

THREE YEARS IN:

\$42 BILLION

SPENT OR ALLOCATED

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nEight is proud to sponsor *On-Site's* 2019 Infrastructure Report issue. As a leading developer of construction project management software, InEight has a rich history of partnering with Canada's owners, contractors and engineers to help them overcome their infrastructure project challenges.

With the federal government committing \$190 billion dollars to infrastructure, and upwards of 48,000 projects underway across Canada, it's never been more important for the construction industry to embrace the benefits of technology.

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Sincerely,

Jake Macholtz Chief Executive Officer, InEight





n the early morning hours of June 24, a few minutes before sunrise, a small convoy of cars drives slowly across the freshly paved asphalt deck of Montreal's new Samuel de Champlain Bridge.

With the deep blue of twilight still dominating the sky, the official first crossing of the 3.4-kilometre span marks the end of just over four years of dedicated work to replace the aging cantilever bridge now sitting

in its modern counterpart's shadow.

At peak, about 1,600 workers were on-site assembling the new bridge, which is expected to stand 125 years, twice as long its relatively short-lived predecessor erected in the 1960s. With a striking cable-stayed design that employs 600 box-girders and a main pylon extending 170 meters (nearly 560 feet) above the St. Lawrence River, the new bridge was a monumental undertaking.

As it so often is with major infrastructure work, however, meeting expectations is easier said than done.

The bridge opened to traffic six months behind schedule and about \$235 million over its original \$4.2 billion budget.

A few final pieces remain, most notably the reconfigurations of several highway links and the bridge's central pedestrian and cyclist path, but all work is scheduled to









About 100,000 directly or indirectly employed



wrap up by the end of October.

Though it was sanctioned in 2015, before the introduction of the much-touted Investing in Canada Plan (IICP), the Champlain Bridge has been among the largest infrastructure jobs underway across the country in recent years.

Still, as the federal infrastructure plan has picked up steam, crews in Montreal have had plenty of company in cities and

towns across the country. Ottawa has put shovels in the ground or allocated funding for 48,000 separate projects since the outset of its wide-reaching infrastructure plan in 2016, with many more to come. All told, the federal government has spent or allocated \$42.3 billion for infrastructure work, according to the most recent available data released this May.

"One-quarter of the way through the

plan, the government has invested more than one-quarter of its commitments to communities." Infrastructure Canada savs in a statement. "That's on time and on track."

Initially introduced as a \$180 billion plan, several years of revisions and additions have seen that figure climb to approximately \$190 billion.

Among the high-profile projects already

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funded are subway extensions in Vancouver and Montreal, and new light rail transit lines in Calgary, Edmonton, Montreal, Toronto and Surrey, B.C. While multibillion-dollar transit projects dominate the top end of the list, the federal funding is available for everything from small-scale wastewater and sewer upgrades to local hockey arenas.

THE BIG PICTURE

The 12-year infrastructure initiative has helped kick-start thousands of projects, but it's also faced challenges meeting its targets from the outset.

In Budget 2019, released this spring, the federal Liberal government admitted, "The pace of spending under the Investing in Canada Plan has been slower than originally anticipated." For the delays, it blamed lapses between construction activity and claims for federal dollars, as well as "some" jurisdictions for being slower to move on projects than expected.

The plan has moved undeniably forward, but the progress has not always been smooth.

In last year's budget, for instance, Ottawa pushed back billions in funding originally allocated for between 2018 and 2024 to the tail end of the 12-year plan. The funds remain on federal books, but won't be spent until well into the next decade. This year, the government announced a one-time, \$2.2 billion top up to the Federal Gas Tax Fund, which is doled out to pay for municipal infrastructure. The move gave cities a shot in the arm while

skirting the provinces, which Ottawa has accused of holding up spending.

Moving forward, it's clear the federal government must work more closely with other levels of government and Indigenous communities, which together own more than 98 per cent of all Canadian public infrastructure, to ensure a more consistent flow of funds. It tacitly admitted this in February by simplifying the application process and creating a new online portal for submissions.

Since implementing these changes, Infrastructure Canada pointed to a new water treatment plant in B.C.'s Comox Valley and new internet service infrastructure in Quebec's Laurentian region as two examples of how the better streamlined approval process has translated into results.

LOOKING FOR TRACTION

As funds continue to leave government coffers, the Canadian Construction Association (CCA) remains firmly behind the spending plan, but would like to see more progress.

"What we are concerned about is the flow of funds and that it is taking longer than really anybody could have imagined – particularly the wave two of the investments, which were set out in 2018," says CCA President Mary Van Buren. "As of right now only two provinces, B.C. and Alberta, have commitments of greater than 50 per cent of the funds in place [for Phase 2] and the remaining provinces range everywhere from zero to about 25 per cent."

Still, Van Buren admits that with such





\$3.8
BILLION

DIVERGENT PATHS

Municipalities and provinces have headed into starkly separate directions on infrastructure since the introduction of the 12-year IICP.

In its most recent report on the infrastructure initiative, the Parliamentary Budget Officer (PBO) pointed to a "clear difference" in how the two lower tiers of government have backed up federal funds. "It appears the IICP has contributed to increase municipal capital spending, but not provincial capital spending," Yves Giroux wrote in the report this May.

According to the PBO's calculations, municipalities have stepped up funding, contributing a combined \$1 billion more to infrastructure than they would have if the federal plan had not been implemented.

Provincial capital spending, on the other hand, has been below budget since the start of the IICP. The PBO says without the slew of new infrastructure programs from Ottawa, provinces would have spent \$3.8 billion more.



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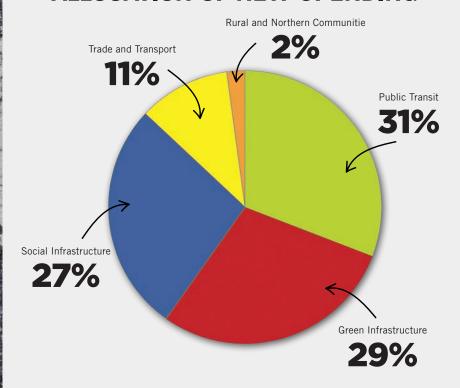
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ALLOCATION OF NEW SPENDING



a complex process, the fixes aren't always simple. "There's no silver bullet," she says. "One of the lessons out of this is just how much time it takes to get municipalities ready. So, it's one thing to put money on the table, it's another for the municipalities to put together their project plan, then to get them approved by the province, to get them approved by the [federal] government, then go through the whole procurement process, choose their partners and then put the shovels in the ground."

Taking note of some of the issues that have hampered the 12-year plan, the CCA has begun pushing Ottawa to lay the groundwork even further ahead next time around. A 25-year plan would take into account how long it takes to get the building cycle working, Van Buren says. The longer-term commitments could also smooth out some of the usual turmoil that follows government turnover.

Matt Jeneroux, the federal Conservative shadow minister for Infrastructure, Communities and Urban Affairs, is less forgiving in his analysis of the first few years of the Liberal spending plan.

"I don't know of any stronger adjective to say than it's been a complete failure of a plan," he says, pointing to lots of "hype" but too many delays and not enough focus on rural communities.

"I just think the government's had four years to, they say, build infrastructure and it seems to be shifting to a message of hope and aspiration in the first two years and now basically a message of blaming provinces and anyone else that seems to get in the way," Jeneroux says.

Unsurprisingly, Infrastructure Canada sees things differently. The department says it's made "significant progress and delivered concrete results" that have benefited Canadians across the country since 2016, adding that it sees building modern, resilient and green infrastructure as a "generation-defining challenge."

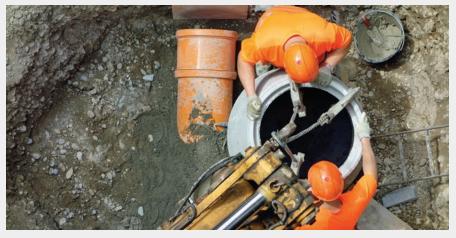
"The government will continue to work in partnership with provinces, territories, municipalities and Indigenous communities... to ensure that they have the transformational infrastructure they need to build strong, resilient communities, while creating new economic opportunities for Canadians," the department says.

THE \$35 BILLION QUESTION

One long-idle piece of the Liberal infrastructure plan that finally dropped into place 12 months ago was the Canada Infrastructure Bank (CIB).

The crown corporation designed to draw private investors into spending on infrastructure made its first move last August, loaning Montreal's Réseau express métropolitain (REM) project nearly \$1.3 billion. It followed that up by extending a \$2 billion debt financing package to the Toronto-area's GO Regional Express Rail On-Corridor project this May. Even more recently, it made two smaller investments of \$55 million and \$20 million in Ontario and Quebec.

Nevertheless, critics remain skeptical. With a \$35 billion investment target by 2028 and only several billion doled out so far, the CIB needs to get moving. Jeneroux notes that the bank – with its focus on getting private capital involved in infrastructure – was one aspect of the IICP the Conservative Opposition initially saw as promising.





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"It looked like it was going to be a unique way to infuse private money into infrastructure and get things built," he says. With the institution now established, however, Jeneroux is critical of the CIB's added mandate of concentrating on "transformative" projects and its focus – at least so far – on urban projects and not rural communities.

Van Buren, meanwhile, is keen to give the fledgling bank more time.

"It's just getting going and starting to figure out its role and how it can help de-risk some of these very complex projects," she says. "We think that's really important to continue."

While the Liberal's public infrastructure commitments, the CIB included, played an important role in the 2015 election campaign, at this early stage of the 2019 race, highways, bridges and sewers appear more likely to be a backburner issue.

Private infrastructure, on the other hand, may play a starring role.

TESTING THEIR RESOLVE

Energy infrastructure, most notably pipelines, has been a divisive issue across Canada for years.

Proponents of new pipelines argue they are vital to Canada's economy, while critics claim the risk of spills and the downstream carbon emissions created by crude oil or natural gas transmission systems run counter to the country's interests.

The years-long battle over the project to

VALUE OF APPROVED PROJECTS

PROVINCE

TROVINGE	
Alberta	\$6.5 B
B.C.	\$5.6 B
Manitoba	\$2.2 B
New Brunswick	\$716 M
Newfoundland and	
Labrador	\$584 M
Northwest Territories	\$527 M
Nova Scotia	\$945 M
Nunavut	\$574 M
Ontario	\$12.2 B
P.E.I.	\$241 M
Quebec	\$6.7 B
Saskatchewan	\$1.3 B
Yukon	\$621 M

twin the Trans Mountain pipeline between Edmonton and Burnaby, B.C. encapsulates the stark divide.

The federal government purchased the pipeline last summer with plans to move forward on the project. The Federal Court of Appeal then quashed the approval in August 2018.

A year later, the pipeline has been reapproved, but with construction poised to restart, opposition groups are preparing to launch fresh challenges.

The reapproval of Trans Mountain and the ramp up of construction on an approximately \$40 billion liquefied natural gas facility in Kitimat, B.C. are encouraging signs from a construction standpoint, but if the past few years of court challenges are any indication, neither project can be considered entirely in the clear.

By backing the pipeline, but also remaining committed to a carbon tax, the Liberals continue to attempt to straddle the two camps. At the same time, the Conservatives have established themselves as in favour of more energy infrastructure and against the carbon tax in its current form. Leader Andrew Scheer also recently revived the idea of establishing a cross-country energy infrastructure corridor where projects would be preapproved.

The federal NDP swings the opposite way. It recently slammed both the pipeline reapproval and the current carbon tax, which is claims "doesn't make the biggest polluters pay." The Green Party is against all new raw bitumen export projects, including Trans Mountain.

The issue could well determine the fall election. The latest polling from the Angus Reid Institute shows the environment and climate change issue, in which energy infrastructure plays a prominent role, is the top concern for voters.

Stakes for construction are high. Along with tens of billions on the line in the energy industry, a new government could mean changes, for better or worse, to the IICP, which is scheduled to run through 2028.

As parties hit the campaign trail, Van Buren says the CCA wants to see a commitment to both the CIB and the \$190 billion infrastructure plan from all parties heading into the fall election. \square

BIG TICKET PROJECTS COAST TO COAST

PROJECT	PROVINCE	ESTIMATED COST
Muskrat Falls Generating Project	Newfoundland and Labrador	\$12.7 billion
Site C Dam	British Columbia	\$10.7 billion
Eglinton Crosstown LRT	Ontario	\$9.1 billion
Keeyask Generating Station	Manitoba	\$8.7 billion
Réseau express métropolitain (REM)	Quebec	\$6.3 billion
Gordie Howe International Bridge	Ontario	\$5.7 billion
Green Line LRT	Alberta	\$4.7 billion
Samuel de Champlain Bridge	Quebec	\$4.4 billion

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Urban transit projects roar to life, creating opportunity for Canada's construction sector

BY: JILLIAN MORGAN

orking in tandem along a stretch of highway in Montreal, a pair of launching gantry cranes hoist 50-ton concrete segments into the air off flatbeds below. The gantries slide the prefabricated segments into place, steadily forming a single 30-metre span over the course of two days.

The three-year journey has just started for the cranes, affectionately nicknamed Anne and Marie. With the help of construction crews, the massive yellow beams are building more than a dozen kilometres of elevated track on which the Réseau express métropolitain's (REM) rail cars will eventually run.

Come 2023, the gantries will have launched more than 4,000 concrete segments, forming 366 spans of elevated track from Technoparc, near the airport, to the city's western tip of Saint-Annede-Bellevue. Crews will cap off the 14.5 kilometre section as the remainder of the 67-kilometre, \$6.3 billion light rail transit project is built.

The use of launching gantries is unprecedented in Quebec's construction

market, which hasn't embarked on a public transit project of such magnitude in the more than 50 years, since work began on the Montreal Metro.

"We have a lot of diversity of work to do. It's going to be a pretty rich experience for everybody who's going to be in touch with this project," says Jean-Vincent Lacroix, director of media relations for the REM. "It's pretty rare to have so much different kinds of work and so much different kinds of workers that are on the same project."

The construction consortium taking on the project, comprised of SNC-Lavalin Group Inc., Dragados Canada, Aecon Group Inc., Pomerleau and EBC Inc., have been operating at full throttle to build the ambitious light rail network since April 2018.



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PHOTOS: R



Above: A total of 15 pillars will stretch along highways 10 and 30 in Montreal, part of the Rive-Sud terminal station sector on the South Shore.

Left: Excavation work underway on the Édouard-Montpetit Station in downtown Montreal, which will extend 70 metres below ground level. Once complete, it will be the one of the deepest metro stations in North America.

This momentum for transit work isn't confined to the Greater-Montreal area.

With some credit owed to the steady flow of infrastructure funding from Ottawa and commuter demand for public transit, projects across Canada have gathered steam, unlocking opportunities for the workers bringing those structures to life, says Marco D'Angelo, president and CEO of the Canadian Urban Transit Association (CUTA).

"It's going to be huge for the Canadian construction industry," he says. "I think there's really an opportunity here for the construction sector to be building transit and I think it means good things in terms of jobs and great things for the economy."



INVESTING IN TRANSIT

Once gathering dust, plans for proposed transit infrastructure and network expansions in cities across Canada have taken major steps forward in recent years thanks to newly available funds.

The federal Liberal's \$190 billion infrastructure plan, underpinned by provincial and municipal investments, is one stream giving some long-sought transit projects a leg up, D'Angelo says.

In July, Prime Minister Justin Trudeau committed \$1.3 billion to expand Montreal's Metro, effectively green lighting the project decades after it was first promised to the city's commuters. On the West Coast, Trudeau pledged \$1.4 billion in 2018 for two "long overdue" projects to extend Vancouver's SkyTrain transit network and construct an LRT system in Surrey, B.C. Construction of Calgary's Green Line LRT and the expansion of two Edmonton LRT networks are among the other projects to secure more than a billion dollars from the federal government over the last few years.

"We're really just starting to see those funds and projects get underway," D'Angelo says. "It's been very helpful for local transit systems to look at the backlog that they have in terms of their capital needs, look forward to a state of expansion."

The long-awaited dole out of funds from the Canada Infrastructure Bank (CIB) – first floated in 2016 – has also helped get more transit projects off the ground, D'Angelo adds.

Designed to attract private sector investment for public infrastructure projects, the crown corporation inked its first deal in August 2018, loaning \$1.3 billion to Caisse de dépôt et placement du Québec, the pension fund manager delivering the REM.

In June, the CIB entered its second agreement, committing \$2 billion to expand Ontario's GO Transit network. President and CEO Pierre Lavallée says the need to bolster public transit is evident coast to coast.

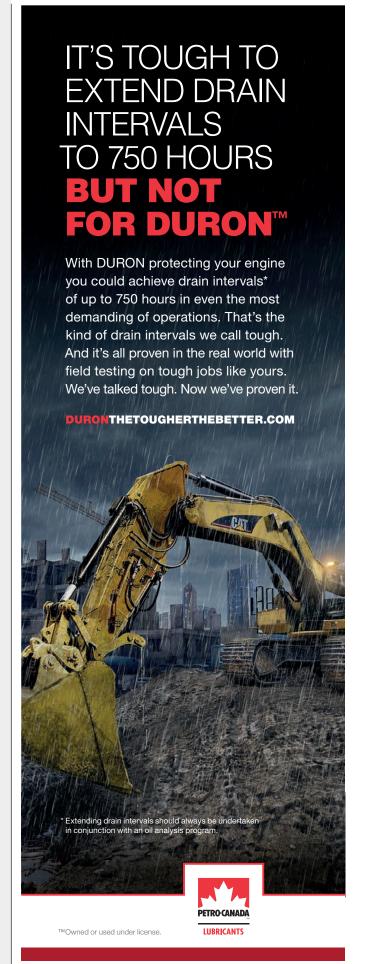
"There are major LRT projects underway in a number of places across the country. Some of them haven't started being built yet, some of them have one phase or two phases of work done, but there's always the next phase," Lavallée says. "I foresee that over the next nine years of our investment period, there will be many more opportunities for us to invest in building new transformational urban transit infrastructure for Canadians."

Gordon Lovegrove, an associate professor at the University of British Columbia School of Engineering, says investing in transit projects offers considerable payback.

"Every buck we invest in transit infrastructure, we're getting three to four to 20 times back," Lovegrove says. "In response to people who say the funds going to transit could go towards improving highways: let's flip that on its head. Let's look at the opportunity benefits of transit – climate change, safety, aging in place, eco-tourism, travel time... Communities that spend more on public transport free up so much of their economic funds, they have a higher quality of life, bar none."

In a recent CUTA-commissioned survey, Canadians in Vancouver, Calgary, Winnipeg, Toronto, Montreal and Quebec City were polled on public transit. Just under 90 per cent of respondents called on governments to invest more in public transit that reduces congestion and greenhouse gas emissions.

"The cost of congestion is dictating billions of dollars per





year right across the country," Lovegrove says. "We're running out of space, and we can't afford to build our way out of congestion anymore."

BUILDING FOR THE FUTURE

Mapping out transit networks that can meet commuter demand in swelling Canadian cities requires long-term thinking.

"It's really an opportunity here to develop transit for the next generation," D'Angelo says. "Looking down the road to see what the needs of our cities are from 2030 to 2050... Many of our bigger systems are already putting out plans like that."

Vancouver's TransLink is one transportation agency plotting out its future. The transit authority launched consultation for its 30-year strategy – Transport 2050 – in May, calling on the public to envision the possibilities for Metro Vancouver's commuters.

The decades-long plan aims to account for new technologies, shifts in the global economy and the impacts of climate change on transportation. For Colin Earp, national transport leader at KPMG Canada, that generational transformation is already underway.

"When we're starting to think about what the transit services for the next 40 [or] 50 years looks like, you have to understand how urban centres and rural communities are going to act in the future from a smart perspective," he says.

The move towards urbanization has had a marked influence on transit development in Canada and globally, according to Earp. Though, there are a number of other factors reshaping transit across the country, he says. Autonomous vehicles, alternative drivetrains and electrification are poised to "critically change" transit, along with intelligent infrastructure and smart cities. Commuters are also more likely to use multiple modes of transport going forward, and transit infrastructure will need to evolve to meet that need.

Delivering those projects will require greater collaboration between the public and private sectors.

"The cost of building transit and big transport projects continues to go up because the scale of the projects [and] the complexity of delivering," Earp says. "Understanding the whole lifecycle cost means we need to take a much more portfolio view of, 'What are the outcomes from a public sector [perspective] that we're looking for?""

Sustainability plays a key role, too, with many urban transit systems working to lower Canada's environmental footprint. The fully electric REM, for example, is designed to emit zero greenhouse gases, reducing emissions by 680,000 tonnes over its first 25 years of operation.

"Infrastructure that facilitates climate adaptation and resiliency, building our electric and alternative fuel infrastructure... those are a couple of complementary areas where the construction industry can take the lead as well in creating the conditions for better transit," D'Angelo says.

KEEPING UP THE PACE

Throughout Greater Montreal, 34,000 trades workers are expected to mobilize to build the extensive REM.

Altogether, crews will construct 18.2 kilometres of elevated track, 26 stations (eight elevated, 13 ground-level and five underground), 14 park and ride lots, 11 bus stations, two maintenance centres, five bridges spanning 1.6 kilometres and 3.5 kilometres of tunnels.

Project teams will coordinate with 11 municipalities, eight boroughs and six public transit authorities, operating in both industrial environments and dense, urban centres.

"We also have to implement all the electronic components, the communication components," Lacroix says. "We always try to present it like a brand new system, a collective system... This is one of the main challenges for our team - to build the infrastructure but to really connect with the technical team that is responsible for this new transport system."

The network's first trains are expected to get rolling in 2021, with the remaining branches coming into service between 2022 and 2023. Once complete, the fully automated light rail network will be one of the largest of its kind in the world after Vancouver, Singapore and Dubai.

"At the end of the day... if it's helping to develop here in

Quebec and in Montreal an expertise for this kind of major transport system or work site or project, it's of course a good thing," Lacroix says.



A rendering of Calgary's \$5 billion Green Line LRT project. Construction is expected to begin in 2020 and run until 2026.

