

A large, modern arch bridge with a white metal structure spans across a wide river. The bridge's arch is supported by a complex network of cables. In the background, a city skyline with various buildings is visible under a blue sky with light clouds. The foreground shows a rocky riverbank and a concrete barrier.

BUILDING OUR URBAN FUTURES:

Inside Canada's infrastructure
and real estate needs



Contents

Foreword /3

Meeting Canada's Infrastructure
and Real Estate Needs /4

Our Approach /6

Looking Back /7

Looking Forward /11

Something to Talk About /14

Preserving Canada's Prosperity /16

Acknowledgements /21

Contributors /22

Foreword

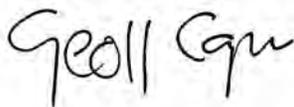
The adverse impacts of Canada's historical underinvestment in infrastructure (the "infrastructure gap") have been well publicized and widely discussed. We know that infrastructure investment is a critical enabler of our collective productivity, competitiveness, and prosperity and, despite significant increases in infrastructure investment over the past decade or so, significant work remains to ensure Canada makes sufficient infrastructure investments to help Canadians maintain or improve their standard of living over the next several generations.

In this report, Evergreen and Deloitte have attempted to scope out the size of the challenge in front of us. Taking a longer term view, we sought to determine how much infrastructure investment Canada will require in the next 50 years and the answer is daunting: between now and 2067, we estimate Canada will need between \$11 trillion and \$22 trillion of infrastructure investment just to maintain our current standard of living – an unprecedented level of sustained investment.

As our work progressed and the sheer scale of investment required became apparent, our conversations quickly evolved beyond the initial question of how much money is required to other more practical matters such as where will it be spent, on what, and how will we pay for it? What choices can we make now to set up for success in the future; to be more resilient, to embrace emerging technologies; to shift habits, behaviours and expectations of society, such that our quality of life, sustainability, and resilience will be unilaterally improved?

We cannot leave these questions to happenstance. Nor can we expect them to be answered by any one individual, organization, or government. This report is the first step in a process that seeks to create a network of responsible, influential individuals and organisations that will provoke the right debate to mobilise government, businesses, and the social sector to collectively and intelligently shape our future for the better, for all Canadians.

That we face a profoundly different future, with more complex, fast-moving, and interdependent challenges is no longer in question. How we go about approaching it however, most certainly is. We must organize a strategy for our future to reinforce this position. The opportunity is ours and the time is now, on the heels of a global disruption that calls into question many previously held facts. With the right leadership we can shape a collective strategy, coordinate private and public actions, and set in motion priority investments, starting today.



Geoff Cape
Chief Executive Officer, Evergreen



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National Leader, Infrastructure for Deloitte Canada

Meeting Canada's Infrastructure and Real Estate Needs

Our future prosperity hinges on the decisions we make today

To identify the steps Canada must take to address its infrastructure and real estate needs, Evergreen has teamed up with Deloitte to support the development of this report as part of its Future Cities Canada, a national collaborative platform that harnesses the momentum for change already in progress in cities. Future Cities Canada, of which Evergreen is a founding partner, brings together people, ideas, platforms and innovations from across sectors to address two of the most pressing issues of our time: inequality and climate change and their consequential challenges facing cities.

Context

In 2019, Deloitte assessed the current state of Canada's competitiveness relative to peer countries in its competitiveness scorecard.¹ While the report found that Canada is very competitive on an overall basis, under-investment in infrastructure was identified as a key constraint to our future economic prosperity.² Recent studies have also found that Canada's businesses are making lower capital investments per worker than those being made in peer nations, including the United States.³ These are worrying trends because a lack of infrastructure and real estate investment does more than harm overall productivity – it also threatens Canadians'

income-earning potential and Canada's overall economic growth, leading to a downward cycle of underinvestment for years to come. Thus, it is imperative that we revisit our infrastructure and real estate needs to secure a future of shared prosperity including adequate housing, healthcare, and flourishing standards of living for all Canadians.

To drive economic prosperity, countries need to invest in their infrastructure and real estate. This is critical to ensure sustainable growth across the different regions and sectors of the economy, and to support the living standards of the population

1. <https://www2.deloitte.com/ca/en/pages/finance/articles/canada-competitiveness-scorecard.html>

2. Throughout this report, references to "standards of living" and "economic prosperity" refer to the overall economic welfare enjoyed by a country's residents. From an economic perspective, this concept takes into account the quantity and quality of items that individuals are able to afford given their levels of income as well as access to goods and services delivered by the public sector. Broader measures of this concept also encompass basic human needs (e.g. health care, sanitation, education, and shelter), wellbeing (e.g. technology, accessibility, and life expectancy), and opportunity (e.g. personal rights, freedom of choice, and general tolerance).

3. C.D. Howe Institute, September 2018. "Tooling Up: Canada Needs More Robust Capital Investment," by William B.P. Robson, Jeremy Kronick, and Jacob Kim. https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/Commentary_520.pdf



as a whole. For example, business success hinges on access to purpose-built structures that meet the needs of a rapidly evolving workforce. Domestic commerce and international trade can only thrive if our infrastructure supports the smooth and efficient movement of goods, services, and people. Governments need modern hospitals, schools, and public buildings to deliver critical services. And residents will increasingly require a wider array of social services reliant on built form – from affordable housing and social infrastructure to senior living – across the nation. Moreover, while continued immigration underpins labour force growth as the other key component toward economic prosperity, retaining immigrants will depend on the country's ability to provide strong social services which can only be achieved by making the right investments.

Given the fundamental role of these capital investments, it seems clear that underinvestment in infrastructure and real estate will only undermine our country's competitiveness. If we do not meet the infrastructure needs of our economy and residents, productivity will likely falter, limiting our economic growth and prosperity.

But, what level of infrastructure investment is needed to support an economically prosperous Canada? In particular, as we look ahead over the next 50 years to 2067, how much is enough to maintain, and potentially exceed, our standards of living by then? How much is enough to address climate change and social inequality, maintain the wellbeing of Canadian residents, and accommodate shifting demographics? These important questions are the focus of this report.

Determining the amount of investment required for economic growth is just the first step. This work is the first step in a three-phase foresight project designed in an effort to advance future-focused, responsive infrastructure investment and planning in Canada's urban regions. **Phase 1 has been designed to be a "fire starter"** to showcase the financial investment required over a 50-year horizon, a reasonable timeframe for infrastructure planning. **Phase 2 is already in motion** and involves regional scenario planning to consider future aspirations and risks for building a collective preferred future. **Phase 3 is the action phase**, when we will work across sectors in a more coordinated and aligned way to develop actionable solutions for a more resilient, inclusive future. To set a context for this task, in addition to studying the investment required to meet our country's expanding infrastructure needs, this report also considers several key questions raised by that capital requirement. As with any endemic challenge, however, if there were easy fixes, we would have adopted them already. That's why this paper doesn't purport to provide the answers for how, or from whom, we attain the investment we'll need. Instead, it aims to pose a series of provocative questions designed to spark conversations between businesses, governments, and residents across the country – the groups that will ultimately have to come together to fund our infrastructure needs.

The decisions we make now will not only inform our investments to 2067, they will also reverberate long into the future. We owe it to ourselves – and to the generations to come – to discuss the choices and trade-offs we must make as we chart our path forward.



Our Approach

Working together, Evergreen and Deloitte researchers sought to assess the level of infrastructure and real estate investment the country will need over the next five decades. At the outset of this project, 2067 provided a 50-year period, a sensible timeline for conversations about long-term planning. The assessment began by looking back at past infrastructure and real estate investments (since 1961, the earliest year for which Statistics Canada has records that reconcile with current expenditure categories). This helped us determine our present level of both the private and public sector capital stock of infrastructure and real estate—i.e., the overall value of Canadian residential construction, non-residential buildings, and engineering infrastructure. From there, we looked forward to calculate required future capital investments to maintain our current levels of economic prosperity.

The aim throughout was to establish a baseline that Future Cities Canada and others can expand upon as we begin to plan more seriously, as a nation, for infrastructure and real estate investments. As this report reveals, a massive investment in infrastructure and real estate will be critical if Canada hopes to maintain its economic prosperity and its residents' quality of life.

Looking Back

What's our current infrastructure worth?

To set a baseline for calculating required infrastructure and real estate investments, we began by examining how much Canada's current infrastructure was worth in 2018 (the latest year for which a complete set of data was available). This involved a look back at the past six decades of infrastructure investments by public and private sectors.

Public Sector Investments

Government investment in infrastructure has increased in recent years, although not as quickly as anticipated in federal budget projections. In 2018, we estimate public investment in infrastructure and real estate⁴ has fluctuated between \$43 billion and \$59 billion over the past decade (Figure 1), reaching the upper limit of this range in 2018.⁵ These investments have represented between 2.3 percent and 3.2 percent of gross domestic product (GDP) (Figure 2) annually. And after accounting for demolitions and depreciation, they represent an addition of

(on average) one percent of GDP to the country's existing capital stock.

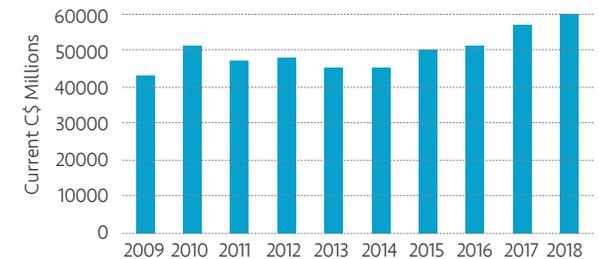
In recognition of imminent infrastructure needs, the current federal government has also committed to spend \$186.7 billion on infrastructure over the next 12 years.⁶ In many cases, federal funds are intended to be matched by the provinces. Additionally, the federal government set up the Canada Infrastructure Bank to attract private sector and institutional investment in infrastructure projects.

INFRASTRUCTURE is defined as the physical and organizational structures and facilities needed for the operation of a society

REAL ESTATE is defined as land, as well as any physical properties (buildings), and related property improvement



Figure 1: Investment in public infrastructure and non-residential structures



Source: Statistics Canada (2019) Infrastructure Economic Accounts.

Figure 2: Public investment in infrastructure and non-residential structures as % of GDP



Source: Statistics Canada (2019) Infrastructure Economic Accounts.

4. Public investment in infrastructure and real estate refers to annual government spending to construct structures (e.g., airports, roads) and improve existing facilities. To obtain these estimates we aggregated certain categories from Statistics Canada, Table 36-10-0108-01, "Gross fixed capital formation, quarterly, Canada (x 1,000,000)." In particular, it includes the following categories: commercial buildings; non-residential institutional buildings (e.g., hospitals, schools); marine engineering infrastructure; transportation engineering infrastructure; waterworks infrastructure; sewage infrastructure; communications networks; electric power infrastructure; oil and gas engineering constructions; and other engineering construction.

5. Statistics Canada, April 11, 2019. "Infrastructure Economic Account, 2018." <http://www150.statcan.gc.ca/n1/daily-quotidien/190411/dq190411a-eng.htm>

6. House of Commons, June 2018. 42nd Parliament, 1st Session. "Update on Infrastructure," The Honourable Judy A. Sgro, Chair. <https://www.ourcommons.ca/Content/Committee/421/TRAN/Reports/RP9972812/tranrp25/tranrp25-e.pdf>

Private Sector Investments

Despite efforts and new imperative in public infrastructure investment, it is by no means sufficient to meet Canada's economic and social needs. Consequently, private sector investment is essential.

Historically, private sector investment in non-residential space has fluctuated considerably – between four and eight percent of GDP (Figure 3). In 2018, we estimate private investment in infrastructure and real estate⁷ was over \$123 billion after hitting a peak of over \$156 billion in 2014 (Figure 4). At the end of 2018, the capital stock of these assets is estimated to have reached \$1.4 trillion⁸, an amount almost three times larger than the value of the public sector stock in these assets.

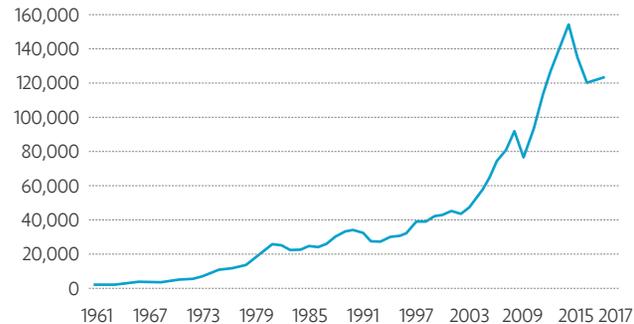
Notably, residential investment⁹ accounts for an even higher proportion of Canada's capital stock – coming in at roughly \$2.5 trillion as of the end of 2018.¹⁰ In the same year, we estimate annual investments in residential construction reached \$136 billion¹¹ and are currently at historical annual highs (Figure 5).

Figure 3: Investment in non-residential buildings and engineering structures (% of GDP)



Sources: Statistics Canada, Haver Analytics, and Deloitte calculations.

Figure 4: Investment in non-residential buildings and engineering structures (million, C\$)



Sources: Statistics Canada, Haver Analytics, and Deloitte calculations.

Figure 5: Investment in residential construction (million, C\$)



Sources: Haver, Statistics Canada, and Deloitte estimates.

7. Private investment in infrastructure and real estate refers to annual business spending to build non-residential buildings and engineering structures as defined in Statistics Canada, *Table 36-10-0108-01, "Gross fixed capital formation, quarterly, Canada (x 1,000,000)."*

8. Statistics Canada, November 19, 2019. "Stock and consumption of fixed capital, 2018." <https://www150.statcan.gc.ca/n1/daily-quotidien/191119/dq191119b-eng.htm>

9. Residential investment represents the amount individuals, enterprises, and governments spend to build new residential dwellings, renovate existing dwelling, or acquire new units.

10. Statistics Canada, November 19, 2019. "Stock and consumption of fixed capital, 2018." <https://www150.statcan.gc.ca/n1/daily-quotidien/191119/dq191119b-eng.htm>

11. Calculations by Deloitte using data from Statistics Canada.

Figure 6: Infrastructure and residential construction, 2009 to 2018

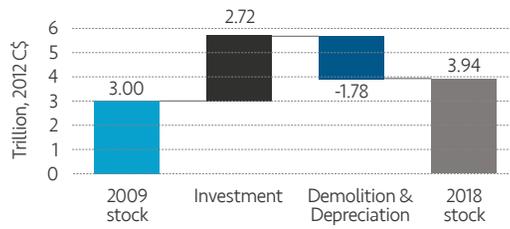


Figure 7: Residential construction, 2009 to 2018

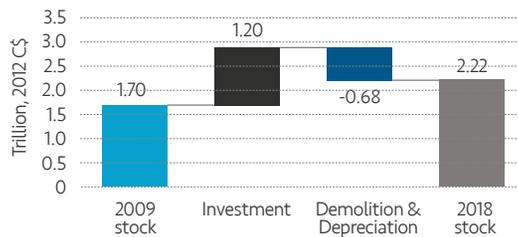


Figure 8: Engineering construction, 2009 to 2018

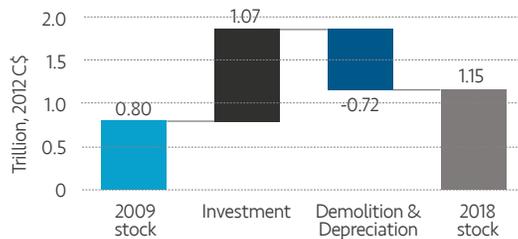
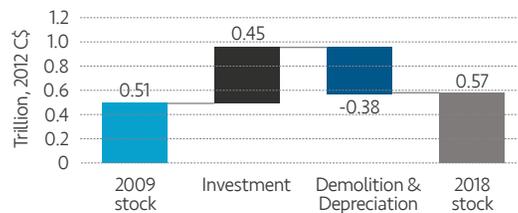


Figure 9: Non-residential buildings, 2009 to 2018



Sources: Statistics Canada and Deloitte calculations.

How it adds up

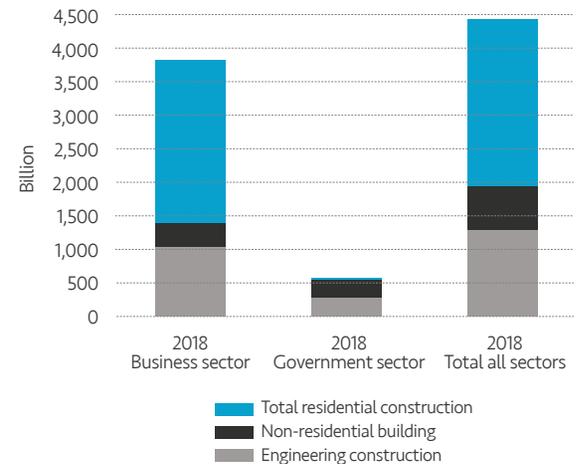
To calculate the total value of Canada’s public and private sector capital stock, we rely on the perpetual inventory method (PIM) which considers a range of variables, including investments made to date, the current value of Canada’s capital stock, and the extent to which those infrastructure assets depreciate over time as structures and facilities age. Keep in mind, too, that the value fluctuates as stock is demolished to make room for new structures, and as existing stock is renovated.

By putting together past public and private infrastructure and real estate investment, we establish just how much Canada’s current capital stock is worth. The PIM demonstrates that the country’s capital stock grew considerably between 2009 and 2018, both in nominal terms and in real terms (when adjusting for inflation and economic price levels, i.e., expressed in constant C\$ 2012):¹²

- The country’s total stock grew by \$940 billion or about 31.0 percent (see Figure 6)¹³
- Residential stock grew by \$520 billion or about 30.6 percent (see Figure 7)
- Engineering construction grew by \$350 billion or 43.8 percent (see Figure 8)
- Non-residential building assets grew by \$60 billion or 11.8 percent (see Figure 9)

What all this means in real numbers is that, in 2018, Canada’s capital stock was worth \$4.5 trillion (Figure 10). Notably, between 2009 and 2018, roughly 65 percent of all infrastructure investment covered demolitions and depreciation. Assuming a similar pattern going forward, this means only 30 to 40 percent of all new investments will be added to Canada’s capital stock.

Figure 10: 2018 stock of infrastructure and real estate¹⁴



Sources: Statistics Canada and Deloitte calculations.

12. While statistics shown in nominal terms capture the monetary value of an item at any given period, real term measurements are adjusted for inflation and are used to track actual changes in volumes regardless of price fluctuations.

13. See appendix A for a detailed list of the structures included under each sub-category as defined by Statistics Canada.

14. For a definition of what constitutes residential construction, non-residential buildings, and engineering construction, see Appendix A.

Is this number large enough to meet Canada's current infrastructure needs? Probably not. As we invest in the next generation of infrastructure in Canada, what do we need and want to build? To date, there have been myriad attempts to quantify Canada's so-called "infrastructure gap" – which is essentially an attempt to measure the extent to which our past investments have fallen short of optimal levels, creating an investment shortfall. The problem with this approach is that the definitions and estimates of such a gap vary considerably depending on the segment examined and assumptions being made.

In 2013, for instance, the Canada West Foundation estimated the accumulated infrastructure deficit at \$123 billion, with an additional \$115 billion new infrastructure requirement, bringing the total estimate to \$238 billion.¹⁵ For its part, the Canadian Infrastructure Report Card of 2016 estimated that it would require \$388 billion to replace municipal assets in fair, poor, and very poor condition.¹⁶ Extrapolating from there, the shortfall for all Canadian infrastructure assets comes to more than \$683 billion.

No matter which source is ultimately correct, one thing is clear: a gap exists and additional investment will be required. Herein we are ultimately not attempting to answer the question of how much additional investment is needed to "bridge the gap". Instead, we ask a different questions: what will be needed simply to maintain our current standards of living in the years to come? How might infrastructure prevent and respond to shocks such as those posed by COVID-19 or those expected due to the impacts of climate change? We also lay the foundation for far more aspirational questions as well, like: what might we need to improve upon our current standards of living in a future rife with change?

15. Canada West Foundation, February 6, 2013. "At the Intersection: The Case for Sustained and Strategic Public Infrastructure Investment." <https://cwf.ca/research/publications/at-the-intersection-the-case-for-sustained-and-strategic-public-infrastructure-investment/>

16. Canadian Journal of Civil Engineering, February 6, 2017. "Infrastructure Crisis – A Proposed National Infrastructure Policy for Canada," by Saeed Mirza and M. Shafqat Ali. <https://tspace.library.utoronto.ca/bitstream/1807/77688/1/cjce-2016-0468.pdf>

Looking Forward

Assessing our future capital requirements

While it's interesting to look back at our past investments, the real issue for policymakers, business leaders, and the public is how prepared we are to meet future infrastructure needs through 2067. To make this calculation, we decided to start at the end goal—by determining how much investment Canada needs to remain prosperous, rather than assessing what our prosperity will look like if we stay on our current investment path.

Remaining prosperous depends on the pace of our economic growth. To measure investment needs, Deloitte examined two economic factors: labour force growth (how many workers we will have) and a sustainable level of productivity growth. Combined, labour force growth and productivity growth allow us to estimate the rate at which our economy can grow sustainably in the years to come, and thus the amount of infrastructure that will be needed to support that growth.

Our assumptions for the baseline growth scenario project an annual labour force growth rate of 0.7 percent to 2067.

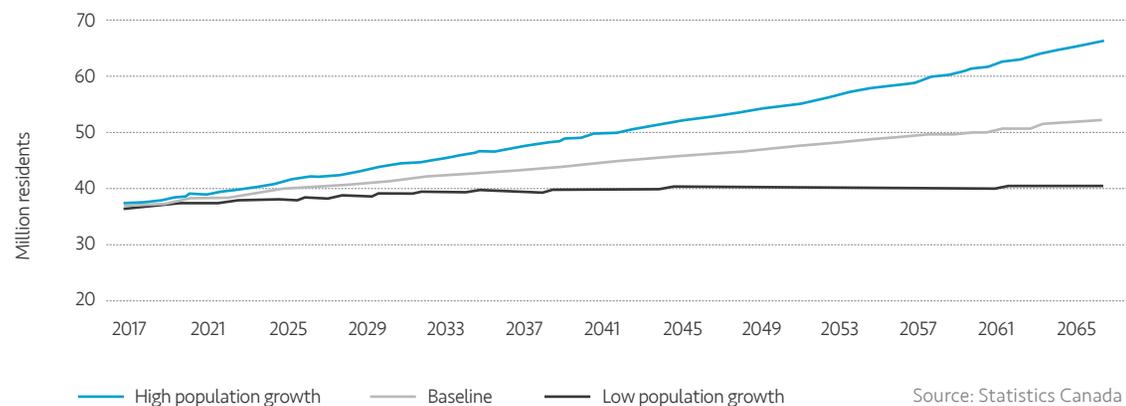
Labour Force Growth

Forecasting labour force growth starts by considering Canada's population growth rate, which is based on both demographic projections and immigration targets. According to Statistics Canada, there are three likely population growth scenarios (*Figure 11*):

- In the high-growth scenario, higher fertility and immigration rates result in higher birth rates.
- In the baseline-growth scenario, which underpins our current projections, the fertility rate per woman will reach 1.67 births in 2022 and stay constant after that, while the national immigration rate will oscillate in the range of 0.8 percent.
- In the low-growth scenario, lower fertility and immigration rates result in a lower national birth rate.



Figure 11: Three population growth scenarios



Productivity Growth

Because labour productivity growth helps drive the economy's pace of growth, it's strongly linked to the country's GDP. According to numerous economists, think tanks, and the Bank of Canada, the country's GDP is expected to rise by between 1.5 percent and 1.9 percent per year. Deloitte Economic Advisory's projection falls in the middle of that range – at 1.7 percent. We use these figures to project high-, baseline-, and low-growth scenarios of the required amount of capital needed per worker.

The Bottom Line

As our population and economy grow, the country's need for real estate and infrastructure investment will expand apace. Based on our labour force and productivity growth projections, we estimate that Canada will need between \$11 trillion and \$22 trillion by 2067 to meet our burgeoning requirements for infrastructure and real estate, respectively. (Note: for additional detail into our calculations, please refer to Appendix B.)

The range is the result of the spectrum of outcomes that can be expected given our different population growth and investment per worker scenarios. Here's how the numbers break down (Figure 12):

On an annual basis, this means that combined public and private sector infrastructure investments will need to rise from the \$309 billion spent in 2018 to \$481 billion in 2067.¹⁷ And that's assuming the baseline population growth scenario applies. In a higher population growth scenario, the necessary investment will go up.

Let's do the Math

After looking back at Canada's past investments, we determined that our country's capital stock was \$4.5 trillion in 2018. Looking forward, we found that we'll need between \$11 trillion to \$22 trillion of additional investment by 2067 simply to maintain our standard of living. But that's not all. Of this projected \$11 trillion to \$22 trillion investment, 60 to 70 percent will go towards replacing infrastructure and real estate that has experienced capital depreciation or been demolished. Turned around, this means only 30 to 40 percent of those investments will be added to Canada's capital stock.

Canada will need between \$11 trillion to \$22 trillion of infrastructure investment by 2067.

As a result, Canada's real capital stock will only rise by between \$3.3 trillion (based on our low estimate of \$11 trillion of investment) and \$8.8 trillion (based on our high estimate of \$22 trillion of investment). This makes the mid-point estimate \$6 trillion. Think about it: although it took Canada 150 years to reach a capital stock of \$4.5 trillion, we now need to at least double or even triple that value in the next 50 years. No matter which way you cut it, the prospect is daunting.

While we know the total dollar amounts that will be needed, we do not have a roadmap for how to generate the immense amounts of investment suggested above. However, these calculations do provide us with a base of information to spark much-needed discussion about our future infrastructure requirements. We look at some of those key considerations in the next section.

Figure 12: Baseline investment projection, 2018 to 2067

| Aggregate Investments over 49 years | | Trillion C\$ |
|---|--|--------------|
| Low  | Non-residential + Engineering Structures | 10 |
| | Residential Construction | 1 |
| | Total | 11 |
| Baseline  | Non-residential + Engineering Structures | 13 |
| | Residential Construction | 4 |
| | Total | 17 |
| High  | Non-residential + Engineering Structures | 15 |
| | Residential Construction | 7 |
| | Total | 22 |

Source: Deloitte estimates

17. Annual investment in Canadian dollars expressed in billions of real 2018 dollars.

Our Urban Futures: Canada's Aging Assets and Investment Imperative Ahead

2018

2067

Canada's capital stock as a result of over 150 years of development

\$4.5
trillion

We need **\$11 trillion – \$22 trillion** of infrastructure investment over the next 50 years

It will increase our capital stock by **\$3.3 to \$8.8 trillion.**

30-40%

60-70% of the investment dedicated to replacement and renewal

Total annual infrastructure investment in 2018

\$309
billion

Total annual infrastructure investment in 2067.

\$481
billion

Private sector stock

\$1.4
trillion

75%

Public sector stock

What needs to change in infrastructure investment and planning to enable flourishing communities that improve our quality of life, sustainability, and resilience?



Something to Talk About

Key considerations for cross-sectoral stakeholders and residents

While it's clearly important to calculate our future capital requirements, it's only the first step on the road towards sustainable economic prosperity. A critical next step is for cross-sectoral stakeholders including businesses, government, civil society and residents to engage in conversation to discuss how we plan to meet our investment needs. In doing so, each stakeholder must be prepared to address several key questions. Our aim here is to pose just some of the questions that will help define our way forward.

How will we work together to raise the capital required to expand our infrastructure investments?

To gain the impetus to invest \$11 trillion to \$22 trillion between now and 2067, public and private sector leaders will need to work together to better understand how a widening infrastructure and real estate gap can negatively impact Canada's economic prosperity and our standard of living. This calls for increased public-private collaborations that bring together a wide range of stakeholders – such as developers, investors, urban planners, academics and think tanks, and representatives from every level of government. Business leaders and governments must also collaborate to determine how to close any funding shortfalls that arise due to competing demands for government dollars.

Pre-COVID, the assessment was that if the economy expanded in line with the projections, it would generate sufficient income for business investment and household real estate purchases. It would also provide governments with the fiscal revenues they need to make capital investments. The key at that point is to ensure that governments and businesses are prepared to make infrastructure and real estate outlays a priority – and that bears talking about.

The COVID-19 pandemic, however, could have a long lasting legacy in the form of dramatically higher government debt. The future fiscal rebalancing could take more than a decade. If so, there is a question of whether governments may be inclined to underinvest in infrastructure and real estate. The implication being that more private sector investment and involvement in areas typically pursued by governments might be needed. Again, a topic for discussion.

Framing Essential Dialogues

- How will we incentivize additional capital spending on Canadian infrastructure, both from Canada and internationally?
- How can we encourage long-term infrastructure spending given short government tenures?



How should we prioritize our investments given the diverse needs our society will face?

Even with the financial capacity to make adequate investments in infrastructure and real estate, there's still a risk that necessary funding will be diverted to other uses. For example, if health care costs continue to balloon, they'll absorb a greater share of provincial finances. Public pressure would likely lead provinces to prioritize health care spending over infrastructure and real estate spending – leading to underinvestment that could weaken our economy. While spending decisions are difficult, cross-sectoral stakeholders should discuss how long-term planning and evidence-informed policymaking might help guide their investment decision-making.

It also makes sense for key stakeholders to proactively identify their investment priorities. For instance, as Canada becomes increasingly urbanized, a high percentage of the anticipated investments will need to be spent in our major urban centres, which have different infrastructure and real estate needs than non-urban areas. According to Statistics Canada, Census Metropolitan Areas (CMAs) – which are large urban areas with a population of at least 100,000 people – will continue to grow rapidly. In fact, 35 of the largest CMAs are expected to constitute more than 80 percent of our country's total future population.¹⁸

In light of these trends, governments, businesses, and residents will need to discuss strategies for managing our mounting reliance on critical assets

such as public transit systems, roads, hospitals, and schools. We'll need to consider ways to expand our cities' affordable housing, senior living, and social infrastructure, while also enhancing their resilience to environmental stresses (e.g., storm water management); we'll need to talk about how to reduce our carbon emissions by investing in additional green infrastructure and real estate – from renewable energy generation and clean energy transportation to green buildings. At the same time, we'll need to consider the role of all these assets in supporting how we live, work and play, while planning for the ways our activities may shift in the next 50 years and beyond.

Framing Essential Dialogues

- What are the key lenses we must apply when prioritizing infrastructure spending?
- How will those lenses differ to take the differing needs of the country's regions into account?
- How can we use infrastructure investments to meet our climate goals?
- How will long-term trends and changes in behaviour (especially urban behaviour) drive different infrastructure decisions?

What must we do to ensure these investments happen?

Rather than speculating about the potential infrastructure and real estate shortfalls our country may face, cross-sectoral stakeholders should focus on how to make these investments happen. This calls for conversations about the steps we must take to generate the required capital, to provide attractive financing costs for infrastructure and real estate projects, and implement regulations that spur productivity.

It also means discussing ways to exceed our 1.7 percent GDP long-term potential growth forecasts. In the early 1990s, for instance, the long-run sustainable rate of growth was around 2.8 percent per year. Perhaps it's time to discuss how we can get back there by improving the labour market outcomes of workers that face barriers – such as women, disabled Canadians, youth, newcomers, indigenous peoples, and others.

Through thought-provoking exercises and the use of foresight tools, stakeholders can begin to get a handle on how to invest more strategically in infrastructure and real estate – which should ultimately enable us to shape initiatives to create responsive, reliable, and future-ready plans for investments across the country.

Framing Essential Dialogues

- What major obstacles are currently hindering and/or slowing infrastructure investment?
- Are current policy models optimally designed to allow us to collaboratively solve our infrastructure challenges?

18. Statistics Canada, February 8, 2017. "Census in Brief: Municipalities in Canada with the largest and fastest-growing populations between 2011 and 2016." <https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016001/98-200-x2016001-eng.cfm>

Preserving Canada's Prosperity

Upward cycle or downward spiral? The choice is ours.

We sit at a crucial time in Canada's global economic competitiveness. We can forecast Canada's capital needs for the years to come, but even small deviations from current spending can have a profound effect in the long term, both positive and negative.

Our current projections are based on the assumption that the economy will grow by 1.7 percent a year. However, if we don't make the necessary infrastructure and real estate investments, economic growth will likely be slower than anticipated – leading to lower household income, reduced business profits and equity values, and less government fiscal capacity to pay for social priorities. With less available resources, capital investment will

continue to fall, resulting in a constant downward spiral towards increasingly poor outcomes.

On the flip side, if we manage to turn this around by enhancing labour productivity and adopting regulations designed to drive business growth, we could unlock the potential of workers. This, in turn, would lead to greater demand for more infrastructure and real estate. The upshot? Just as there is a negative downward spiral that stems from underinvestment, there is a positive upward cycle that would result from stronger economic growth. This report reflects just one potential prosperous future where our investments total \$11 trillion to \$22 trillion. With greater and more strategic investment in future-

focused infrastructure and real estate, however, we can actually accelerate this upward cycle and spur the improved economic and social outcomes we seek.

This is the aspiration, but we'll only reach these lofty goals if we come together to candidly wrestle with the most difficult questions. The need of the hour is to identify big ideas that will not only advance Canada's prosperity, but also enhance the sustainability and resilience of our cities. By laying the groundwork today, Canada can realize exponential growth as we crest into the next 50 years. Let's engage in the courageous conversations that need to take place if we hope to build a strong, sustainable, and resilient ecosystem for future generations.



Appendix A

Here's how Statistics Canada defines residential construction, non-residential buildings, and engineering construction:

| Building Constructions | | Engineering Constructions |
|--|--|---|
| Residential | Non-residential | |
| <ul style="list-style-type: none"> • Apartments and row houses • Single-detached houses • Other residential buildings | <ul style="list-style-type: none"> • Institutional building construction • Office buildings • Industrial building construction (included plants for manufacturing, processing and assembling goods) • Schools, colleges, universities and other educational buildings • Shopping centres, plazas, malls and stores • Hospitals, health centres, clinics and other health care buildings • Other non-residential buildings | <ul style="list-style-type: none"> • Oil and gas engineering construction • Transportation engineering construction • Electric power engineering construction • Mining engineering construction • Highways, roads and streets • Other engineering constructions |

Appendix B

Projections

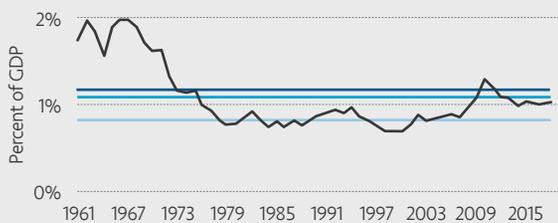
The projections for **public non-residential infrastructure** and **real estate investment** are based on the historical relationship between actual investment and GDP. Knowing the historical values, we determine the share of investments relative to GDP from 2018 to 1961. Looking over the total range of historical data, we identify the average share of investment relative to GDP (baseline scenario), as well as the share in the 25th percentile (low scenario) and the 75th percentile (high scenario). We assume that these shares for each scenario hold constant to 2067.

This resulted in public non-residential GDP shares of 0.8% (low), 1.1% (baseline), and 1.2% (high) and engineering structures shares of 1.1% (low), 1.4% (baseline), and 1.7% (high):

Investment in Engineering Structures

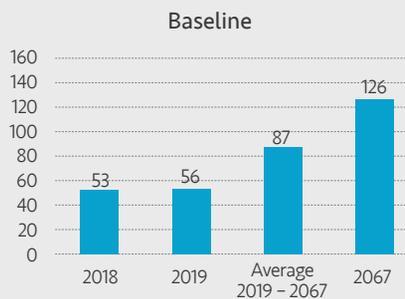
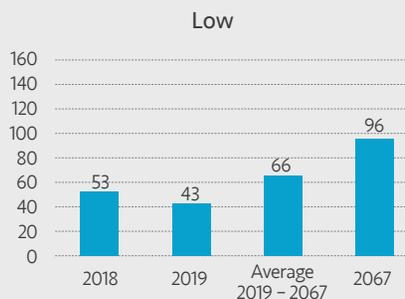


Investment in Non-residential Buildings



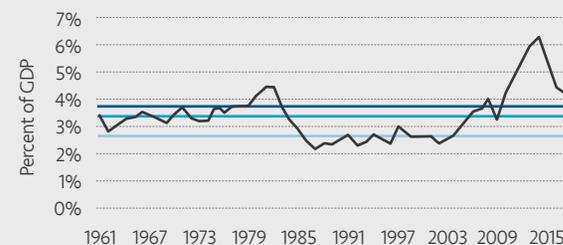
To determine future investment levels, we apply these shares to forecasted GDP based on the assumption of a stable equilibrium real GDP growth averaging 1.7% over the forecast horizon. This results in the following projections:

Public Investment in Non-residential and Engineering Structures
(In 2018 Billion, C\$)

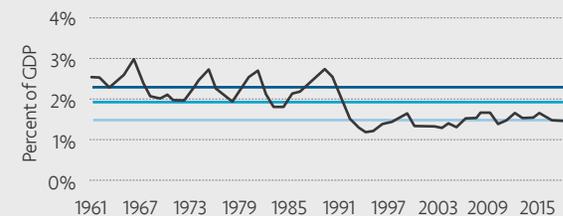


The same process was also used to determine **private non-residential infrastructure** and **real estate investment**. This resulted in private non-residential GDP shares of 1.5% (low), 1.9% (baseline), and 2.3% (high) and engineering structures shares of 2.7% (low), 3.4% (baseline), and 3.7% (high):

Investment in Engineering Structures



Investment in Non-residential Buildings



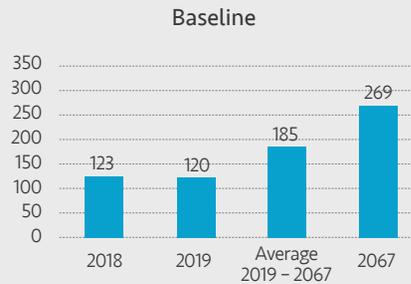
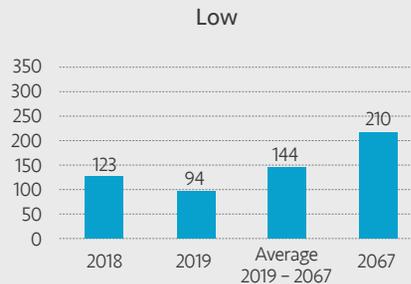
— Actual — High Projection — Baseline — Low Projection

— Actual — High Projection — Baseline — Low Projection

Applying these shares to the GDP forecast, we get the following projections:

Private Investment in Non-residential Infrastructure and Real Estate

(In 2018 Billion, C\$)



By combining public and private investment in both non-residential infrastructure and real estate and using the average investment levels from 2019-2067 as an anchor for annual investment, we aggregate these value 49 years into the future for each of the three scenarios.

Altogether, the total non-residential infrastructure and real estate investment is:

- \$10 trillion in the low scenario
- \$13 trillion in the baseline scenario
- \$15 trillion in the high scenario

Finally, for **residential investment**, we rely on a different approach, which is centered around the three population growth scenarios we outlined earlier in the Looking Forward section. We anchor our residential investment forecast on the assumption that residential investment per new resident will be constant for the entire forecasting period. As depicted below, the projection is based on a return to historical averages after declining from recent highs:

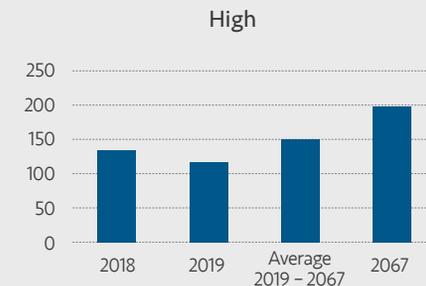
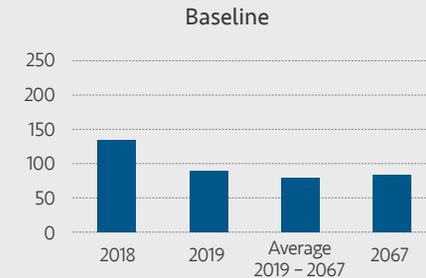
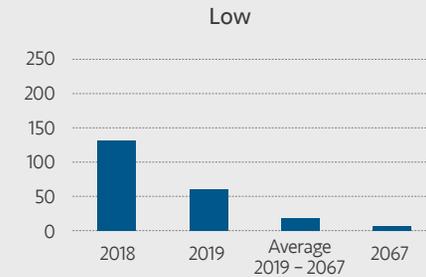
Residential Investment Relative to Population Growth
(Thousand 2012 C\$ per new resident)



As a result, we get the following projections:

Residential Investment

(In 2018 Billion, C\$)



As with non-residential investment, we use the average investment levels from 2019-2067 as an anchor for annual investment to aggregate these value 49 years into the future for each of the three scenarios.

Altogether, residential investment is:

- \$1 trillion in the low scenario
- \$4 trillion in the baseline scenario
- \$7 trillion in the high scenario

When aggregating over the 49 years between now and 2067 we see a range of investments from \$11 to \$22 trillion.

| Aggregate Investments over 49 years | | Trillion C\$ |
|---|--|--------------|
|  | Low | |
| | Non-residential Infrastructure and Real Estate | 10 |
| | Residential Construction | 1 |
| | Total | 11 |
|  | Baseline | |
| | Non-residential Infrastructure and Real Estate | 13 |
| | Residential Construction | 4 |
| | Total | 17 |
|  | High | |
| | Non-residential Infrastructure and Real Estate | 15 |
| | Residential Construction | 7 |
| | Total | 22 |

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