The report states the fusion of information technology (IT) with operational technology (OT) creates new vulnerabilities.

Exposing utilities, like water systems or the power grid, to the internet could

make it accessible to attacks.

The most pressing threats to the physical safety of Canadians are to OT and critical infrastructure.

The 2019 federal budget earmarked \$144.9 million for cyber security of Canada's critical infrastructure. It outlined the money would be spent over five years "to protect Canada's critical cyber systems including in the finance, telecommunications, energy and transport sectors."

And, there has been more recent movement from the government as well. In January, the federal government announced more than \$375,000 in funding for the Université de Sherbrooke to collaborate with Hydro-Sherbrooke, to make cyber security improvements to the utility's infrastructure.

The Canadian infrastructure sector recognizes the increased threats and along with help from governments are taking the necessary measures to keep pace with digital criminals.

But it's not enough. Canadian authorities, backed by industry partners, must recognize the increased risks to infrastructure and take the necessary measures to combat digital criminals. *

John Tenpenny is editor of ReNew Canada. john@actualmedia.ca

As you may have noticed, there is a new author occupying this space. I am very happy to share this issue my first—of ReNew Canada with you. I am also very excited to join the ReNew Canada and Actual Media team. I look forward to meeting those in our industry, hopefully face-to-face sooner rather than later, to hear their stories and share them in the pages of this magazine. Until then, please feel free to reach out to me via email.

Join the conversation. For daily news and discussion, visit @ReNewCanada () /ReNewCanada () ReNew Canada



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ABOUT THE COVER

Federal Minister of Infrastructure and Communities, Catherine McKenna, is pictured during a Zodiac cruise around Prince Leopold Island in the Qikiqtaalu Region of Nunavut as part of her visit to a Students on Ice Foundation expedition. To read Minister McKenna's interview with ReNew Canada contributor Connie Vitello, see page 8.

ONTARIO AND CANADA INVESTING \$3.4B TO ADVANCE HAMILTON LRT

Hamilton's LRT project will see a 14-kilometre, 17-stop line built from McMaster University in the west to Stoney Creek.

The governments of Canada and Ontario announced a deal to invest nearly \$3.4 billion in the shovel-ready Hamilton Light Rail Transit (LRT) project. Each government is contributing 50 per cent of eligible project costs, up to \$1.7 billion.

This new transit system will offer frequent and reliable service from McMaster University in the west, through downtown Hamilton to Eastgate at Centennial Park in Stoney Creek. In total, the project will run 14 kilometres, with 17 stops and have an average end-to-end commute time of 32 minutes. When complete, it will have immediate benefits for workers, students, seniors, and their families across the City of Hamilton and beyond.

"This investment in the only shovel ready major transit project in Hamilton, will help kickstart the economy and create good jobs," said Catherine McKenna, Minister of Infrastructure and Communities. "It will reduce commute times and help workers, students, seniors and families across Hamilton and beyond get where they need to go faster, cleaner and in affordable ways."

"We have remained focused on delivering rapid transit for the people of Hamilton," added Ontario's Minister of Transportation Caroline Mulroney.

NEXT ISSUE: SEPTEMBER/OCTOBER INDIGENOUS INFRASTRUCTURE

Moving Foward Funding Indigenous megaprojects Material Change Hybrid building construction **Risk Reduction** Early construction involvement

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Front

UBC BREAKS GROUND ON RENEWABLE ENERGY HUB

new \$23 million renewable energy hub will transform an entire city block at the University of British Columbia into a smart energy district, including the province's first-ever hydrogen refuelling station for light and heavy-duty vehicles.

It will also include the addition of a solar array, as well as intelligent charging infrastructure for electric vehicles.

"In the face of a growing climate crisis, we are mobilizing even more of our institutional education, research and innovation capacity to pursue climate solutions," said Santa J. Ono, UBC president and vicechancellor.

The energy hub will become a city-scale, "living laboratory" that explores critical links between energy, transportation and urban design, said project lead Dr. Walter Mérida, a professor of mechanical engineering who leads MéridaLabs in the faculty of applied science. A key feature is a water electrolyzer that uses electricity from the solar panels to split water into hydrogen and oxygen, resulting in "green hydrogen"—or 100 per cent renewable hydrogen. The process does not emit carbon emissions.

The electric vehicle charging stations have been installed and will be operational by the end of the summer. The hydrogen refuelling centre is scheduled to open in March next year, followed by the commissioning of the solar array in October.

"The vision for the test bed was developed more than five years ago, and the recent interest in the relevant technologies is a testament to UBC's global leadership," added Dr. Mérida. "Ultimately, the test bed will link technology and people." *



fter lengthy negotiations between the Federal government and the province of Ontario, a joint investment of \$26.8 billion was announced for four shovel-ready public transit projects in the Greater Toronto Area (GTA). It marks the largest subway expansion in Canadian history with the all-new Ontario Line; a three-stop Scarborough Subway Extension; the Yonge North Subway Extension; and the Eglinton Crosstown West Extension. An additional investment of \$180 million to purchase new streetcars in Toronto that will be manufactured in Thunder Bay by

Alstom was also announced.

"By having the federal government come to the table in this historic partnership, we are moving full steam ahead on building these projects that our residents need today and for future generations," said Ontario's Minister of Transportation, Caroline Mulroney.

"Public transit is at the heart of a clean, inclusive recovery," added Catherine McKenna, Minister of Infrastructure and Communities. "This announcement—the largest investment in public transit in the GTA's history—will help drive Canada to a net zero emissions future."

The Canadian Council for Public-Private Partnerships (CCPPP) welcomed the agreement.

Mark Romoff, outgoing president and CEO of the Canadian Council for Public-Private Partnerships (CCPPP) called the agreement a tremendous accomplishment.

"As we work to successfully re-emerge socially and economically from the pandemic, these projects will create thousands of muchneeded jobs in the region, transform our communities and knit the Greater Toronto and Hamilton Area closer together." *



ransport Canada announced the launch of two new contribution funding programs to help Canada's airports recover from the effects of the COVID-19 pandemic, including a program to support critcal infrastructure.

The Airport Critical Infrastructure Program (ACIP) will provide close to \$490 million to financially assist Canada's larger airports with investments in critical infrastructure-related to safety, security or connectivity.

The Airport Relief Fund (ARF) will provide almost \$65 million in financial relief to targeted Canadian airports to help maintain operations.

In addition to launching these two new funding programs, the Minister announced that Transport Canada's Airports Capital Assistance Program (ACAP) is receiving a funding top-up of \$186 million over two years. The ACAP is an existing contribution funding program which provides financial assistance to Canada's local and regional airports for safety-related infrastructure projects and equipment purchases.

One airport on the receiving end of ACAP funding is North Peace Regional Airport (YXJ), in Fort St. John, B.C., which secured more than \$8.2 million.

The funding will support the planned rehabilitation of Runway 03-21, including engineering, general and civil construction works and electrical upgrades. A smaller, secondary project to replace the facility's emergency backup generator, will also be

NEW FUNDING PROGRAMS TO SUPPORT CANADA'S AIRPORTS

funded by the ACAP contribution. Both projects will ensure that YXJ can continue to offer critical air connectivity for business and leisure travel and support essential air services such as air ambulance and emergency firefighting response.

"The North Peace Regional Airport is an economic enabler for our region that fosters resilient communities," said Jim McKnight, president, North Peace Airport Society. "Our runway is a vital piece of infrastructure that not only supports leisure and business travel, including fly-in and fly-out projects, but also wildfire suppression services and medevac services. We are incredibly grateful for the federal funding we have received and look forward to continuing to provide vital services for our region." *



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In 2017, Maple Reinders was awarded the Construction Management work on the Central, South and North bundles of the Trent-Severn Waterway National Historic Site, a major network of locks, bridges and dams that traverses 386 km through central Ontario. The objective of the project is to improve the structural integrity and public safety on the waterway, while protecting its heritage value and character-defining elements, as well as enhancing water management operations. The work included the repair or replacement of the structures at more than 20 sites, including 14 dams, one lock and a fixed bridge.

This multi-year project is one of the largest for Maple Reinders, and comprises part of the Government of Canada's \$3 billion investment into Parks Canada infrastructure history. Maple Reinders has been honoured to play such a key role in this significant infrastructure work.

See www.maple.ca for other civil and infrastructure projects and for more information.



Maple.ca



How Catherine McKenna is constructing a cleaner,

more inclusive Canada. By Connie Vitello

atherine McKenna presented a confident keynote address at our Top100 Projects event earlier this year, imploring attendees to "think big" about infrastructure solutions. Despite the challenges of an unprecedented pandemic, it was obvious she was poised and prepared to confront the challenges ahead and make her mark on Canadian history.

In May, ReNew Canada engaged the Minister for a follow-up on key infrastructure promises, and on the nation's progress toward a resilient recovery.

Road to infrastructure leadership

Elected as the first female Member of Parliament for Ottawa Centre in 2015, McKenna was appointed Minister of Environment and Climate Change in Prime Minister Justin Trudeau's cabinet in 2015. She was appointed as the Minister of Infrastructure and Communities in 2019.

McKenna previously worked as a lawyer in Canada and Indonesia and as a negotiator with the United Nations mission in East Timor. She also taught at the Munk School of Global Affairs and Public Policy and co-founded the charitable organization Level Justice.

Overcoming pandemic obstacles

ReNew Canada: You've earned a reputation as a skilled negotiator, tenacious community builder, and environmental advocate. How has your previous experience as a lawyer and environment minister informed your ability to manage the infrastructure portfolio? And has the pandemic altered your views on any preconceived notions regarding public infrastructure development?

Catherine McKenna: Yes, my skills as a lawyer and my experience working as an international negotiator has absolutely helped me in my portfolio as the Minister of Infrastructure and Communities. We just announced that after many months we have reached a historic deal with the Government of Ontario to invest over \$12 billion in public transit—the largest investment in public transit in the history of the Greater Toronto Hamilton Area (GTHA)— helping to kickstart our economy and create tens of thousands of jobs as part of our government's plan to create one million jobs. It is critically important to get out of the COVI9-19 recession.

This is a smart plan, worked through in earnest over the last six months, and not easily made—but it is a good deal for the residents of the GTA and Hamilton that will reduce congestion and take cars off the road, create good jobs, connect historically disadvantaged neighbourhoods, and help tackle climate change.

I believe that Canadians will look back on this time of the pandemic—and Canadians' collective response to build a cleaner, more sustainable, and liveable country in its aftermath—as one of those turning points in the history of our country.

The way we look back on the building of the transcontinental railroad, or the TransCanada Highway, or the Lions Gate Bridge— the longest suspension bridge in the British Commonwealth and one of Canada's biggest construction projects during the Great Depression years. These are periods of great ambition, toil, and sacrifice that pay dividends for generations.

It became clear to me through the pandemic that "infrastructure" is a bureaucratic, fuzzy word. Really it is clean water, energy security, safe roads, bridges and public transit, housing, communications technology, and so much more. It's the thing that improves the quality of life for



Canadians and connects us. Infrastructure is critical for economic growth, job creation, and combating the effects of climate change, which is key as we look towards recovery from the COVID-19 pandemic. We need to be ambitious and build modern, sustainable infrastructure to revive our economy, to help create one million jobs, to support vibrant and inclusive communities, and to leave a cleaner world to our children. by 2026 and to connect all Canadians by 2030. Since 2015, our government and federal agencies have committed \$6.2 billion for universal broadband. Budget 2021 committed an additional \$1 billion to the now \$2.75 billion Universal Broadband Fund to support Canadians in rural and remote communities.

While we will get out of the pandemic, the climate crisis has made it clear that

We need to be ambitious and build modern, sustainable infrastructure to revive our economy.

Advancing connectivity

ReNew Canada: The current edition of ReNew Canada is focused on digital innovations in the infrastructure industry. Technology is transforming the way that Canadians manage their infrastructure construction projects, making it easier for municipalities to design, build, operate, and maintain the infrastructure assets we need for a robust economy. How is your ministry working to support the advancement of digital solutions and more equitable broadband capacity?

Catherine McKenna: Our goal is to achieve 98 per cent access to high-speed broadband

we need to redouble our efforts and transition as quickly as possible to netzero emissions, and technology will be crucial to get us there. This is a trilliondollar economic opportunity, including for Canadian clean energy, Canadian businesses with clean technologies, and partnerships on Indigenous-led solutions. Canada is in a competitive global race at a time of a rapidly changing climate, digital transformation, changing demographics, and shifting geopolitics.

Countries with next-generation infrastructure will be outsized winners at this critical movement of transformative change. Long-term and well-coordinated investments in infrastructure are critically important. With government resources already stretched, we must invest public dollars wisely while working with the Canada Infrastructure Bank (CIB) and leveraging private sector investment to innovate, to accelerate the transition to net zero and to invest at the scale needed to build the country we want. But we will not achieve our infrastructure ambition by accident. Working with Canadians, using the best available data and guided by global best practices in infrastructure planning, investment, design, and management, we can chart a forward-looking roadmap out to 2050 to guide new infrastructure investment in Canada including nation-building projects.

Public transit projects

ReNew Canada: There have been several major infrastructure project announcements since the beginning of the year. In February, transit infrastructure received a boost with the \$14.9 billion announcement for public transit projects over the next eight years, which includes permanent funding of \$3 billion per year for Canadian communities beginning in 2026-27. The new fund has been delivered in response to decades of lobbying from municipalities and transit authorities that a source of permanent and stable funding is essential to allow for careful

and long-term project planning and delivery. How did you finally bring this to fruition?

Catherine McKenna: While we are reeling from a devastating pandemic and a stalled economy, moving forward is more important than ever. It was clear to me that during the pandemic we needed to invest in our public transit to kickstart our economy. As we build back better, it is also time to think ambitiously as we invest in modern and sustainable public transit across our country, reducing congestion, helping to create a million good jobs, and supporting cleaner and more inclusive communities. This stable funding provides cities with predictable transit funding they need to plan for the future in order to create jobs and growth and to build more inclusive communities with cleaner air, less congested streets, and a clear path to net-zero emissions by 2050.

Good public transit creates thousands of good jobs for everyone from transit and construction workers to architects and engineers to Canadian manufacturers and their suppliers. By investing in cleaner public transit, we are also investing in cleaner air and a critical solution to climate change. Transportation represents a quarter of Canada's greenhouse emissions. Without

plans to invest in renewing, deepening, and extending infrastructure across America. President Biden's proposal and Canada's infrastructure spending are for comparable amounts, when adjusted for currency and population, and are equally ambitious when it comes to policy, regulations, and achieving economic, social, and climate outcomes. Canada has a head-start on both spending and policy since our government ran on and began implementing progressive social and climate policy in 2015. We have continued to build on those investments, and to make the necessary adjustments when the pandemic hit. Biden's proposal is an opportunity for Canada, if we keep playing our cards right. It is one of those important moments in our relationship when our priorities align. For example, Canada has the opportunity to export clean power, helping to reduce emissions, maximizing clean power use, and making electricity more affordable for Canadians. The Lake Erie Connector is a perfect illustration of that. The CIB's investment will give Ontario direct access to North America's largest electricity market—13 states and D.C.

There are other opportunities for Canada and the United States to work more closely

Countries with next-generation infrastructure will be outsized winners at this critical movement of transformative change.

bold action, this will grow. By increasing ridership in public transit and linking it to cycling and walking paths, by electrifying our trams, trains, and buses, we are building a healthier and cleaner future for our kids.

National infrastructure assessment

ReNew Canada: In March, you announced a first-of-its-kind National Infrastructure Assessment to help target the federal government's infrastructure spending and plan for Canada's net zero future. Two weeks later, U.S. President Joe Biden announced a historic US\$2 trillion infrastructure program to revitalize energy, transportation, manufacturing, and the care economy. The recent Lake Erie Connector project sounds promising. What other opportunities do you see for collaboration, for example, with regard to clean energy infrastructure?

Catherine McKenna: Infrastructure is a major commitment of national governments in both Canada and the United States. The new Biden administration has ambitious

together on investments in infrastructure. Everything from supply chains to clean power, to trade corridors, to nature. Canada has the metals and materials used in electric vehicles. Canada's electricity grid is currently 83 per cent emissions-free and among the world's cleanest, thanks partly to our abundance of hydropower. Canada already has nearly three dozen transmission lines that cross the Canada-U.S. border, contributing to the export of over 60 terawatt hours of electricity to the U.S. per year. In fact, every border province has a transmission line that interconnects them with at least one neighbouring U.S. state, an integral part of our electricity security.

Green communities

ReNew Canada: The April launch of the Green and Inclusive Community Buildings program supports resilient retrofits, repairs, upgrades, and new builds. The program provides \$1.5 billion in funding over the

next five years. How is your team making sure these initiatives and investments reach remote and underserved communities across the country?

Catherine McKenna: We work directly with communities to increase awareness of our programs and make sure they can take full advantage of our programs. The Green and Inclusive Community Buildings program will invest in projects that meet a minimum threshold for energy efficiency improvements and that increase social inclusion in under-served and high-needs communities across Canada. Projects could include: the installation of energy efficient windows in public libraries; the construction of an Indigenous cultural centre built to green specifications; and, other such projects that would reduce energy waste, improve ventilation, and contribute to inclusive community spaces.

We can build better to save money, reduce emissions, and support Canadian supply chains—including low carbon Canadian materials, such as low carbon concrete, steel, and aluminum.

Local governments, provincial and territorial governments, and not-for-profit and Indigenous organizations can apply for funding for projects that retrofit or build new publicly-accessible buildings that provide services to the public. At least 10 per cent of this funding will be allocated to projects serving First Nations, Inuit, and Métis communities, including Indigenous populations in urban centres.

Budget 2021

ReNew Canada: Let's look back to late April when Deputy Prime Minister and Minister of Finance, Chrystia Freeland, released Budget 2021: A Recovery Plan for Jobs, Growth, and Resilience. How instrumental were you in helping to firm up the various investments? Is \$17.6 billion sufficient to achieve a green recovery toward a net-zero emission economy by 2050?

Catherine McKenna: By making targeted investments in transformational technologies, we can ensure that Canada benefits from the next wave of global investment and growth. Investing now in areas such as clean fuels and carbon capture will foster well-paying middle-class jobs now and for many years into the future. I advocated for significant investments in clean infrastructure, which is the biggest driver or economic growth and jobs. Additionally, I also advocated for making the investments we need, in public transit, planting trees, retrofits, and the CIB's







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That is why we propose a historic investment of a further \$5 billion over seven years, starting in 2021-22, in the Net Zero Accelerator. The Net Zero Accelerator, launched in the government's strengthened climate plan last December, will help build and secure Canada's clean industrial advantage. By investing in decarbonizing large emitters, transforming key sectorsfrom steel and aluminium to cement-and accelerating the adoption of clean technology across the economy-for example, the auto and aerospace sectors-the Net Zero Accelerator will spur Canada's shift to innovative net-zero technologies and attract the large-scale investments needed to meet our goal of net-zero by 2050. It will also help Canadian firms grow and create the jobs of our low-carbon future.

Indigenous partnerships

ReNew Canada: The budget also provides an investment of more than \$18 billion to help close the gaps between Indigenous and non-Indigenous peoples. In our recent INFRAIntelligence discussion on funding Indigenous megaprojects, we heard from Sharleen Gale, Chief of the Fort Nelson

It's time to think big and build the Canada we want in 2050.

First Nation and chair of the First Nations Major Projects Coalition. Gale advocates that First Nations need to be involved as owners in order to use revenue streams to raise the status of Indigenous communities. How is the federal government making sure that infrastructure investments through the ministry, and the Canada Infrastructure Bank, are meaningful and that Indigenous Peoples are treated as equitable partners?

Catherine McKenna: Many communities in the North rely on diesel or other emissions intensive sources of energy, which not only contribute to climate change but also pollute the air. Indigenous Peoples are taking economic development in their own hands. They're finding low-emissions solutions to build the clean energy future we need and we are supporting communities transitioning to clean energy and making the air cleaner and healthier.

I have instructed the CIB to establish a new investment target of \$1 billion for Indigenous infrastructure projects in full partnerships with Indigenous Peoples and that benefit them across the five priority areas (green infrastructure, clean power, broadband, public transit, and trade and

transport). The CIB is already active in projects that include Indigenous partners, including Oneida Energy Storage with the Six Nations of Grand-River, and the Inuitled project the Kivalliq Hydro-Fibre Link between the government of Nunavut and Manitoba. Meaningful partnerships with Indigenous communities are the only way to maximize the benefits of investments, advance Reconciliation, and improve the infrastructure deficit. Last month, the CIB launched the Indigenous Community Infrastructure Initiative to provide loans of at least \$5 million for up to 80 per cent of total project capital cost; this will support community-based projects that provide a service and a direct benefit to an Indigenous community or communities to help to close the infrastructure gap.

Progress on procurements

ReNew Canada: Let's talk timelines. After a year of negotiations and partial procurements the federal government recently made the largest investment in public transit in the Greater Toronto Area's history, as we previously mentioned. How quickly are shovels going to get into the

e want in 2050.
ground to complete the various subway lines

and extensions promised?

Catherine McKenna: I've been focused on shovel in the ground projects. I know Mayors love hearing that, so do Ministers. We have many shovels and the good news is that a lot of them are going into the ground. It will help kick-start the economy, create thousands of jobs during construction, which can begin immediately, and over the lifetime of the project, and drive billions in investment over the lifetime of the system while building cleaner more inclusive communities.

The Greater Toronto Area's historic \$10.4 billion in funding will go towards the four shovel ready transit projects in Toronto—the Ontario Line, the Scarborough Rapid Transit replacement, the Eglinton Crosstown LRT, and the Yonge-North subway extension where procurement are underway. The Hamilton LRT investment is the only shovel ready major transit project in Hamilton, which means construction can begin and jobs can be created immediately.

ReNew Canada: You often state that infrastructure policies should perform

"triple duty." What are the key policies you are employing to effectively address this equation and help Canada build back better?

Catherine McKenna: Smart investments require thoughtful planning, in order to ensure that every public dollar spent on infrastructure achieves triple benefits: creating jobs and economic growth, fighting climate change and fostering resilience, and building more inclusive communities. We design our programs to achieve those outcomes. I have launched the engagement to help shape Canada's first National Infrastructure Assessment. The Assessment will be key to fostering Canada's long-term growth and competitiveness, driving to net-zero emissions, increasing the resiliency of our infrastructure to a changing climate, and to improving quality of life for all Canadians. It's time to think big again and build the Canada we want in 2050.

ReNew Canada: There has been criticism from certain industry associations that infrastructure construction funds for state of good repair are not flowing quickly enough from the federal government to adequately support economic recovery initiatives, particularly in Ontario. Are there specific steps your team is taking to deduce how to address challenges facing infrastructure development and maintenance sooner than later?

Catherine McKenna: We're making historic investments in cleaner water, better transit, more efficient buildings, more accessible high-speed internet-and the fact of the matter is that almost 96 per cent of all projects we've funded are underway. Put another way, more than 19 of every 20 funded projects has begun. We're creating new ways to connect our communities, move more efficiently and sustainably with electrified transit, and extend clean energy to power rural and Northern Canada. Since last March and the start of the pandemic we have approved over 3,000 projects, representing a federal investment of over \$4 billion-all this in a little more than 12 months under the largest program led by my department, the Investing in Canada Infrastructure Program.

ReNew Canada: Thank you for your time. Do you have any closing remarks for ReNew Canada readers?

Catherine McKenna: Let's continue to think ambitiously and build the future we want for Canada—prosperous, clean, and inclusive. *****



Connie Vitello is a regular contributor to ReNew Canada.



SHAPING THE FUTURE

At the forefront of innovation, we work in a committed, collaborative and sustainable way to create innovative and durable infrastructures that will benefit future generations.



THE DIGITAL AGE OF CONSTRUCTION

Technology is moving infrastructure projects forward.

echnology is transforming the way Canadians do business. While the pace of change has accelerated and can be daunting, technology is making it easier for municipalities, engineers and constructors to design, build, operate and maintain the infrastructure assets we need for a robust economy.

Are there opportunities for greater use and faster adoption of technology? Are we taking advantage? Is our lack of knowledge, lack of capital, or a lack of willingness creating barriers to change?

During a recent INFRAIntelligence webinar, sponsored by Citylitics, ReNew Canada explored with experts in construction technology the use of technology in construction and public works, where it is being adopted and, perhaps more importantly, where it is not and why.

E-permitting

One effect of the COVID-19 pandemic has been to drive more and more tasks online, from shopping for groceries to conducting meetings via technologies like Zoom.

The construction sector is no different. The push towards e-permitting has been going on for years, but that push has been ramped up over the past year.

A couple of years ago, the City of Windsor—the ninth largest municipality in Ontario—was the first municipality in Canada to go fully digital with its permit system.

John Revell, the city's chief building official said the e-permit system put the city at the forefront when it comes to "offering a complete suite of online permit applications" that will allow builders to monitor the progress of their project through the online system using a tracking tool.

The technology chosen was from Finnish company Cloudpermit (formerly Evolta).

"When we started looking at going paperless we came across a lot of project management systems that were being reused for issuing permits and other things," said Revell. "[This] product was customized specifically for the construction industry and we thought it might be a good

By John Tenpenny

opportunity to take us electronically to the next level."

According to Richard Lyall, president of RESCON (Residential Construction Council of Ontario), "Ontario municipalities need a standardized development approvals process and streamlined e-permitting system to help reduce the amount of time it takes to get projects approved."

Specifically, he pointed to the One Ontario proposal, which is requesting funds to establish guidelines for provincial data exchange standards for a comprehensive e-permitting system.

"That's step No. 1," he emphasized.

"We have over 20 organizations, including the planners, the building officials and the builders. What we're saying is, 'We want to do this. This is going to make things better. We need to have that data exchange capability for interoperability between systems and between jurisdictions.""

According to Lyall, the World Bank ranks Ontario as 64th in construction permitting, and there are up to 45 agencies involved in the approvals process.



"If that process isn't working smoothly, then you lose time, and if you lose time you lose money."

Lyall said developers and investors must know when they're going to get projects approved so they can figure out the numbers and measure risk.

"A very important part of this whole exercise is really de-risking the development process which is critical, especially with respect to any private sector-based investment." data? And a clear understanding of what kind of data they need. The best way is to start small and have some success before scaling it up."

It's about the journey

Adoption is key and there are always early adopters, but what about the rest of the construction industry?

It usually starts at the highest levels, said Badruddin. "When we

Ontario municipalities need a standardized development approvals process and streamlined e-permitting system to help reduce the amount of time it takes to get projects approved.

Ahmed Badruddin, CEO of Citylitics, a company that specializes in predictive intelligence of North American infrastructure markets, agreed.

"The trend of more digitization and data availability is skyrocketing in the public sector now that they need to provide services in a different manner. Generally, it starts with a clear goal: What do they want to do with the think about any transformative technology, it started with some public sector government application, which was then made available to the wider population."

What Citylitics has found is that a lot of the data exists, but it's not connected. "It's in silos and from thousands of disparate sources and formats," he said.

DIGITAL CONSTRUCTION

We asked attendees some questions about the use of technology in construction. Here's what they had to say:

What is the biggest barrier preventing technology adoption? Lack of knowledge 65%

Lack of information 12% Fear of change 23%

How often do you use construction apps? 3-5 times per week 10% 1-2 times per week 15% Hardly ever 75%

DATA COLLECTION

Are you making the most of the data you collect? Yes, we use it to make informed decisions everyday 25% Somewhat, but we could be doing more 35%

I know we collect it, but I don't know how to access it 20% We don't actively collect data 20%

What areas of AI and machine learning interest you the most? AI implementation to prevent cost overruns 4% AI for better design of buildings through generative design 35% Risk mitigation 13% Project planning 9% How AI will make job sites more productive 26% AI and the big data in construction 13%

Where we saw an opportunity for technology was how do you use algorithms to pull all this data together so industry can make better decisions around what's going on in the infrastructure market?

"Our approach is how do we make better use of the data that exists and leverage that, as a starting point. And then how do we find more data sources to plug into the system."

Any change also requires a champion, said Revell, "because at the municipal level you're working with a group of individuals who don't all have the same understanding of what the benefits are and you're competing against other priorities. It's a matter of putting together a group of people who can advocate for it so that the political leadership is going to make the investment."

It's all about the journey, added Anna Robak, director, research and innovation with WSP Canada. "And part of it is how do we get industry to adopt technology, but part of it is internally, how do we get our own people to adopt these things?"

As infrastructure investment races to rebuild some of the economic damage from COVID-19, construction spending in Canada has taken centre stage. Our construction projects have long been a major investment industry—we spent \$1.3 trillion on construction in 2019 alone, according to WSP research.

As part of a series called "Costing the Chasm," WSP estimated that the costs of construction will rise significantly over the next 10 years due to 12 major trends the company identified, relating to areas such as climate, resources, society and technology.

"With more projects and greater expenses creating a double-edged challenge, left unchecked, construction costs could soar unsustainably high. But integrating smart technology throughout the construction lifecycle could play an important role in mitigating and even reversing those costs," stated the report.

Something governments can do to help with technology adoption is support pilot projects, added Robak.

"There is nothing like a pilot project to get things moving.

"In the research I've seen on what makes people adopt something new, every single time, whether it's purchasing a green product, allowing your private data to be used, every single time the person making the decision has looked at what someone else has done." drones and sensors, can save up to 60 per cent of labour costs and cut construction timelines by 30 per cent."

Robak agreed. "The benefits and the promise of data and the proper use of data is the capacity to simulate projects quickly and to change them and then run the apps on climate change issues. You can recalibrate the energy performance of buildings almost instantly."

There are also practical benefits for the environment, added Lyall.

"We spend hundreds of millions of dollars every year reproducing drawings, many of which end up in a bin and never get used, which is really unnecessary.

In Windsor, Revell said they have already identified practical benefits that could save lives.

"We had an experience with our fire department. They were responding to a building fire and firefighters were sent into an underground space that was actually structurally compromised. Afterwards, the Fire Chief commented that he wished he had quick access to drawings of that building because he never would have put his firefighters in that part of the building had he known it was compromised."

When we think about any transformative technology, it started with some public sector government application, which was then made available to the wider population.

A pilot project gives that first instance of somebody doing something and it being successful, or not, and the lessons that come from that.

Benefits of technology

There are many real and potential benefits that can be derived from having digitized construction information, said Lyall, who pointed to a research project which looked at using drones and sensors where on any given day you have an up-to-date set of as-built drawings as the project is progressing.

While there are challenges, such as keeping up with the pace of change, Lyall said the future looks bright for the use of new technology in construction.

Drones and sensors can provide up-to-date information so drawings can be changed as a project is progressing, he said, and artificial intelligence (AI) can be used to simulate the effects of climate change on a structure so drawings can be revised to make it more energy efficient.

"And real-time location systems, using

The situation speaks to having data accessibility, he added. "If this information is cloud-based then it's something we can provide to the fire department and first responders can be looking at structural drawings on a tablet en route."

It's no longer science fiction

Artificial intelligence (AI) is another technology starting to find its way into the construction industry, according to Robak, who cited a recent study at the University of Waterloo.

AI gave researchers new insights to help reduce wear-and-tear injuries and boost the productivity of skilled construction workers.

Studies using motion sensors and AI software revealed expert bricklayers use previously unidentified techniques to limit the loads on their joints, knowledge that can be passed on to apprentices in training programs.

In their first study, the researchers analyzed data from bricklayers of various

experience levels who wore sensor suits while building a wall with concrete blocks. The data showed experts put less stress on their bodies, but were able to do much more work.

"They've learned over the years how to move their bodies in a way that avoids injury or keeps them safe and healthy," said Robak. "It's something they wouldn't be able to explain, but with cameras and AI they are able to monitor that movement and then train younger workers to move in a safer way." The researchers are now developing a system that uses sensor suits to give trainees immediate feedback so they can modify their movements to reduce stress on their bodies.

"It's a fascinating direct application to construction around keeping workers healthy, safe and more productive," said Robak.

Looking ahead

Moving forward the architecture, engineering and construction (AEC) industries will encounter challenges.

One is that individuals in organizations making the decisions about the data are different from the ones using it and that can create adoption challenges, said Badruddin.

In today's world many people are aware, they can't ignore the data, they can't ignore digital and they're looking for smarter ways to use it.

Companies and organizations "need to keep the end user in mind. How is it going to improve their workflows?" said Badruddin. "You don't want to overwhelm the user. You want to give them something simple, that is powerful, that enables them to do something they couldn't easily do themselves before."

Lyall said there is a disconnect because right now technology is evolving faster than our capability of keeping up with it.

"Necessity is going to drive change more than enlightened thinking because all of a sudden we're going to realize that we're 10 or 15 years behind some jurisdiction that we're trying to compete with."

He said there will be a big learning curve, because the reality is that not everyone is at the same level.

"Saying that you can accept applications by email is not e-permitting. Creating the platform to link different entities together so they can exchange and share data in a secure manner is critical."

Robak said she finds it striking that every time WSP conducts a technology mapping exercise at a municipality, one department will not know about the technology another department has and the potential of that technology to grab data that will be useful to them.

"It's very eye-opening," she said. "There



is potential for municipalities to use the technology they already have even better."

There are some good models out there he commented, citing the example of the Eastern European country of Estonia's digital identity model. Twenty years ago, the Estonian government made a commitment to digitally transform their society and now it's estimated that 97 per cent of activity between the public and the government is online.

"When COVID-19 hit, they didn't skip a beat," said Lyall. "There is no reason we can't do that.

It's just a matter of time, effort, commitment and training."

What the industry could really use is some kind of established cooperative venture involving government and industry and the design community to oversee the transition to increased use of technologies such as building information modeling (BIM).

According to the third annual BIM Report survey, conducted by the Building Innovation Research Centre at University of Toronto in collaboration with others, RESCON, "the use of innovative BIM-based processes and analyses can bring significant productivity improvements to the AEC industry. However, steps need to be taken to remove barriers that hinder a broader implementation. This report sheds light on those barriers, which include the need for an industry standard."

The survey shows a progressive increase with respect to different entities at different levels of sophistication, said Lyall.

However, "there's a push-pull effect. I'm not going to do it because the government doesn't require it and government says I'm not going to ask them for this because they can't do it."

There are costs associated with change, but then there are benefits with the change that reduce costs, added Lyall.

Robak took a more aspirational view of the future.

"All organizations will have a policy of piloting, of trying out new technologies, of collaborating with each other, of gathering an evidence base so that they know what's going to work and what's not and then sharing that information."

So, what does the future of construction look like?

"It will probably evolve in ways we haven't even begun to imagine," stated Revell. *

John Tenpenny is the editor of ReNew Canada.



PREPARE FOR THE WORST, HOPE FOR THE BEST

Cyber security is finally emerging as a priority for municipalities. By Glenn Miller

S ince the onset of the pandemic, thousands of Canadians have been forced to work remotely and the number of hours spent in front of computer screens has skyrocketed, along with our overall reliance on internet connectivity. Unfortunately, the past 16 months have also seen an increase in the frequency of cyber attacks on municipal governments and local utilities. According to malware experts Emsisoft, more than 4,000 ransomware demands were made in Canada in 2020 alone.

Protection against cyber attacks

Most cyber attacks in Canada are ransomware demands related to data theft, but in the U.S. critical infrastructure such as municipal water, wastewater treatment plants and hydro utilities have been damaged or seen their functions impaired through malicious cyber attacks. Anca Pop-Charles, principal in charge of cyber security at Ross and Baruzzini, a U.S. consultancy working with Ontario's Municipal Infrastructure Group, suggests that even though Canada may have experienced fewer direct cyber attacks on critical infrastructure than the U.S., the "attitude about being prepared should be, not if, but when."

In February 2021, a small city in Florida suffered a potentially catastrophic breach when malicious hackers gained access to the town's water treatment plant, most likely via remote access protocols put in place during COVID-19. As a horrified engineer watched in real time, the hacker raised the amount of sodium hydroxide (used to lower acidity) by a factor of 100. Officials explained that mandatory chemical checks would have prevented contaminated water reaching residents, but the ease with which the hacker gained access was of sufficient concern that the city's mayor took the rare step of releasing details of the attack. He used the opportunity to call for more funding and IT resources to protect critical infrastructure.

Chronic underfunding of municipal water systems is not unique to the U.S. Similar challenges are faced in Canada. Even though the federal government recently announced millions for new spending to upgrade municipal water systems in Canada, the focus was on maintaining water quality, not cyber security.

But the Florida incident also raised the issue of transparency. In November last year, the City of Saint John, New Brunswick was forced to shut down all municipal services following a severe breach. Unlike the city in Florida that went public, Saint John not only refused to pay ransom demands but, controversially, elected not to reveal details of the attack, deciding instead to completely rebuild its systems. The city was then forced to communicate with the outside world through Gmail accounts until new systems had been installed and double checked.

Canada's commitment to cyber security

Since ReNew Canada first covered this topic (*Cyber Threats: Do Municipalities Have the Tools to Protect Their Critical Infrastructure? March/April 2019*) local authorities have begun to see cyber security as a priority, even as the number of attacks continues to increase. The building blocks for establishing and maintaining better cyber security at the local level are being assembled, but are still at different stages of readiness.

partners to solve Canada's most complex cyber challenges."

The Cyber Centre's latest threat assessment confirms that although the number of cyber attacks on municipalities and local utilities continues to increase, the vast majority of events are ransomware attacks targeting "victims who need to avoid a disruption in service." But the Centre cautions that attempts to interfere with the electrical grid or inflict damage

Local authorities cannot afford to turn a blind eye to the possibility of disruptions to critical infrastructure.

The federal lead is the Canadian Centre for Cyber Security (Cyber Centre). Formed in 2018 following publication of "National Cyber Security Strategy—Canada's Vision for Security and Prosperity in the Digital Age" by Public Safety Canada, the Cyber Centre brought together diverse expertise from Public Safety Canada, Shared Services Canada, and the communications security establishment into one organization. The Cyber Centre works "side by side with provincial, territorial, and municipal governments as well as private sector on water treatment and wastewater plants cannot be ruled out.

Ironically, modernization upgrades could also increase the risk threat for utilities and municipal authorities. This is because the worlds of operational technology (OT) and information technology (IT) are beginning to merge. The Cyber Centre reports that "ransomware has almost certainly improved its ability to spread through corporate IT networks and threaten adjacent industrial control systems (ICS). In some cases, victims have chosen to disable their industrial processes as a precautionary measure during a significant ransomware event."

Although Canada may not have the same risk profile as the U.S., Israel, India or Saudi Arabia, which have all suffered "statesponsored cyber attacks," this doesn't mean that local authorities can afford to turn a blind eye to the possibility of disruptions to critical infrastructure by North Korea, Iran, Russia and China. This is because the source of cyber threats is open-ended, and in the cyber environment, geographic borders are meaningless, which makes tracking, investigation, apprehension and prosecution difficult. Some attacks are criminal (often seeking payouts in Bitcoin), while other bad actors are simply malicious individuals or "hacktivists" seeking to do damage for its own sake. Another troubling source of cyber attacks is when disgruntled employees or contractors who feel they have been badly treated decide to exact revenge by taking advantage of inside knowledge.

The non-profit CyberNB (New Brunswick) is a relatively new entity focused on cyber security for municipal critical infrastructure. Led by Executive Director Tyson Johnson, the organization also manages the Critical Infrastructure Protection Network (CIPnet), dedicated to implementing a four-pronged strategy for innovation in the sector through collaboration with government, business and academia: workforce and skills development; trust and compliance; innovation and infrastructure; and, growth and commercialization.

Since 2019, municipal associations in Alberta and Ontario have also begun to focus on the cyber security needs of their members.

Shortly after Shaun Guthrie joined the Alberta Urban Municipalities Association (AUMA) as its senior director, information technology, he reviewed the Association's own cyber assets. Then, prompted by the findings of a Municipal Information Systems Association (MISA) survey that highlighted financial constraints as one of the principal obstacles preventing municipalities from establishing and maintaining cyber security capacity, AUMA searched for a company whose services could be delivered costeffectively to members through AUMA. "Our arrangement with Stratejm (Canada's first cloud-based cyber security-as-a-service company) brings scale to the table," says Guthrie. "In a nutshell, we were able to negotiate volume discounts through the size of our membership that makes cyber security more affordable to individual municipalities."

An example of a service available through Stratejm is Security Information Event Management (SIEM). "A municipality generates millions of logs every month that are far beyond the capacity of human surveillance. SIEM runs through massive files then reduces the data down to a handful of suspicious entries—what I call 'actionable intelligence.' This is a true value-added contribution," Guthrie says. priority steps, as well as access to vendors of record whose capabilities have been vetted.

Five pillars of cyber security preparedness for municipalities

The following points summarize current advice from multiple sources, including AMO, Ontario's Cyber Security Centre of Excellence, CyberNB and the Cyber Centre. Municipalities and other local utilities should:

1 Conduct a risk assessment, then develop a strategy to address vulnerabilities. This is an essential first step to ensure that your organization makes the most appropriate technological investments. Network segmentation addresses the imbalance between enhancements to IT systems and links to industrial control systems for physical devices such as pumps, valves and sensors. According to J.S. Edry, with Trend Micro, as the operation of electricity grids, water and wastewater treatment plants become more reliant on remote access industrial control systems, IT staff may not know enough about operational technology to ensure the system as a whole is well protected. It is also important to acknowledge that even the best intrusion detection software still requires live monitoring.

2 Develop risk response protocols focused on recovery, business continuity and communications (internal and external). Make sure to integrate these findings into your organization's emergency preparedness plan. "A municipality must also be prepared to deal with critical infrastructure owned by others but within its borders (e.g a rail corridor transporting

Smaller municipalities are targeted as low hanging fruit because they are often underfunded, underprepared, and do not have the capacity internally to implement effective cyber security measures.

The Association of Municipalities of Ontario (AMO) takes a different approach. Pressed by members at AMO's 2019 annual conference, AMO reconstituted its Digital Government Taskforce to focus on cyber security concerns. The result was publication of a cyber security best practice toolkit in 2020 that provides a comprehensive overview of the challenges. Noting that "Smaller municipalities are targeted as low hanging fruit because they are often underfunded, underprepared, and do not have the capacity internally to implement effective cyber security measures," the AMO toolkit provides advice on a number of dangerous goods)," notes detective sergeant Vern Crowley, a member of the OPP's Cybercrime Investigation Team.

Carry out due diligence on all digital initiatives (including an evaluation of all contractors and companies providing digital services in the municipality's supply chain). According to Anca Pop-Charles, "The trend is towards supply chain attacks, where hackers seek out weak links among vendors involved in supporting the main application." Occupants of an office building in New York suffered a multimillion-dollar loss when hackers breached building management systems via a vending machine connected to the internet.

As the Internet of Things (IoT) becomes more entrenched as an industry standard, the trend is to display all networks on a single dashboard. While a more streamlined design has functional benefits, Pop-Charles notes that "this also creates a single point of attack, potentially making it easier for hackers to gain access, requiring municipalities to take extra care in system design." The upside is that advanced systems are now using AI as a predictive tool to determine the probability of specific types of attack.

Invest in insurance. There are many options, ranging from business interruption to protection against liability suits stemming from inadequate preparation. Experts suggest the benefit of this kind of coverage is useful because the insurer will likely require evidence of preparedness before agreeing to provide the coverage, which triggers a decision to upgrade or enhance cyber preparedness capacity.

5 Establish permanent programs dedicated to education, training and awareness. People can be the weakest link, especially when harried staffers inadvertently trigger access to an organization's systems through a phishing attack. The example of an unfortunate financial officer in a Saskatchewan municipality whose innocent reply to a phishing email saw \$1 million transferred to a cyber thief rather than a contractor whose identify had been stolen is often cited as a cautionary tale.

Coping with COVID has understandably affected how municipalities and local utilities set their priorities, but the potential for cyber attacks to inflict financial and physical damage to critical infrastructure cyber security is finally being taken more seriously. As Brian Rosborough, AMO's executive director says, "AMO is supporting our members on cyber security by providing tools and learning opportunities...to help build staff knowledge and capacity around an important and evolving issue." This fall, AMO will again be co-hosting a Municipal Cyber Security Forum with the Municipal Information Systems Association of Ontario (MISA-ON) to further support member learning on this critical topic. 🌞

Glenn Miller, FCIP, RPP is a senior associate with the Canadian Urban Institute and co-founder of Strategic Regional Research Alliance.

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Panorama

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The Réseau express métropolitain (REM) light metro transit system, when completed, will have 26 stations. Currently in the construction phase, the REM is the largest public transit project in Quebec in the last 50 years. — **Staff**

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> TOGETHER WE BUILD SUCCESS

How Lethbridge County doubled down on its asset management.

By Michael Bly

ethbridge County, Alberta, (population 10,061) started working on its asset management in 2018 because its employees and council recognized the need for a reliable and ongoing strategy to manage the municipality's assets. After receiving a grant from the Municipal Asset Management Program (MAMP) in 2018, the team began moving through the program's Asset Management Readiness Scale (AMRS). (MAMP has approved 71 grants in Alberta since its founding and provided training through MAMP-funded partners to more than 350 Albertans.) By using the AMRS, the team knew they'd chart a safe and smart path forward to guide the city's decision making for decades to come.

Highlights of the strategy included:

- Completed in-house training for a large group (at a reduced rate);
- Increased interest in asset management and related processes; and
- Prioritized asset management as a budgetary and departmental priority.

Challenge

Though it had already moved through Level 1 of the AMRS, the team needed a new plan to bring its asset management to life. It required a clear strategy and a roadmap to move from theory to action. This was the focus of its Policy and Governance work in Level 2. and Rural Municipalities of Alberta (jointly), Canadian Urban Transit Association, NAMS Canada and the Canadian Network of Asset Managers

The municipality also hired an asset management consultant to help the team make accurate assessments before it crafted an implementation plan.

Our project team is connecting departments in new ways so that, as a municipality, we continuously strive to improve our decision-making processes together.

Collaborative approach

Members of the asset management team benefitted immensely from training provided by several of MAMP's partner organizations. Elected officials and municipal staff members participated in a variety of awarenessbuilding and training events offered by Alberta Urban Municipalities Association

Barriers

It can be a challenge to ensure that Council members are regularly trained and engaged on relevant aspects of asset management, alongside staff. Though the Council participated as much as possible, employee team members had more training in asset management processes and its benefits

Federal fund needed to improve critical water infrastructure: RCCAO

Leaky and broken watermain transmission pipes are draining millions of litres of water from municipal systems across Ontario every year.

Over time, the pipes and mains get old and fall into disrepair. Failing to fix them can lead to drinking water contamination, sewage backups and flooding.

Across Toronto and Ontario, significant sections of municipal water, wastewater and stormwater infrastructure are well past their useful life.

RCCAO is calling on the federal government to establish a fund that will help municipalities fix those leaky pipes and crumbling sewers. Such a fund would allow for the repair of critical infrastructure that we all rely on.

RCCAO outlined the considerable cost to Ontario municipalities from leaking or broken watermain transmission pipes and deteriorating sewer, wastewater and stormwater infrastructure in a video released in April.

Deteriorating pipes and infrastructure result in too much treated drinking water going into the ground every year. This is incredibly inefficient and almost singlehandedly defeating Ontario's water conservation goals. The ongoing use of combined sewers in big urban centres is also resulting in untreated sewage being released into the Great Lakes and municipal waterways every year.

A study funded by RCCAO and conducted by the University of Toronto found that up to 25 per cent of all drinking water in Toronto is lost due to pipe leakage.

Thirty per cent of the energy used to pump the water could be saved if leakage is addressed, which would result in savings of more than \$700 million per year, according to the findings of the study.

Funding infrastructure repairs and replacement would also create jobs and dovetails with the federal government's objective of building climate-resilient infrastructure.

Every \$1 billion invested in water infrastructure construction can create up to 11,500 direct jobs and 47,000 indirect jobs.

The population of Ontario is expected to grow by more than 30 per cent by 2041, which will strain water infrastructure even further. Unfortunately, it often takes a burst watermain or sewage overflow to remind us how dependent we are on these normally steadfast systems.

Therefore, planning ahead and having proper funding in place to fix and replace this critical water infrastructure is essential.

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than others involved in the process. This knowledge gap was noticeable during the early stages of the project.

Results

Lethbridge moved to Level 2 in the AMRS's Policy and Governance competency by completing three steps:

1 Policy and objectives: It completed its formal Asset Management Policy, which was adopted by council and endorsed by the senior management team.

2 Strategy and framework: It completed a State of Maturity Report and a Systems Maturity Report, both of which contain strategies for the next two phases of work.

Measurement and monitoring: It outlined, documented and tracked its objectives through regularly scheduled asset management team meetings and an Action Tracker.

Lethbridge also moved from Level 1 to Level 2 in several other competencies in the AMRS, including People and Leadership and Planning and Decision-making. It moved to Level 3 in Data & Information as well as Contribution to Asset Management Practice. It's worth noting that municipalities rarely work on one competency in isolation. Rather, they typically find that work on one competency helps them progress in others. 2 The group training increased interest in asset management and related processes. Employees who thought they might not have a significant role in asset management now understand where they fit in.

It can be a challenge to ensure that Council members are regularly trained and engaged on relevant aspects of asset management, alongside staff.

Benefits

1 The consultant provided in-house training to a large group, which meant more people than expected received training for a lower-than-anticipated cost. The team transferred the savings to the rest of the project and had a well-trained team. 3 Asset management is now a budgetary and departmental priority. It's a budget item, and generates significant discussions amongst council.

We know we're moving in the right direction with our asset management. Our project team is connecting departments in new ways so that, as a municipality, we continuously strive to improve our decision-making processes together. We all have a stake in getting asset management right so that we can ensure we provide safe, reliable and sustainable services to our residents and improve levels of service."

What they learned

Get support. Having clear support from council and senior management is critical. It allowed the team to complete this project and deem it a success. With the right support, the team was able to adjust finances and resources as required.

Assign a lead. Assign a champion to head up your asset management project to lead the team through the necessary steps. This person plays a major role in keeping team members and others engaged in the process and in maintaining momentum. It's tough to progress without someone leading the effort.

Establish a cross-functional team. Having a focused, engaged and dedicated asset management team helps make asset management a high priority in your organization. Ensure that all members have dedicated time assigned to this project so they can put in the effort needed to help it succeed.

Schedule regular team meetings. This keeps each team member engaged in the overall project work. It also encourages the regular discussion of progress across teams that depend on each other to accomplish overarching objectives.

Prioritize council's asset management awareness. Council's support is not enough. You have to keep up their asset management-related educational opportunities. It's imperative that they understand asset management's importance, benefits and processes as well as the employee team, so everyone can make well-informed decisions together.

Next steps

The Lethbridge team is focused on three areas for next steps:

1 Asset inventory validation: They will continue to work with a consultant to help disaggregate and validate spatial

data against financial data.

2 Gap analysis and lifecycle strategy: They will further strengthen their data by defining life cycle strategies and applying these against their assets. This will involve identifying deficiencies and addressing them, and further refining and developing risk models against all asset classes.

3 Policies and processes: They will develop formal asset management processes within the organization. They will also create a data governance policy (i.e., define asset management practices and workflows across the organization to ensure that data integrity is maintained).

There's significant work ahead, but the team understands the positive impact that accomplishing these objectives will have on its long-term asset planning. *

Michael Bly is GIS and asset coordinator for Lethbridge County, Alberta.

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RENEWING WATER INFRASTRUCTURE

Survey says environmental considerations are a major factor for asset renewal strategies in Canada. By Simran Chattha and Connie Vitello

n this second part of a two-part feature on linear water infrastructure renewal, ReNew Canada reveals the results of a comprehensive survey on current practices and opinions related to the management, design, and procurement of linear public sector water infrastructure in Canada.

Respondents revealed that environmental considerations are poised to play a pivotal role in the decision-making for future asset renewal strategies.

Engineers and consultants from across the country weighed in to provide expert perspective on renewal options—mainly rehabilitation and replacement—that can be implemented, independently, or jointly. They also provided insight into the priorities involved in the decision-making process and other pressing water infrastructure issues.

When it comes to linear water infrastructure, how do municipalities and water infrastructure owners decide how to rebuild or renew their pipelines? What are their key priorities and concerns?

Our research in part one indicated that a variety of factors traditionally impact decisions around linear water infrastructure renewal, including:

- Project objectives (age and size of the renewal project and nearby developments);
- Site constraints (such as a sensitive surface structure or geographic challenges);
- Schedule timeframes (emergency service versus planned project); and
- Client budgets.

However, our research also revealed an increasing awareness of indirect costs that are coming into play. These include impacts to trees, interference with neighbourhoods, traffic congestion, idling traffic emissions, and disruption to business patterns.

The survey, which included responses from 375 participants, echoed our research findings in many ways and illuminated the growing appreciation and application of green solutions and water quality protection.

Lead infrastructure

When conducting watermain renewal or rehabilitation an alarming number of respondents indicated that they often encounter lead infrastructure, with 45.33 per cent selecting "sometimes" and 43.33 per cent selecting "regularly."

This could be due to the fact that many utilities don't know where many lead pipes are located because the information is not available or is not complete. Utilities are starting to use new approaches, like artificial intelligence, to determine where lead pipes might be located. Once utilities determine where lead pipes are located, they will be in a better position to address ongoing concerns (e.g., impacts on health) associated with lead pipes.

Open-cut versus trenchless excavation solutions

When working with municipal clients on linear water infrastructure renewal projects, respondents most often recommend a roughly even split between full open-cut replacement and trenchless excavation solutions. A majority of respondents indicated a preference for a combination of methods (31.73 per cent). (*See figure 1*)

FIGURE 1: WHEN WORKING WITH YOUR MUNICIPAL CLIENTS ON LINEAR WATER INFRASTRUCTURE RENEWAL PROJECTS, WHICH DO YOU MOST OFTEN RECOMMEND?

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These decisions are made based on assessment data. A clear majority (93 per cent) of respondents indicated that their municipal customers use leak detection or condition assessment technology before proceeding with a project.

There is a range of reasoning for

- Improving water quality
- End of usable life/multiple breaks
- Replacement due to use of lead
- Need for greater delivery capacity

Improving water quality was the top priority selected. (*See figure 2*)

Selecting a technology

There was a relatively balanced response when it came to consultants' main priorities for selecting a technology for a client's replacement or rehabilitation of water infrastructure. There was a close tally between the following priorities:

- Profit to the firm
- Reduced disruption in the community
- Environmental impacts
- Cost to the client

Once again, the environmental consideration was the top concern. (*See figure 3*)

Waste management woes

Yet the lack of awareness about environmental risks to linear water infrastructure systems persists. A vast majority of respondents have had to recommend that municipal clients replace their linear wastewater infrastructure in the past 12 months due to clogs caused by FOGs (fats, oils, and greases) or flushable wipes. (*See figure 4*)

Environmental benefits

Finally, when discussing linear water infrastructure projects with clients, do consultants ask clients to consider

environmental benefits of a technology when selecting a method of replacement versus rehabilitation?

An overwhelming majority of respondents (96 per cent) indicated that environmental benefits are a concern for clients.

Concluding thoughts

The results of this survey indicate strong preference for green and innovative linear water infrastructure technologies and should give consultants and engineers across Canada the confidence to encourage clients to see assess the big picture—

FIGURE 4: HAVE YOU HAD TO RECOMMEND TO A MUNICIPAL CLIENT THAT THEY REPLACE THEIR LINEAR WASTEWATER INFRASTRUCTURE IN THE PAST 12 MONTHS DUE TO CLOGS CAUSED BY FOGS (FATS, OILS, AND GREASES) OR FLUSHABLE WIPES?

the direct and indirect costs—when deciding on infrastructure solutions. *

Simran Chattha is the editor of Water Canada magazine. Connie Vitello is a regular contributor to ReNew Canada.

POWER FORWARD

Nova Scotia town pairs renewable power with world class battery storage.

By Zack Metcalfe

n the global rush for renewable power, Berwick, Nova Scotia, has about a century's head start.

It began in the 1920s, when the Berwick Electric Commission was founded to manage this community's single hydroelectric dam; now they're part owners of the Ellershouse Wind Farm, stealing megawatts from the breeze. This small, splendid, and otherwise unremarkable community has quietly become a champion of renewable power.

"Our early foray into the world of renewables has caught the imagination of our council," said Berwick Mayor Don Clarke, "and indeed many residents will tell you they enjoy living in a progressive, green town."

In October of 2019, Berwick joined municipalities across the country in declaring a climate emergency, acknowledging their minor contribution to the climate crisis as well as their willingness to do something about it. Clarke said that over 60 per cent of Berwick's electricity is now renewable, either produced locally with wind and water or else purchased from Nova Scotia Power, but in the very near future, they intend to do much, much better.

Power forward

From July of 2019 until about March of this year, the Town of Berwick financed energy efficiency upgrades for 25 buildings within its borders, commercial and residential, through the Berwick Green Energy Program. This entailed the installation of heat pumps, solar water heating systems, additional insulation, smart thermostats, modern lighting, highly efficient Energy Star windows and doors, electric car charging stations and more, with all upfront costs borne by the town. The technical expertise for this venture, however, came from the private sector.

Equilibrium Engineering is a Nova Scotian energy services firm specializing in sustainable and efficient building design. They facilitated the Berwick Green Energy Program with energy audits, contractor oversight and administrative support for the municipality. Among other things, they enabled Berwick to displace significant sums of carbon dioxide and make better use of their existing renewables. The Berwick Green Energy Program is on hold, but this partnership between company and community is on to bigger and better things.

The Power Forward Challenge is a contest organized collaboratively by Natural Resources Canada and the Department for Business, Energy and Industrial Strategy in the United Kingdom, wherein Canadian and UK companies were encouraged to partner with one another and propose projects which would further the cause of smart grid technology. Finalists received \$3 million to make their proposal a reality.

One such proposal came from the cross-Atlantic partnerships between Equilibrium Engineering and StorTera, a lithium ion battery manufacturer based in Edinburgh, Scotland. Together, they proposed bringing Scottish batteries to Berwick, and with the vocal support of the community, they won their \$3 million.

"The idea of Power Forward is to advance some sort of disruption technology, but also to advance international collaboration," said Jeremy Lutes, a partner with Equilibrium Engineering. "It's working."

At this moment, Lutes and his colleagues are overseeing the installation of residential lithium ferrous phosphate battery packs, supplied by StorTera, into 10 Berwick homes, each system complemented by a rooftop solar array. They will also be installing two commercial scale battery packs (the size of shipping containers) for use by the Berwick Electric Commission.

As finalists in the Power Forward Challenge (there are seven total), Equilibrium and StorTera must finish their work in Berwick by the end of 2020 to qualify for a grand prize of \$1 million, but given the frustrations of the global pandemic, Lutes expects Natural Resources Canada will extend the deadline. Even so, Equilibrium Engineering doesn't plan to miss the New Year by much.

Gavin Park, director and CEO of StorTera, said their batteries will allow for more intelligent use of Berwick's renewable energy, squaring the demands of customers with the unpredictability of wind, water and sun, and foster more electrical independence. Then, of course, there's climate change.

"It's why we set up StorTera, why we partnered with Equilibrium Engineering and decided to go for this project in Berwick," said Park. "For these residential homes, we are putting in efficiency measures, moving them off burning oil and

The power of connection

According to the International Renewable Energy Agency, the price of battery storage technology will drop an estimated 66 per cent between 2017-2030. For the moment, however, Lutes said Equilibrium's work in Berwick would be prohibitively expensive without financial aid from the Power Forward Challenge. When the price does drop, he said Canada will be grateful for the pioneering steps taken in Berwick, proving the technology and building the market.

Equilibrium Engineering is in the process

For these residential homes, we are putting in efficiency measures, moving them off burning oil and giving them sustainable alternatives.

giving them sustainable alternatives. As well as generating their own solar, we can support the utility's locally generated wind power by storing energy when it is windy. A preliminary estimate of the impact of these measures is that they will save between 60-90 tonnes of carbon dioxide, per year, just with the residential systems."

These tonnes of carbon equate to the annual electrical demands of 10-15 U.S. homes. of signing a "distribution agreement" with StorTera, empowering this Nova Scotian company to sell Scottish batteries on Canadian soil. The value of this distribution agreement will only grow, said Lutes, for themselves and for Nova Scotia at large, as prices drop and StorTera continues to innovate new products.

Of particular interest is StorTera's so-called "Flow Battery," which relies on an energy dense liquid to store electricity. While existing prototypes still rely on lithium sulfur (three per cent low grade lithium sourced from recycled batteries only), Park said they are exploring new materials altogether, and hope the final product will be entirely recyclable. These Flow Batteries have a 20-year lifespan, and, Park said, will be "significantly cheaper than lithium ion" at scale.

Even as Scottish batteries are being installed in Berwick homes, the community itself is not standing still. Clarke said they are forging ahead with the concept of "solar gardens," in which Berwick residents can invest to receive an equivalent credit on their monthly electricity bill. Rooftop solar arrays are not within everyone's budget, he said, so smaller investments in community arrays would make solar feasible for most residents.

"Our interest in renewable energy has led to an interest in the whole climate change discussion," said Clarke. "The overwhelming scientific evidence... points to the urgency for a change of attitude globally, and to a reduction in greenhouse gases. It seemed only natural for the Town of Berwick to take the initiative locally." *

Zack Metcalfe is a freelance journalist, columnist and author active across the Maritimes.

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ASSET STEWARDSHIP

Value-based decision-making supports TransLink's vision. By Llewellyn Fonseca

sset management is common in asset intensive industries, such as utilities, mining, oil and gas, municipalities, and mass-transit; and is now well-recognized globally as part of standard engineering and business practices. Successful organizations that have institutionalized asset management ensure that their assets provide maximum value to the organization and their stakeholders.

The decision-making process for optimizing the value from investments requires a careful balancing act, especially at the political level where one must balance requests from constituents for new "shiny" projects and services with ensuring that existing customers and services are not neglected. Asset management provides a well-articulated and documented justification to ensure that the desired levels of service are maintained. Additionally, asset management provides assurance that the organizations' assets will fulfill their intended functionality throughout their lifecycles at an acceptable level of risk.

The Metro Vancouver region contends with a growing population—over one million new residents are expected by the year 2050—aging assets and infrastructure, climate change, technological advances, and questions around sustainable funding sources. Our leaders and elected officials will need to continue making hard decisions and weighing trade-offs. Technical requirements, supported by asset management and renewal analysis, ensure that levels of service are maintained, but service expansion identifies the investment requirements for additional vehicles, infrastructure and resources to meet forecasted service increases. Structured value-based decision-making provides clear guidance in alignment with the overall strategy and vision.

TransLink, along with its operating companies and subsidiaries Coast Mountain Bus Company, British Columbia Rapid Transit Company Ltd. (SkyTrain), West Coast Express Ltd. and Metro Vancouver breaking ridership year-over-year (leading up to the pandemic), combined with substantial planned network growth for mass-transit light-rail services and staff retirement requires proactive and regular structured decision-making for investment planning and prioritization.

Stewardship of assets

TransLink's Corporate Asset Management Strategy (CAMS) program was established to foster proactive asset management and build cross-enterprise partnerships to best support the organizational vision and ensure customer-focused, value-based investment decisions. The objective of the program is

Structured value-based decision-making provides clear guidance in alignment with the overall strategy and vision.

Transit Police, is financially responsible for managing an integrated regional transit network, including roads and bridges. TransLink continues to provide value to our customers through a great customer experience, including increased services that are safe, reliable and convenient, technological advances that improve services, and information that is accurate, timely and accessible. However, recordto effectively and efficiently deliver our corporate priorities to ensure enterprisewide stewardship of our assets.

The initial focus of the asset management program was to build momentum, education, and a common understanding of the enterprise-wide asset management initiative within TransLink. By leveraging readily available data and information, the intent was to collaborate and sustain a Transit

cross-enterprise partnership and provide our senior leadership with visibility and confidence in our organization's asset management capabilities.

One of our most successful initiatives has been our decision-support tool (DST) framework, which is used to support investment planning and prioritization by consistently evaluating a broad range of capital project requests on an annual basis. As a public agency committed to our customers, maximum value is achieved when our projects and programs align with the organizational vision and strategies. This vision includes definition of our corporate priorities, core business drivers or expectations of a transportation agency, organizational risk tolerance, and the levels of service expected by our customers.

As an example of optimizing the value from capital projects, major projects and public commitments (such as a new operations and maintenance center) or projects that are part of our corporate priorities and core business (like the replacement of customer-facing escalators) would provide multiple benefits and higher enterprise value, justifying their priority for funding. Additionally, the DST framework assesses the overall maturity and total enterprise-wide benefits of a proposed project. This implies that projects with a poorly defined scope, schedule or budget, or those pending the completion of a business case to justify the requested funds should be deferred or reconsidered later in the year.

Getting buy-in from stakeholders

With multiple competing interests for the same pot of limited capital funds, TransLink established an objective scoring criterion to evaluate and prioritize capital funding requests on a consistent basis. In alignment with asset management best practices, the scoring criteria were determined by the key drivers for business value across the organization. The DST framework is a strategic level objective framework that provides a transparent and structured means to identify the enterprise-wide business value of all projects and programs that are submitted as part of the annual capital planning process.

The framework examines how well the underlying business case for the project addresses the agency's strategy and policy initiatives, the impact on the customer experience, business effectiveness, safety and security, environmental and financial responsibility, and other factors. Through the development of this process, TransLink has determined/ established/ confirmed/ prioritized strong alignment of corporate goals, buy-in and support across the enterprise, justification for changes to prior processes, and the importance of engaged stakeholders. on a portfolio basis taking into account key organizational constraints, such as budget availability, human resources, operational impacts, project interdependencies and so forth. The reason for the split between value assessment and portfolio optimization is to provide our senior leadership with an opportunity to change the constraints. For example, if there is a resource constraint, they can recommend the hiring of more employees or contracting the service out. Alternatively, they could recommend moving forward with projects that have a lower organizational value but are still important to a specific operating company or subsidiary.

As with the implementation of any new business process, the key challenge was ensuring constant and consistent communication about the rationale behind the DST framework. During the first few years of using the DST framework, all stakeholders involved in the capital

The main benefit of implementing the DST framework within the capital planning process is the support provided to our senior leadership for structured decision-making.

The DST (*see figure above*) is intended to help inform a broader investment planning process where needs are identified and validated by the specific operating company and subsidiary, solution options are developed and justified in a business case/ feasibility study/assessment, and preferred solutions are assessed for overall business value (i.e. where DST is used).

After value assessment (DST), preferred solutions are then prioritized/optimized

planning process needed to be reminded of the following:

- The DST assessed enterprise-wide value; hence a project that may be important to a specific stakeholder group does not automatically mean higher value.
- The DST valuation is a prioritized list of capital solutions assessed for business value; hence it is not recommended to define a 'cut-off' line for the list of capital projects.

Asset investment planning and enterprise portfolio decisions need to support decisionmaking based on the total lifecycle of the assets (i.e. optimizing capital and operating expenditures, performance and risk) and across different time horizons. Consider the following scenarios that may apply to any organization:

• A batch of vehicles are scheduled for replacement only in at least another couple of years; however, the number of unplanned maintenance issues are increasing, resulting in lower overall performance of the asset. This implies that it may be cost effective and of higher value to replace the vehicles this year instead of waiting another year.

2 A production facility that has a scheduled roof and HVAC system replacement within two or three years of one another. Again, the value of combining the two projects and undertaking the work as at the same time is cost effective and efficient, leading to a higher enterprise value.

3 As noted in the graphic, any netnew business initiatives or projects that are aligned to an organization's overall strategic goals would also influence their enterprise value. Examples could include an organizational priority to utilize renewable energy to support operations, or leveraging technological advances to support business process improvements.

The main benefit of implementing the DST framework within the capital planning process is the support provided to senior leadership for structured decision-making. With the entire capital program assessed for business value, the conversations and debate between our decision-makers has shifted to understanding the benefits of the capital solutions versus just the importance and urgency of individual projects; especially for projects that did not score high within the DST value assessment. Additionally, the benefit of using a structured and consistent framework to justify our capital program has become even more apparent during these uncertain times, when "business as usual" has been disrupted, but the strategic vision and purpose of the organization has remained the same-providing essential public service to the Metro Vancouver region.

Value based decision-making

Asset management is a multidisciplinary

approach that is valuable and relevant to employees across the organization – it is not just for engineers or maintenance personnel. Executive leadership needs to be confident in justifying their investment recommendations. Financial and procurement officers need to be transparent and consistent with their decision-making and reporting. Planning, design, engineering, maintenance, operations and project management staff need to understand and rationalize their projects for capital investments. Finally, asset managers need to support the organization with longrange strategic planning and prioritization of investments.

Value-based assessment of capital projects integrates the long-term requirements of an organization with the short-term business priorities across the entire lifecycle of the organizational portfolio to ensure consistent decision-making. *

MORNINGSTAR DBRS

Llewellyn Fonseca, MBA, P.Eng. (non-practising) is senior manager, corporate asset management, project management office, with TransLink.

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Contracts Awarded for the Réseau express métropolitain

2021 Top100 Projects Rank: 11 Value: \$6.32 billion

The governments of Quebec and Ottawa have reached a \$600-million deal to fund a link connecting the Montreal-Trudeau International Airport to the city's new light rail system.

Under the agreement, the airport authority will receive a \$300-million loan from the Canada Infrastructure Bank, a \$100-million investment from Transport Canada and a \$100-million loan from the Quebec government.

The construction of the Réseau express métropolitain (REM) station at the Montréal-Trudeau International Airport will help reduce traffic congestion and improve accessibility and connectivity to the airport by offering an environmentally sustainable link between downtown Montréal and the airport.

"As Canada looks ahead to economic recovery, transportation and tourism will be vital while we build back better. Our government clearly stated its commitment to ensuring that critical infrastructure projects at Canadian airports was a priority," said federal Minister of Transport Omar Alghabra. "This funding will ensure that Montrealers and all Canadians benefit from an efficient and green connectivity to the Montréal-Trudeau International Airport."

"For Aéroports de Montréal, it was

unimaginable to pass up on a project that will provide a reliable and sustainable public transit option serving the Montréal-Trudeau International Airport, as is the case in all major cities around the world," added Philippe Rainville, president and CEO, Aéroports de Montréal. "The airport station is highly strategic for the REM network since it will not only enhance Montréal's competitiveness but also ensure the attractiveness of the airport for passengers and employees in the community. The REM project is also a structuring project that will benefit the entire Québec community." *****

Top100

For information about the annual Top100 Projects report and event, visit renewcanada.net/top100-projects

Broadway Subway Project Reaches Major Construction Phase

2021 Top100 Projects Rank: 24 Value: \$2.83 billion

Major construction is beginning on the Broadway Subway Project, a 5.7-kilometre extension of the Millennium Line from VCC-Clark Station to Broadway and Arbutus, adding six stations along the way.

Once built, the Broadway Subway will provide people in Metro Vancouver with faster, more convenient and more affordable travel.

The estimated cost of the project is \$2.83 billion, funded and delivered by the Province of B.C. (\$1.83 billion), with contributions from the Government of Canada (\$896.9 million) and the City of Vancouver (\$99.8 million in kind). It is projected to create more than 13,000 direct and indirect jobs during the construction phase.

"This is an exciting milestone for a

critical infrastructure project that will transform the way people travel in and around the Broadway corridor," said Rob Fleming, B.C.'s Minster of Transportation and Infrastructure.

Six new underground stations will connect communities and neighbourhoods to make it easier and more affordable to live, work, shop and access services along Broadway. Once opened in 2025, the commute from VCC-Clark to Arbutus Station will take 11 minutes, saving the average transit user almost 30 minutes a day and relieving congestion along Broadway.

The innovative engineering solution on the project involves drilling and placing vertical columns to support steel plates for the traffic decks. Traffic decks will keep people travelling through the station blocks on Broadway while excavation and construction continues underground.

Later this year, work will begin on the elevated guideway and tunnel portal that will provide access to the underground portion of the new line.

The majority of the line will be built underground using a pair of tunnel-boring machines. This approach, along with traffic decking on Broadway, will minimize the impact on businesses, residents and people travelling to the area. Next year, both machines will have a staggered launch from the Great Northern Way-Emily Carr Station. *

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APPOINTED

Tenpenny

Actual Media Inc., the parent company of ReNew Canada is pleased to announce that **John Tenpenny** is joining the company as editor of ReNew Canada. Tenpenny will be responsible for

managing all editorial content for the print and online offerings, as well as managing the Top100 Projects report and participating in industry events.

"John has an extensive background in B2B publishing. He's an excellent storyteller, and he has experience covering the infrastructure industry," said **Corinne Lynds**, content director of Actual Media Inc.

Denine Das

Infrastructure Ontario (IO) announced the appointment of **Denine Das** as the new head of equity, diversity and inclusion. Das brings extensive experience developing and executing on

equity, diversity and inclusion strategies for organizations, including the Toronto International Film Festival, and most recently, a North American retailing, manufacturing and distribution company. A community advocate and educator, Das has spent her career building sustainable EDI plans, programs and policies that drive longterm cultural change and empower employees to achieve their full potential.

"As an organization, we have placed equity, diversity, and inclusion at the center of our corporate values," said **Michael Lindsay**, president and CEO at IO. "Through a thoughtful and candid review, undertaken by our employees in 2020, we have come to appreciate how much remains to be done to ensure our workplaces are free of bias. Given Denine's proven track record, she is well-suited to provide leadership to move us forward and help catalyze wider change in our industries."

Mark

Romoff

The Canadian Council for Public-Private Partnerships (CCPPP) announced that **Mark Romoff** stepped down as president & CEO on May 31. During his tenure, Romoff earned the trust and

confidence of governments at all levels across Canada, Indigenous communities and the private sector, establishing CCPPP as the collaborative organization of choice to raise awareness, acceptance and greater adoption of the public-private partnership model. He is known nationally and internationally for celebrating and promoting Canada's remarkable P3 track record. He elevated the Council's award-winning annual conference into a "must attend" industry event.

"It's a difficult decision to leave such an amazing organization that I have been enormously privileged to serve. I am especially proud of what our strong and dedicated team accomplished, positioning the Council as the 'go to' organization on P3s for governments, industry, the media and the research community both at home and abroad," said Romoff. "The Council is a vibrant, unique and much valued place where leaders in the public and private sector can work together to find innovative solutions to the most pressing infrastructure challenges facing Canadians."

Mark Bain, chair of the CCPPP Board of Directors, said: "Our Board appreciates Mark's strong contribution over the past 10 years and in particular, over the turbulent past 12 months. Mark has worked hard to engage with our stakeholders and emphasize the need for sustained and disciplined infrastructure investment and public-private collaboration both during the pandemic and as we emerge from it. Mark has positioned the Council for continued success as the leading Canadian P3 organization and he will be greatly missed."

WSP announced that **Marie-Claude Dumas** has been named president and CEO of WSP in Canada. Since joining WSP in January 2020, Dumas has served as global director of

Marie-Claude Jan Dumas

major projects and programs, executive market leader in Quebec, working closely with Canadian and global operations and leadership.

A member of the Ordre des ingénieurs du Québec, Dumas brings a proven track record as a global engineering and construction executive with over 20 years of multi-disciplinary management and consulting experience acquired with several multinationals.

"As we have entered the last year of our strategic cycle, we are confident that Marie-Claude's extensive technical background, combined with her track record in major project delivery, will set the foundation for sustained growth at WSP in Canada, in addition to capturing the benefits offered by the Golder acquisition," said **Alexandre L'Heureux**, president and CEO of WSP.

"After witnessing first-hand the undeniable talent and level of expertise of WSP in Canada over the past year, I am proud to continue to work alongside the Canadian leadership team as we pursue the organization's strategic ambitions to further our client-centric approach and people development initiatives," said Dumas.

Loveless

Premier of Newfoundland and Labrador **Andrew Furey** announced **Elvis Loveless** as the new minister of transportation and infrastructure, and minister responsible for the

public procurement agency.

Loveless is a public administrator who represents the electoral district of Fortune Bay-Cape La Hune in Central Newfoundland. His path to government included community service, commerce and business-related work experience, and several years of post-secondary education in business administration and public administration. He previously held the position of Minister of Fisheries, Forestry and Agriculture.

"I am confident that our team is up to the challenge of building a better, brighter future for our province," said Furey. He added that his vision for the province includes fostering new technology, improving healthcare infrastructure and services, and a transition to renewable energy infrastructure.

AECOM announced the appointment of **Gianpiero** (JP) Vancheri as operations manager for the Greater Toronto Area's (GTA) Water business unit. Reporting to the Water

Gianpiero Vancheri

Director of Operations, Vancheri's main responsibilities will be to provide day-to-day business leadership, oversight and direction for water projects and programs across the GTA.

"JP's extensive experience in successfully managing budgets and schedules on complex projects and addressing stakeholder concerns will help advance our growth strategies in the GTA," said **Ian Dyck**, AECOM Water business line leader for Canada.

Vancheri is a structural engineer with over 18 years of experience in the design and construction of structural components for wastewater, water, municipal and urban development projects. His portfolio includes large diameter tunnels, wastewater treatment plants and pumping facilities.

"I'm excited to join AECOM and be part of a team of water experts who are focused on executing tailored solutions for GTA municipal clients, many with whom I've established strong and trusted relationships over the years," said Vancheri.

People

Paul Knowles

Myke Badry

PCL Construction announced that **Paul Knowles** has been appointed new vice president and district manager for PCL's Ottawa district and **Myke Badry** will succeed Knowles as the district manager in the Regina office.

Reporting to **Todd Craigen**, president, Eastern Canada, Knowles will

provide oversight to the district and will be responsible for operations throughout the Ottawa region. He has been with PCL for 23 years, joining PCL Edmonton in 1997 where he served in various capacities before transferring to Calgary in 2006 where he progressed from the role of senior project manager to manager special projects to operations manager. In 2017, he was promoted to district manager in PCL's Regina district.

"I'm excited to be in Ottawa joining a district that is home to an amazing team of construction professionals," said Knowles. "It's an honor to take a leadership role with this talented team that continues to build upon Ottawa's iconic footprint."

Badry will report to **Kris Hildebrand**, president Western Canada, and will assume responsibility for all PCL operations in the Regina and southern Saskatchewan region.

In 2007, Badry joined PCL in Edmonton as a project coordinator and has been involved with such notable projects as the Edmonton South Light Rail Expansion, the Anthony Henday & Stony Plain Road Interchange and the Stantec Tower & Sky Residences. In 2019, he was promoted to operations manager in Winnipeg.

"I am excited to be in Regina and am looking forward to carrying on the longstanding PCL history in this community where the roots of our company first took hold over a century ago," said Badry.

Brandy Giannetta The Canadian Renewable Energy Association (CanREA) announced **Brandy Giannetta** as its new vice president – policy, regulatory and government affairs.

Giannetta has been in a senior policy role with CanWEA/CanREA for eight years, most recently as senior director, Ontario and Atlantic Canada. She will now lead CanREA's policy team in its effort to create new market opportunities in our priority jurisdictions. *

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ELECTRIC FERRY A FIRST FOR ISLAND AIRPORT

By Robert Poirier

PortsToronto, owner and operator of Billy Bishop Toronto City Airport is converting the airport's Marilyn Bell I passenger/vehicle ferry to electric power. This innovative retrofit represents a unique technological advancement in the airport's fleet as the vessel will be the first 100 per cent electric lithium-ion powered ferry in service in Canada. Originally to be completed by the end of 2020, work was delayed to 2021 due to work stoppages related to COVID-19.

The vessel's propulsion system will be entirely powered by battery and fueled by 100 per cent Bullfrog Power renewable electricity, enabling the electric-ferry to eliminate greenhouse gas emissions from the airport's ferry operation. In addition to operating more efficiently and eliminating related air emissions, the retrofitted vessel will build on the airport's award-winning Noise Management Program, as it will operate far more quietly, dramatically reducing related noise in the surrounding community.

As part of PortsToronto's sustainability program, a phased approach to greening the airport's ferry operations began in 2018 when the Marilyn Bell I was converted from diesel to bio-fuel, which resulted in the reduction of approximately 20 tonnes of greenhouse gas emissions last year. The electric-powered ferry is expected to reduce greenhouse gas emissions associated with ferry operations by 530 tonnes, significantly reducing the airport's carbon footprint and setting the organization on a clear path toward achieving PortsToronto's overall emissions target.

In compliance with PortsToronto's Sustainable Procurement Policy. three Canadian companies that share PortsToronto's vision for sustainable operations have been selected to collaborate on completing the ferry retrofit. As developers of the winning concept and proposal, St. Catharines-based CANAL Marine are the prime designers for this project. On board as the project naval architect is Concept Naval, Quebec-based naval architects and marine engineers, recognized for their innovative and customized solutions in Canada's shipbuilding industry. PortsToronto has also engaged Nova Scotia-based E.Y.E marine consultants to assist with the implementation of the project.

"CANAL is proud to be delivering the first completely zero-emission Ro-Pax ferry in Canada," said Shawn Balding, CANAL Commercial Director. "This is an important step in the evolution of the marine industry made possible by maturing advancements in energy storage and power and propulsion system design."

The airport's ferry operation not only transports passengers, airport staff and essential supplies to and from Billy Bishop Airport, but serves as a vital link for City of Toronto service vehicles to gain access to the Toronto Islands. The conversion of the airport ferry to electric power is one of Billy Bishop Airport's key capital projects and will cost approximately \$2.9 million. *

Robert Poirier was the chair of the PortsToronto board of directors from August 2015 until April of 2021. He is also a board director at Metrolinx.

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