

Operations Practice

Investing in Canada's future: How to get capital spending right

Canada's spending decisions on capital projects and infrastructure, if successful, would set the country on a path to reduce emissions, accelerate toward net zero, and boost economic growth.

by Matthieu Dussud, Éric Gaudet, Piotr Pikul, and Raman Sharma



CA \$200 billion a year: this is the gap between Canada's historical spending prior to 2021 and annual future spending to address aging infrastructure, population growth, and climate resilience goals by 2030. That gap could mean that the country will have to choose, for example, between increasing the number of hospital beds per capita and developing public-transit systems—an area in which cities such as Toronto are already vastly behind.¹ And, according to our analysis, the country's capital-projects ecosystem—policy makers, financiers, project owners, engineering and construction firms (E&Cs), and suppliers—won't be able to easily make up the shortfall.

Canada has prioritized investing in its vast infrastructure network² and deploying some funding to repair and modernize transit, utility, and other infrastructure through efforts such as the Investing in Canada Plan.³ But significant, competing priorities still remain when it comes to securing enough capital to maintain a thriving economy while addressing climate change, global shortages in natural resources, volatile capital markets, inflation, global geopolitical tensions, and an economy still reeling from the fallout of the COVID-19 pandemic.

Canada's emissions goals and infrastructure development will need to overcome currently low levels of private investment; misaligned incentives, insufficient project setup time, and prolonged licensing and permitting; stagnant construction productivity; a looming trade labor shortage; market uncertainty; and supply chain disruptions. Fortunately, the path is clear, and the obstacles are known.

Keeping pace with the country's ambitions and needs will require Canadian capital-projects and infrastructure leaders to reimagine how capital is deployed. They can address deficient areas by assessing and managing risk transparently and efficiently; bolstering workforce readiness, stakeholder collaboration, and productivity; and strengthening the resilience of the supply chain through local manufacturers.

The role of capital projects in Canada's economic growth and the path to reduce emissions

According to McKinsey analysis, achieving Canada's ambitions will call for an investment of CA \$200 billion annually above and beyond current anticipated spending by 2030—almost 50 percent

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¹ Detlev Mohr, Vadim Pokotilo, and Jonathan Woetzel, *Urban transportation systems of 25 global cities*, McKinsey, July 2021.

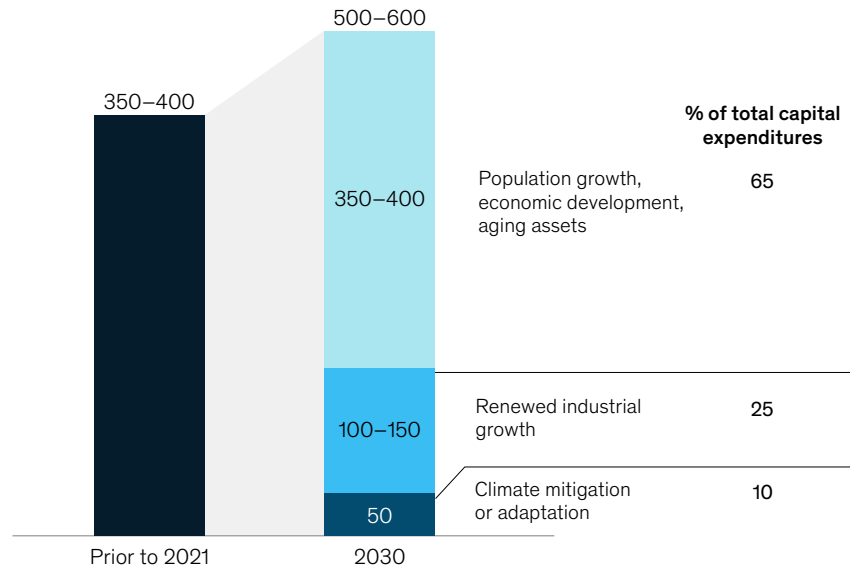
² "Funding delivered under the investing in Canada plan," Government of Canada, June 24, 2022.

³ "Investing in Canada plan – Building a better Canada," Government of Canada, June 24, 2022.

Exhibit 1

Canada’s investment imperative can be illustrated through the estimated capital expenditure needed by 2030.

Estimated annual capital expenditure required by 2030, CA \$ billions



Source: McKinsey infrastructure projects analytics tool (IPAT); Statistics Canada; McKinsey analysis

more than what it currently spends on capital projects and infrastructure (Exhibit 1). We estimate that 60 percent of this investment will support population growth, economic development, and aging assets; 30 percent will go toward renewing the country’s industrial growth; and the remaining 10 percent go to green infrastructure development. (For a brief methodology of our analysis, see sidebar, “About the analysis.”)

Supporting Canada’s people and economic development

A large portion of Canada’s infrastructure was built in the 1950s to 1970s, and an estimated 30 to 40 percent of assets across different categories (such as transportation and water) require replacement

or significant repairs.⁴ Moreover, in some crucial areas—such as public transit and housing—existing infrastructure is not enough to serve the current population. For example, the greater Toronto area’s six million residents get around on just four subway lines.

The housing market is tight across the country: Canada has 10 to 15 percent fewer homes per capita than other countries in the Organisation for Economic Co-operation and Development (OECD) and the European Union.⁵ What’s more, Canada’s population grew at almost twice the pace of other G-7 countries from 2017 to 2021, a growth rate driven by immigration.⁶ The population is also aging, meaning capital investment in healthcare facilities will also need to increase.⁷ All this means that shoring up the

⁴ “Canada’s core public infrastructure survey,” Government of Canada, August 4, 2022; *Canada infrastructure report card 2019*, Canada Infrastructure, 2019.

⁵ OECD Affordable Housing Database, OECD, 2020.

⁶ “Canada tops G7 growth despite COVID,” Statistics Canada, February 9, 2022.

⁷ It is estimated that on average about 5 to 10 percent of facilities would need to be replaced or refurbished and that there needs to be an increase from 2.5 beds per capita to 3.0 to 4.0 beds per capita, which was Canada’s hospital density in early 2000s.

About the analysis

In June 2021, the Canadian Net-Zero Emission Accountability Act became law and demonstrated the government's commitment to achieving net-zero emissions by 2050. Our estimates of Canada's annual capital expenditure needs are based on a 16-month assessment of sector- and economy-wide pathways to achieving Canada's commitment, including data from and interviews with more than 30 of Canada's leading companies. This

analysis includes a comprehensive view of market size, capital requirements, implications for consumers, and sector-level essentials to meeting net-zero targets in Canada.

The analysis also employed McKinsey's Infrastructure Spend and Stock database to conduct a comprehensive assessment of Canada's infrastructure requirements over the next ten years based on historical

infrastructure spending patterns, current state of play across major asset classes (such as transportation, utilities, and social infrastructure), and future spending needs by asset class based on growth ambitions. Specifically, this analysis compares and benchmarks Canada's baseline infrastructure spending and stock against comparable developed countries to determine potential gaps in infrastructure requirements across different asset types.

country's infrastructure will be vital to supporting population growth and economic development.

Reaching 2030 emissions targets

While leaders in most industries now overwhelmingly accept the need to reduce greenhouse-gas (GHG) emissions,⁸ the investment required to meet Canada's GHG emissions target is staggering—CA \$50 billion a year.

Our analysis shows most of this investment will go toward abatement in the power sector, followed by oil and gas, transportation, and buildings (Exhibit 2). The Federation of Canadian Municipalities and the Insurance Bureau of Canada found that the country will also need to find an additional CA \$5 billion to CA \$6 billion a year to adapt its infrastructure to withstand the devastation of wildfires, flooding, and other negative effects of climate change.

Canada's structural challenges

The Canadian capital ecosystem—which includes policy makers, financiers, project owners, engineering and construction firms (E&Cs), and suppliers—isn't well positioned to deliver the capital to meet structural challenges. Historically, the performance of many capital projects has been affected by large cost overruns and schedule delays.⁹ The country is also currently facing labor shortages, a lack of private capital, and supply chain challenges.

Yet failing to meet economic-growth targets and emissions targets for the 2030 goal could translate into CA \$450 billion to CA \$600 billion of cumulative missed GDP growth¹⁰ and require another 700,000 to one million jobs (including construction) alone by the end of the decade. The impact on GDP and jobs could be even greater if we look beyond construction at areas such as positions created by operating new environmental assets.

⁸ *The net-zero transition: What it would cost, what it could bring*, McKinsey, January 2022.

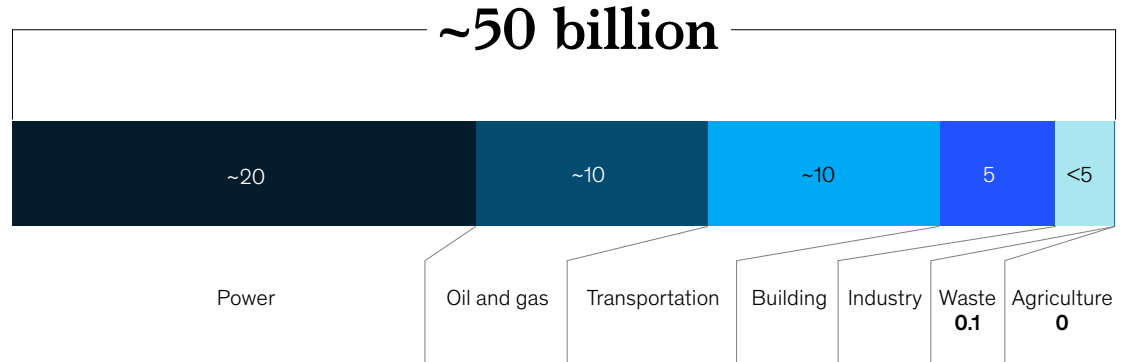
⁹ For more, see "Why the time is right to reinvent capital-project delivery," McKinsey, December 3, 2020.

¹⁰ GDP impact would be even greater when accounting for cascading operations and macroeconomics impact resulting from capital-projects development.

Exhibit 2

The road to 2030 emissions targets is costly.

2022–30 average annual investment toward 2030 emissions reduction goals, CA \$ billions



Source: Statistics Canada; McKinsey analysis

What are the barriers to reimagining how Canada deploys capital?

Low levels of private investment

Canada currently spends the equivalent of about 3 percent of its GDP on transportation (rail, roads, ports, and airports) and utility infrastructure (power, water, and telecommunications). And despite significant investment in the past decade, Canada's transportation and utility infrastructure asset-to-GDP ratio of 67 percent is still lower than the global average of 71 percent.¹¹ To address this gap by 2030, Canada's spending would increase by CA \$10 billion annually on transportation and utility infrastructure, as well as another CA \$50 billion in annual investment into projects to reduce GHG emissions.

There has recently been a surge of investment across capital programs and projects such as the Universal Broadband Fund, Indigenous Infrastructure projects, and the Canada Infrastructure Plan, driven by more than

CA \$180 billion in federal funding from the Government of Canada and innovative financing mechanisms from Canada Infrastructure Bank. However, given the volume and pace in which capital needs to be deployed over the next five to ten years, additional funds will be required. Contributions from the private sector will likely need to increase, especially if Canadians remain divided on whether to pay for the country's GHG emission goals.¹² Rising interest rates will also make it more costly for project owners to borrow, reducing access to low-cost financing alternatives. Policy and regulatory interventions will strengthen the case for private-capital investment in GHG emissions reduction projects.

Misaligned incentives, insufficient project setup time, and prolonged licensing and permitting

Multiple McKinsey surveys and analyses of major projects' preconstruction practices identified three takeaways for how Canada's capital ecosystem can optimize spending.

¹¹ McKinsey Infrastructure Spend and Stock (ISS) Database.

¹² A recent survey paints a divided picture, with only a slight majority of Canadians willing to pay to reduce emissions. In addition, the Canadian government launched a participation campaign to answer the willingness-to-pay question (among others) for the country's future public transport system. For more, see "Slim majority show some willingness to pay more to help achieve Canada's emission reduction targets," Nanos Research, September 2021; "Government of Canada launches consultations on establishing permanent public transit funding," Intelligent Transport, August 3, 2022.

The number-one reason cited for project performance issues, our analysis shows, is misaligned contract incentives between owners and E&Cs. According to McKinsey analysis of 200 projects, additional collaboration may avoid up to 7 percent of cost overruns, according to McKinsey analysis.

Second, the project setup phase is often overlooked: corners are cut to rush projects to investment decision, and project owners miss the last opportunity to thoroughly define and optimize a project's business case, rigorously plan for execution, and build a strong, integrated team. In our experience, this combination can lead to an average value erosion during execution of 10 to 20 percent.

And third, there is significant potential for shortening the lead times for licensing and permitting required before capital project construction and execution. Here, Canada ranks at only 32 out of 33 in OECD countries, according to the World Bank.¹³ Compared with other G-7 and G-20 members, Canada comes last. Some capital-intensive industries in particular, such as mining, may be enticed elsewhere.

Stagnant productivity

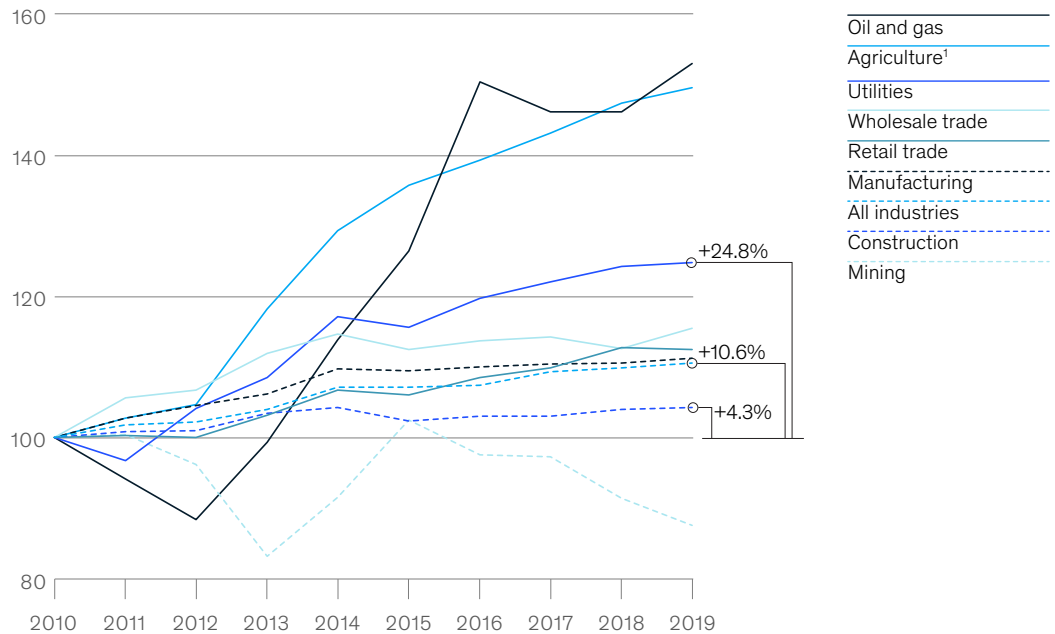
Despite the increase in labor productivity across the Canadian economy from 2015 to 2019, productivity in the country's construction sector stagnated during the same period (Exhibit 3). As a result, the cost and schedule performance of capital projects in Canada has suffered.

Exhibit 3

Canada's construction productivity is stagnating.

Labor productivity by sector for Canada, 2010–19

Real value added per hour (chained 2012) (index: 100 = 2010 values), CA \$



¹Including forestry, fishing, and hunting.
Source: "Labour productivity and related measures by business sector industry and by non-commercial activity consistent with the industry accounts," Statistics Canada, May 20, 2022

¹³ "Infrastructure Sectoral Regulatory Review Roadmap," Infrastructure Canada, Government of Canada, June 7, 2019.

To attract funding for projects that build green infrastructure, strong government procurement programs for clean technologies can help build business cases for investment.

While some labor productivity challenges are driven by structural factors—such as Canada's vast geography, short construction season, and challenging labor structures—many construction firms also struggle with inefficiencies in the day-to-day construction process, coordination, and interactions with engineers and suppliers. Such hurdles may be most problematic in organizations that still use mostly manual processes and have yet to embrace digital productivity tools for systematic process improvements.

Labor shortage

The vacancy rate for construction trade jobs in Canada has almost doubled over the past five years, increasing to more than 63,000 vacancies at the end of 2021, according to Statistics Canada.¹⁴ Project owners and construction leaders are struggling to find and retain specialty-trade contractors—such as masons, painters, electricians, and carpenters—and construction trade laborers, particularly in the Lower Mainland Southwest region of British Columbia and Southern Ontario, including the Greater Toronto Area.¹⁵

If Canada is to deploy an average of \$550 billion to \$600 billion annually in the coming years, our models suggest as many as 700,000 to one million new jobs will need to be created across the capital-projects and infrastructure value chain. At the same time, fewer young people are pursuing careers in construction—the number of bachelor's and master's degrees in civil engineering has remained flat over the past several years¹⁶—and 13 percent of the current construction workforce (more than 150,000 people) is expected to retire by 2027.¹⁷ These three conflicting factors could potentially create one of the most significant labor shortages in the history of the country's industry. This scarcity and competition for labor are further exacerbated by lagging productivity in Canadian construction and significantly increased capital spending on infrastructure in the United States.¹⁸

Market uncertainty and supply chain disruptions

As of February 2023, Canada's industry capital-expenditure indexes reflected what's being felt across all industries: severe cost effects from supply chain disruptions and market uncertainty (Exhibit 4). Over three years, capital costs rose an

¹⁴ "Job vacancies, third quarter 2021," Statistics Canada, December 20, 2021.

¹⁵ Ibid.

¹⁶ Table 325.47: Degrees in chemical, civil, electrical, and mechanical engineering conferred by postsecondary institutions, by level of degree: 1959-60 through 2018-19, *Digest of Education Statistics*, National Center for Education Statistics, September 2019.

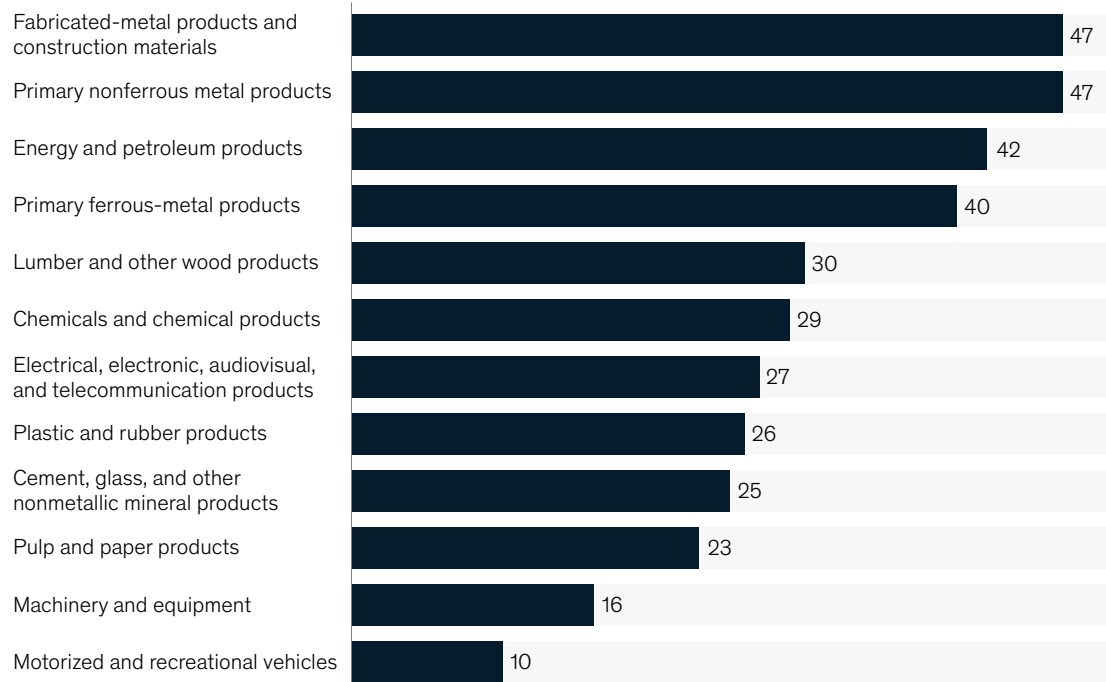
¹⁷ "Near-term rebound and peak retirements create labour force challenges for construction," BuildForce Canada, March 18, 2022.

¹⁸ For more, see "The US Bipartisan Infrastructure Law: Breaking it down," McKinsey, November 12, 2021.

Exhibit 4

Rising capital costs are making projects more expensive.

Industrial product price index, % increase from Jan 2020 to Feb 2023



Source: Statistics Canada

average of about 30 percent, driven by dramatic cost increases in project line items (such as commodities, electricity equipment, and freight) and rising inflation. The cost of lumber increased by 30 percent, while construction materials and fabricated-metal products increased by 47 percent during the same period. In addition to these supply chain disruptions, some construction sites are sitting idle waiting for excavators, cranes, and other construction equipment that is currently in high demand. Construction firms and contractors are struggling to keep up, creating a growing backlog of projects and limited room for growth.

Canada's path forward

To facilitate the deployment of capital required to meet Canada's economic growth targets and stay

on path to achieve 2030 emissions targets, the capital-projects and infrastructure ecosystem, including key policy makers, could reimagine the way capital is deployed and take coordinated action across the value chain to address five key areas:

- **Increase private-capital investment in infrastructure by managing market uncertainty, risk allocation, and appropriate policy development.** In addition to building a pipeline of economically bankable projects with long-term revenue streams and lower costs, it will be increasingly important to balance financial risk between sources of private capital and public authorities to attract more private capital. Public-private partnership projects have faced several challenges in this vein, specifically

regarding risk allocation between sectors and disputes about claims, which has led to reduced appetite and increased apprehension from the private sector. As such, investors should have a transparent view of the infrastructure project pipeline across all sectors as industry leaders streamline and standardize financing, funding, and regulatory processes.

Moreover, to attract funding for projects that build green infrastructure, strong government procurement programs for clean technologies can help build business cases for investment. “Pull” interventions, such as tax breaks, subsidies, or direct funding, can accelerate activities through capital, while “push” interventions can catalyze change through regulations. Both interventions will be necessary.

- ***Build more collaborative project ecosystems to drive end-to-end value and set projects up for success.*** Project owners can mitigate execution challenges by creating systematic, thorough readiness assessments before making investment decisions. For example, they could implement systematic and holistic strategies to improve project value; optimize capital and operating expenditures; and design partnership models to improve co-development, joint problem resolution, and risk sharing. Strong, cohesive teams are also required to underpin projects, with owners fostering transparent communication and end-to-end accountability from day one—all supported by rigorous project management.
- ***Accelerate engineering and construction productivity significantly by reimagining delivery models in the field.*** To address engineering and construction productivity, project leaders could invest in lean

construction practices at scale and consider project production management to improve performance. They could also use the latest available data and analytics solutions to gain real-time transparency on productivity and allow quick resolution of execution issues. Moreover, they could increase the use of prefabrication and modularization and leverage automation and drones.

- ***Build workforce readiness and adaptability for future skills.*** This requires a multifaceted approach. Not only should leaders address barriers that are prohibiting the workforce from joining the construction industry (such as inflexible work hours, lack of gender parity,¹⁹ and a lack of competitive benefits), they should also reimagine how to attract, secure, and retain talent and expand the talent pool through diversity and inclusion policies. Once skilled workers are in place, leaders could use data and advanced analytics to better understand workforce requirements in the Canadian construction sector and inform talent management strategies. These efforts can encourage continuous learning to increase flexibility and mobility.
- ***Strengthen the resilience and reliability of the supply chain.*** Leaders can build resilience in sourcing of materials and supply by developing and contracting local manufacturers, diversifying their vendor exposure, and using better technology to predict prices and potential risks in the supply chain. They can also proactively reduce cost exposure and commodity fluctuation during the procurement process by fully analyzing and comprehending a project’s risk exposure and then adjusting goals and strategies accordingly. For policy makers, strengthening supply chain resilience and minimizing the

¹⁹ For more, see Donatella Bellone, Layan Kutob, Jillian Noel, and Giulia Siccardo, “Empowering talent: Women in energy, resources, and infrastructure,” McKinsey, December 1, 2019.

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impact from geopolitical shocks require appropriate regulatory incentives to enable nearshoring with trade partners and to bolster domestic businesses.

The Canadian capital-projects and infrastructure ecosystem is faced with a once-in-a-generation challenge and cannot look away—there's simply too much at stake. Thoughtful implementation of the five key approaches described above can help the country close the gap between current and projected spending needs to improve infrastructure and reduce GHG emissions.

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